SUBJECT CODE:17CVSE57

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE - MUNICPAL SOLID WASTE MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   List out the types of solid wastes.
2   Write about On-site handling methods.
3   Define of Non-Biodegradable waste.
4   What is meant by Collection route?
5   Define districting.
6   Define compaction ratio.
7   What are the Landfill types?
8   How do minimize the harmful impact from solid waste by using landfill Techniques?
9   What is centralized sorting.
10   Give the disadvantages of an incinerator?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain the Solid Waste Characteristics.
OR
   b.   Explain briefly effective management of solid waste.

12 a.   Explain resource recovery through material recycling.
OR
   b.   Explain the On-Site Handling of Solid Waste.

13 a.   Explain on site storage methods
OR
   b.   Write about Planning of Solid Waste Collection Program

14 a.   What role played Collection equipment in MSWM.
OR
   b.   Explain the types solid waste collection service

15 a.   Describe the magnetic separation method with neat sketch.
OR
   b.   Explain about purpose of processing techniques   p.t.o

16 a.   Explain briefly about fully mechanized composting process with neat sketch

OR

b.   Explain Pyrolysis process.

17 a.   Explain hammer mill technique

OR

b.   Explain the incineration process.

18 a.   Draw the Landfill design

OR

b.   Explain the life cycle of a landfill

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Explain the Improper handling of wastes.

OR

b.   What is hazardous waste? Explain their types with examples

20 a.   Write shortly about Moisture Content Character and Value of the Compost

OR

b.   Explain the leachate collection and treatment and life cycle

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE-DISASTER MITIGATION AND MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define Risk.
2   Define Mining.
3   Define Prevention
4   Define Mitigation
5   What is disaster information network?
6   What is NDMP.
7   Write short notes about Physical Vulnerability.
8   Write two types of tsunami Warning
9   Write short notes about Emergency Services.
10   Write the challenges involved in quick reconstruction

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Describe cyclone and explain causes of cyclone.

OR

   b.   Describe the levels of Disaster

12 a.   Identify the three major mitigation measures to reduce earthquake risk

OR

   b.   Describe about the preparedness in development planning on disaster.

13 a.   List the objectives of National Disaster Management Plan.

OR

   b.   Explain the techniques for reducing oil fire.

14 a.   Write an account on different approaches to disaster management and relation with human ecology.

OR

   b.   Explain in detail about vulnerability of any four types of disasters

15 a. Discuss in detail on categories of vulnerability.

OR

 b. Write brief note on hazards assessment method

16 a. Explain the Major tasks during the disaster.

OR

 b. Explain Volcanism and discuss the causes and effects.

17 a. Explain
 a) National Disaster Mitigation Fund
 b) Disaster Response Plan.

OR

 b.   Explain about the Maintaining and updating the plan in detail.

18 a. Explain briefly about the region/areas involving multiple states requiring special attention.

OR

 b. Explain briefly provisions in the Act for Disaster Risk Reduction.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain the natural and man-made hazards in detail.

OR

 b. What are the steps for formulating a disaster risk reduction plan? Explain.

20 a. Discuss about under flooding risk mitigation in detail.

OR

 b. Explain the Minimum standards of Relief in detail.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

CONSTRUCTION PLANNING AND SCHEDULING

Time : Three Hours   Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

1   What is meant by construction planning?

2   What is the principle of Planning?

3   What do you understand by job shop scheduling?

4   What are the advantages of coding system?

5   Briefly explain the methods of estimation of activity duration in a construction project and their limitations.

6   Difference between CPM and PERT

7   What are the fragnets?

8   Define cost control.

9   Write about Project Budget.

10   What is the scope of Quality Control?

## Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.   Find the critical path and project duration of the given CPM project. Also calculate EST, EFT, LST, LFT and TF, FF in a tabular form.
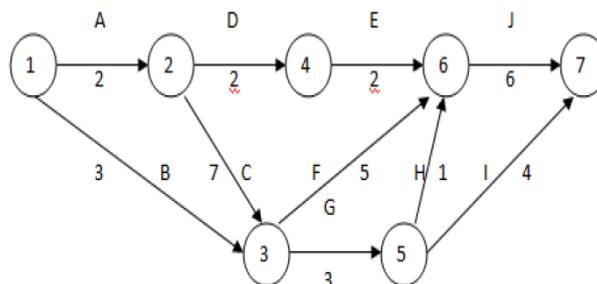
OR

b. For the given PERT network, determine
   A. Expected time, standard deviation and variance of Project.
   B. show the critical path

The three time estimates of each activity are mentioned on the network.
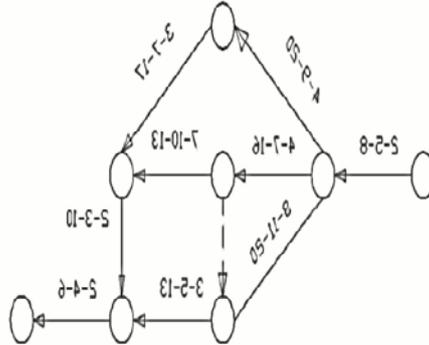
12 a. Explain how to update schedule budget in project.

OR

b. Explain how to control the schedules in project.

13 a. Discuss some of the safety requirements of construction Industry.

OR

b. Explain Quality control and safety during construction.

14 a. Explain the different causes of occupational health hazards.

OR

b. Explain Total Quality Management in detail.

15 a. Explain software tools.

OR

b. Write note on "problems in implementing PIMS"

16 a. Write advantages of Data base approach to the contractor.

OR

b. Explain different methods of scheduling.

17 a. Explain Scheduling with Resource Constraints and Precedence.

OR

b. Explain cash flow control in detail .

(P.T.O)

SL.NO:1364

18 a. Explain Financial accounting systems and cost accounts.

OR

b. Explain the Indian construction industry requies a comprehensive legislation for the safety.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Define crashing of activities, rules for crashing and draw the corresponding graphs and explain direct cost, indirect cost(overhead cost), crashing cost and total cost.

OR

b. Describe the cash flow statement for a contractor company for residential project showing the various inflow and outflow components for 6 months duration.

20 a. Describe the quality assurance techniques.

OR

b.
Design an organization chart for the medium size construction company and explain it briefly.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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CIVIL ENGINEERING

MECHANICS OF FLUIDS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define Kinematic Viscosity

2   Define the term Turbulent flow

3   Define streak line.
4   Give the Euler's formula.
5   Write about frictional loss in pipe flow.

6   How do you calculate the major losses in pipe flow?
7   Define the term incompressible flow

8   Write a short note on similitude.

9   Differentiate between kinematic viscosity and dynamic viscosity.

10   Sketch the shear stress and velocity distributions across a section in circular pipe.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   If the velocity profile of a fluid over a plate is a parabolic with the vertex 20 cm from the plate, where the velocity is 120 cm/sec. Calculate the velocity gradients and shear stress at a distance of 0, 10 and 20 cm from the plate, if the viscosity of the fluid is 8.5 poise.

OR

b.   Analyze the differences in one, two and three dimensional flows.

12 a.   A horizontal pipe line 40m long is connected to a water tank at one end and discharges freely into the atmosphere at the other end. For the first 25m of its length from the tank, the pipe is 150mm diameter is suddenly enlarged to 300mm. the height of water level in the tank is 8m above the centre of the pipe. Considering all losses of head which occur. Determine the rate of flow. Take f = 0.01 for both sections of the pipe.

OR

b.   A Ship is 300m long moves in sea water, whose density is 1030 kg/m^3, A 1:100 model of this to be tested in a wind tunnel. The velocity of air in the wind tunnel around the model is 30m/s and the resistance of the model is 60N. Determine the velocity of ship in sea water and also the resistance of the ship in sea water. The density of air is given as 1.24 kg/m^3. Take the kinematic viscosity of sea water and air as 0.012 stokes and 0.018 stokes respectively.

13 a. Discuss about separation of boundary layer.

OR

b. Derive the expression for loss of head due to sudden contraction in pipes.

14 a. Write in detail about Reynolds Experiment.

OR

b. Explain their types of manometer and application.

15 a. Explain in detail the classifications of fluid flow

OR

b. Derive the continuity equation in three dimensions?

16 a. Derive the Euler's Equation of motion.

OR

b. Derive an expression for loss of head due to friction in pipes.

17 a. Explain in Detail about the working principle of Orifice Meter.

OR

b. Explain in detail about the devices used to measure the practical applications of bernoulli's equation.

18 a. Explain in detail about loss of head due to bend in pipe.

OR

b. Explain about weber model law.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. A 25 cm diameter pipe carries oil of Sp.gr 0.9 at a velocity of 3m/s. At another section the diameter is 20 cm. find the velocity at this section and also mass rate of flow of oil.

OR

b. Examine whether the flowing velocity components represent a physically possible flow? $u_r = r \sin \Theta$, $u_\Theta = 2r \cos \Theta$.

20 a. A pitot tube is inserted in a pipe of 300mm diameter. The static pressure in pipe is 100mm of mercury (vacuum). The stagnation pressure at the centre of the pipe, recorded by the pitot tube is 0.91 N/cm^2. Calculate the rate of flow of water through pipe, if the mean velocity of flow is 0.85 times the critical velocity. Take $C_v = 0.98$.

OR

b. Find the loss of head when a pipe of diameter 200mm is suddenly enlarged to a diameter of 400mm. The rate of flow of water through the pipe is 250 liters/s.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

DESIGN   OF STEEL STRUCTURES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Classify the types of bolts used for structural purposes.
2   What is lug angle?
3   What is meant by built-up compression members?
4   What is meant by slenderness sections?
5   What are the types of load that may act on roof trusses?
6   Discuss the factors to be considered in mechanical properties of structural steel?
7   What are the different modes of failure in tension members?
8   Under what circumstances gusset base is used.
9   What is the main function of providing horizontal stiffener in plate girder?
10   Calculate the permissible deflection for a truss of 10 m span.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   A tension member of a roof truss carries a factor axial tension of 430KN.design the section
        and its connection (a) without using lug angle (b) using lug angles

OR
   b.   Derive the expression for the Economical depth of a plate girder.

12 a.   Discuss in detail about the types of load to be considered for steel design?
OR
   b.   Write in Detail about the types of Rolled Steel Sections.

13 a.   Explain the Different Types of Welded Joints with neat sketch.
OR

   b.   Explain in detail about the step by step procedure for the design of tension member.

14 a. Explain with neat sketch about the tension member splices.

OR

b. Write Briefly about design strength of tension member due to block shear.

15 a. Briefly explain about the shapes of compression member.

OR

b. Define column splices and explain the step by step design procedure to design column splices.

16 a. Explain in detail about Column Bases with neat sketch.

OR

b. Explain about the classification of cross section as per IS 800 - 2007 code.

17 a. Define Built up Beams and explain about the beams subjected to uniaxial bending and beams subjected to biaxial bending.

OR

b. Write in detail about the step by step design procedure to design plate girder.

18 a. Explain in detail about the step by step procedure for design a roof truss.

OR

b. Write briefly about the end bearing in trusses.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Determine the design tensile strength of the plate 160mmX8mm with the holes for 16mm diameter as shown in figure .Steel used is of Fe415 grade quality.

OR
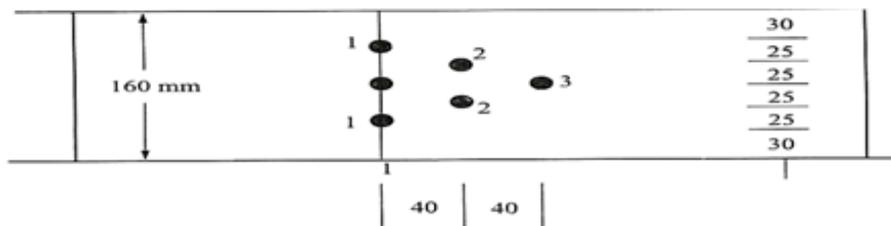
b. Determine the tensile strength of roof truss member 2 ISA9060, 6mm connected to the gusset plate of 8mm plate by 4mm weld as shown in figure. The effective length of weld is 200mm.
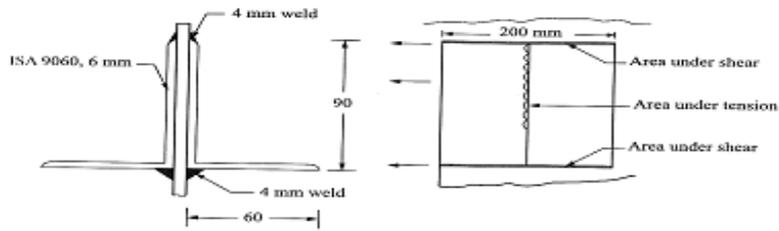
20 a. A simply supported steel joist of 4.0m effective span is laterally supported throughout. If carries a total uniformly distributed load of 40KN(inclusive of self weight).design an appropriate section using steel of grade Fe410.

OR

b. Determine the design bending strength of ISLB 350@486 N/m considering the beam to be laterally supported. the design shear force 'v'is less than design shear strength. Assume steel of grade Fe410.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

APPLIED HYDRAULIC ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

1   Define specific energy
2   What are the conditions of rectangular channel of best section
3   What are the conditions of rectangular channel of most economical section?
4   What is normal slope of an open channel
5   Define impulse turbine.
6   Define propeller turbine.
7   What is the work saved by fitting an air vessel in a single acting, reciprocating pump?
8   Define Chezys formula
9   State the uses of hydraulic jump
10   Explain outward flow radial turbine

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.   Determine the value of Chezy's constant from Manning's formula.
OR
  b.   A 8 m wide Channel conveys 15 cumecs of water at a depth of 1.2 m. Determine
        a. Specific energy of the flowing water Critical depth,
        b. Critical velocity and minimum Specific Energy
        c. Froude number and the weather flow is sub-critical or Super-critical

12 a.   The specific energy for a 5m wide rectangular channel is to be 4 Nm/s. If the rate of the flow
        of water through the channel is 20 m3/s, determine the alternate depths of flow.
OR
  b.   A V – shaped open channel of included angle 90º conveys a discharge of 0.05 m^3/s when the
        depth of flow at the center is 0.225 m. Assuming that C = 50 in the Chezy's equation, calculate
        the slope of the channel.

13 a. Calculate the dimensions of the rectangular cross-section of an open channel which requires minimum area to convey 10 m^3/s. The slope being in 1500. Take the Manning's 'N' as 0.013.

OR

b. An earth channel with a base 3m wide and side slope of 2:1 carries water with a depth of 0.1m. The bed slope is 1in 700. Calculate the discharge, if the value of Chezy's constant is 52.

14 a. A river 100 m wide and 3m deep has an average bed slope of 0.0005. Estimate the length of the GVF profile produced by a low weir which raises the water surface just upstream of it by 1.5 m. Assume N = 0.035. Use direct step method with three steps.

OR

b. In a rectangular channel of 0.5 m width, a hydraulic jump occurs at a point where depth of water flow is 0.15 m and Froude number is 0.5. Determine
a. The specific energy
b. The critical and subsequent depths
c. Loss of head and
d. Energy dissipated.

15 a. A pelton wheel has a mean bucket speed of 10m/s with a jet of water flowing at the rate of 700lits/ses. Under a head of 30m. the buckets deflects the jet through an angle of 160. Calculate the power developed and the efficiency of the turbine. Cv =50.

OR

b. A Kaplan turbine while working under a head of 35 m, develops power of 20000 kW. Assume flow ratio of 0.6, speed ratio of 2, the diameter of boss is 0.35 times the diameter of the assume and overall efficiency is 85%. Find the diameter, speed and specific speed of the turbine.

16 a. The internal diameter of an inward flow reaction turbine is 45 cm. The width of the wheel at inlet is 12 cm and the velocity of flow at inlet is 1.2 /s. Find the rate of the flow passing through the turbine.

OR

b. The impeller of a centrifugal pump has an external diameter of 450 mm and internal diameter of 200 mm. The speed of the pump is 1440 rpm. Assuming a constant radial flow through the impeller at 2.5 m/s and that the vanes at exit are set back at an angle of 25%Determine:
a. The inlet vane angle
b. The angle, the absolute velocity of water at exit makes with the tangent and
c. The work done per unit weight.

17 a. The outer diameter of an impeller of a centrifugal pump is 40 cm and outlet width 5 cm. The pump is running at 700rpm and it is working against a total head of 10m. The vane angle at outer is 400 and manometric efficiency is 70%. Determine,
a. The velocity of flow,
b. Velocity of water leaving the vane and
c. The angle made by the absolute velocity at outlet with the direction pf motion at outlet.

OR

b. Derive the dynamic equation of gradually varied flow.

18 a. Explain the classification of Turbines .Give all in detail

OR

b. Write down the difference between radial flow and axial flow turbine

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. The bed width of a trapezoidal channel section is 40 m and the side slope is 2 horizontal to 1 vertical. The discharge in the canal is 60 cumecs. The Manning's 'n' is 0.015 and the bed slope is 1 in 5000. Determine the normal depth.

OR

b. How do you classify open channels? Explain in detail and also explain the velocity distribution in open channel.

20 a. What is meant by varied flow? What are the assumptions made in the analysis of gradually varied flow?

OR

b. What is meant by Positive displacement Pumps. Explain the various types of positive displacement pumps with all the details

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ENVIRONMENTAL ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What are the factors governing the design period?

2   Give the rational formula for estimating storm water runoff

3   What is shallow well?

4   Define fluoridation.

5   Define fire storage.

6   Define the term head loss.

7   What is ferrule in house service connection?

8   What is the purpose of stop cock?

9   What are the factors affecting per capita demand?

10   List various natural forces of self purification

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Write short notes on any two methods of population forecasting.

OR

b.   What is meant by whole some water? What are the requirements of wholesome water? Explain.

12 a.   Explain.   (a)Pre-chlorination,   (b) Double-chlorination
         (c) Super-chlorination (d)Break point-chlorination Remember

OR

b.   Explain the domestic overhead storage tanks.

13 a.   Explain the different sources of water.

OR

b.   Briefly Explain the Chemical characteristics of water.

P.T.O

14 a. Explain the various pipe joint with neat sketch.

OR

b. Draw a neat sketch of canal intake and explain the working principle.

15 a. Compare the merits and demerits of the 'Continuous' and 'intermittent' systems of water supply.

OR

b. List and explain the factors affecting sedimentation.

16 a. What is aerator? Explain different type of aerator with sketches.

OR

b. Write short notes on   i) Hardness   and   ii) Softening.

17 a. Explain the general design guidelines for a water distribution system?

OR

b. Discuss in detail about the Gravitational system of distribution.

18 a. Discuss about the house water connection.

OR

b. Write notes on   i) Stop cocks   ii) Water taps and bib cocks.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Describe the procedure adopted for laying and testing of water mains.

OR

b. Define the term per capita demand. Explain the factors affecting per capita demand.

20 a. Explain the various appurtenances used in water distribution system.

OR

b. Explain the various system of supply with its advantages.

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SL.NO:1322

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1 What is the condition for filters?
2 Write any some materials used for joints.
3 Write about centering and shuttering?
4 Define dredging.
5 Name the equipments used for volume batching?
6 Write short notes on white cement.
7 What is rubber masonry and ashlar masonry?
8 What is a shoring?
9 State the dimension of flue hole opening in chimney.
10 Mention the various operations involved in grading?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a. Explain the various tests in fresh concrete
                                OR
   b. Elucidate about Fire protection in building

12 a. Explain the concrete hollow block masonry with neat sketch
                                OR
   b. Explain the construction of shallow foundation in detail with sketch

13 a. Explain in detail about super structure of buildings
                                OR
   b. Describe briefly with a neat sketch and explain the manufacture of cement by wet process

14 a. Explain the Non-destructive testing in concrete
                                OR
   b. Define Flooring and explain the types of flooring

                                                               P.T.O

15 a. Write the difference between stone masonry and brick masonry

OR

   b. Explain the foundation available under special conditions with sketch

16 a. Explain the process of Excavation in detail with neat sketch

OR

   b. Explain briefly about cable stayed bridges and steel bridges

17 a. Define Shell structure and explain in brief with merits and demerits

OR

   b. Explain the Articulated structure in detail

18 a. Explain the Pile driving Equipment in detail.

OR

   b. Define the various types of conveyors and explain the advantage
   of using belt conveyors.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain the various types of trusses with neat sketches.

OR

   b. What are concrete chemicals? Explain in detail and discuss their uses.

20 a. Explain the different types of joints in buildings with sketches.

OR

   b. Describe the working principle of diesel hammer and state its limitations.

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SL.NO:1316

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

PROFESSIONAL ETHICS AND HUMAN VALUES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Draw the plot between cost and risk
2   Define the term Engineering
3   Write short note on caring and sharing.
4   What are personal ethics and business ethics?
5   What are the analytical methods?
6   What do you mean by appropriate technology?
7   What is meant by technology transfer?
8   What is the Importance of IPR?
9   Discuss the steps used to resolve the Moral Dilemmas
10   Define Collegiality.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Write down the highlight of code of ethics in ASCE guidelines
                                    OR
   b.   Write a detailed note on courage, co-operation.

12 a.   Discuss the theories pertaining to moral autonomy with specific reference to consensus and controversy?
                                    OR
   b.   "Engineering work is seen as Experimentation" - Discuss.

13 a.   Explain the details about the senses of engineering Ethics ?
                                    OR
   b.   Explain any two case studies which will help us to learn from the past in ethical aspects in engineering.

14 a.   Explain access and reduce the risk?
                                    OR
   b.   Explain "Professional rights and Employee rights for privacy and choice of outside activities.   p.t.o

15 a. Describe the different ethical problem that exists in computer science and technology.

OR

  b. What is meant by Moral Autonomy ? Discuss the factors influencing person concern and the skills required to improve more Autonomy ?

16 a. What are the general features of morally responsible engineers?

OR

  b. List some grey areas of confidentiality, and how management policies influence the maintenance of confidentiality.

17 a. What are the factors that affect risk acceptability?what is the use of knowledge of risk acceptance to engineer ?

OR

  b. List and explain the steps in confronting moral dilemmas.

18 a. Can an engineer become a responsible experimenter- Discuss.

OR

  b. What are the various ways of promoting morally justifiable measures for a Multinational corporation (MNC)?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Compare the similarities between engineering experiments and standard experiments

OR

  b. How can an engineer become a responsible experimenter? Explain in detail ?

20 a. Explain a brief report on the 'Three-Mile Island' and 'Chernobyl' accidents. What are the safety lessons we learn from 'Three-Mile Island' and 'Chernobyl' safe exits?

OR

  b. How did Gilligan recast Kohlberg's level of moral development?

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SL.NO:1304

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

RAILWAY, AIRPORT AND HARBOUR ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define cant deficiency
2   What are the major classifications of railways in India?
3   Define the term taxi way
4   Define cross wind component.
5   Write short notes on jetties.
6   Write types of rate of return methods.
7   Name at least three types of failure in railway track.
8   Give short notes on Calm period
9   Define runway drainage?
10   Briefly write the need for economic evaluation.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain what you mean by buckling of rails ? Why and how buckling occurs?
OR
   b.   Explain Briefly types of imaginary Surfaces

12 a.   What is meant by benefit cost ratio method?
OR
   b.   Discuss different types of rail joints with the help of neat skectches.

13 a.   What are the function of ballast and give the requirements of good ballast?
OR
   b.   Discuss about basic Requirement of Good Alignment in Railways

P.T.O

14 a. Draw with neat sketches and explain different types of station yards

OR

b. Write Short notes on
   a) Passenger and goods Platforms
   b) Loops
   c) Sidings

15 a. Explain the importance of Airport planning

OR

b. An Option is given either to improve an existing airport or to develop a new airport. What will be the governing considerations?

16 a. What do you understand by the term visual aids in air transport? What are their Essential requirements?

OR

b. What is Hydrograpic survey? Briefly Describe the planning techniques for costal labour surveys.

17 a. Explain with neat sketches any four types of navigational aids and state their Functions.

OR

b. Briefly explain Characteristics of Transport Economic Evalution

18 a. Explain the Scope of CBA

OR

b. Describe the internal rate of return method

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Write and explain various types of rail fixtures and fastenings commonly used in the permanent way.

OR

b. Explain the environmental management plan for project

20 a. Describe types of airport components with neat sketch.

OR

b. What is meant by environmental impact assessment and explain it?

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SL.NO:1298

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

STRUCTURAL ANALYSIS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What is meant by linear structure?
2   Define compatibility.
3   Define unsymmetrical Rigid frame.
4   When two members BA and BC are meeting at B. Write the joint moment equilibrium equation.
5   What are the advantages of slope deflection method?
6   While drawing the BMD what are the necessary conditions to be followed?
7   What are the steps followed for analyzing the structure?
8   Draw a typical Distribution factor tabular column.
9   The moment at the central hinge of a three hinged arch is -------------.
10   State the equation to calculate the horizontal thrust in two hinged circular arch.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Using the principle of virtual work, determine the horizontal displacement of joint C of the truss shown. Take $E = 200 \times 10^6$ kN/m^2 and cross sectional area of each bar as 150×10^{-6} m^2
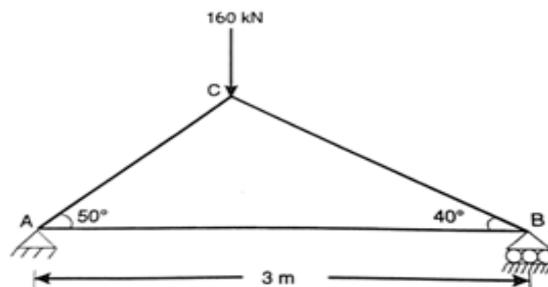

OR

(p.t.o)

b.

Using method of virtual work determine the vertical deflection under the load point for the beam EI is constant
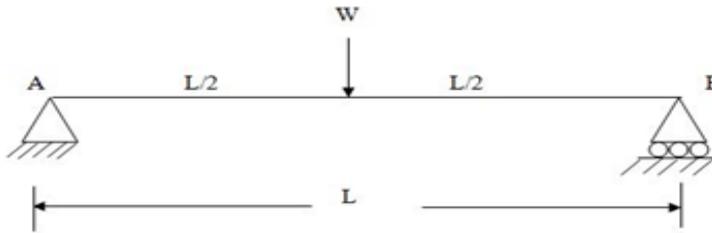

12 a.

Using the principle of virtual forces determine the vertical displacement at joint C of the truss shown in fig. There are no load acts. The member AB gets 4mm too short. The cross sectional area of each member is A= 300 mm² and E=200Gpa.


OR

b.
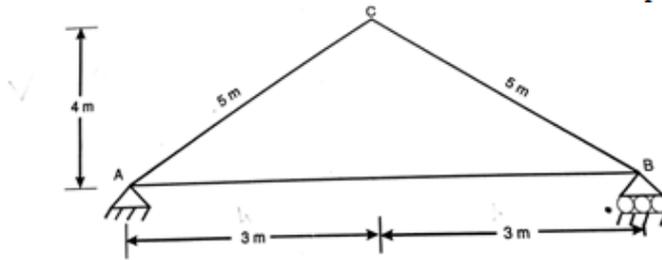
Analyse the continuous beam loaded as shown by the slope deflection method. The support B sinks by 10mm. Take E = 2.1 X 10⁵N/mm² and I = 16 X 10⁷mm⁴. Sketch the bending moment and shear force diagram.

3
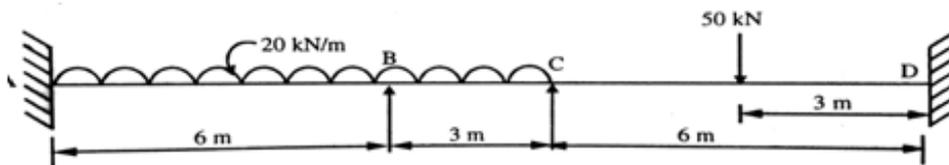
13 a. Analyse the structure shown by the slope deflection method and sketch the bending moment and shear force diagram.
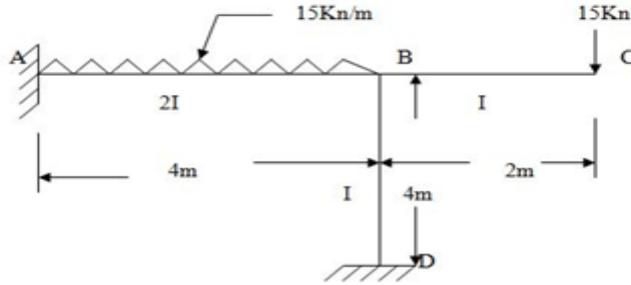
OR

b. Analyse the two span continuous beam loaded as shown by the slope deflection method and sketch the bending moment and shear force diagram.
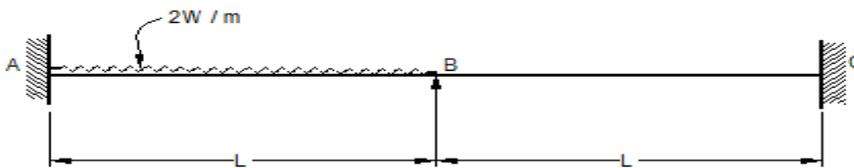
14 a. A continuous beam ABC is supported on an elastic column BD and is loaded as shown in fig. Treating joint B as rigid, analyse the frame and the B.M.D. and sketch the deflected shape of a structure.
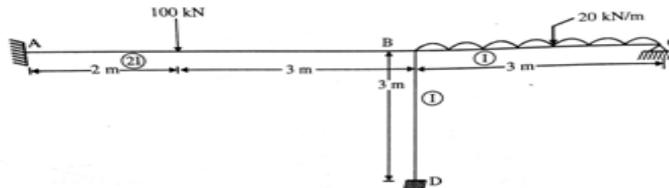
OR

b. Analyse the structure shown by moment distribution method.

(p.t.o)
Sl.No.1292
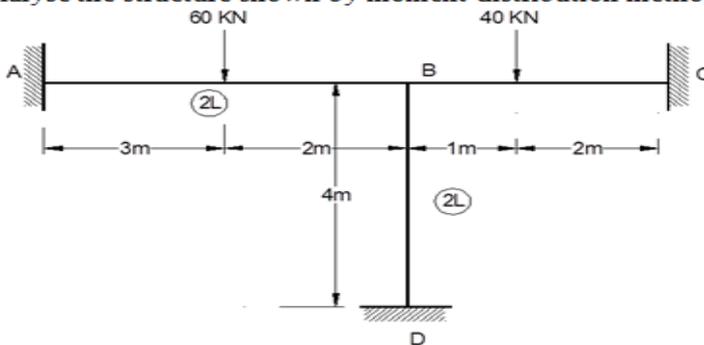
15 a.

Two point loads of 100KN and 200KN spaced 3m apart cross a girder of span 15m from left to right with the 100KN leading. Draw the ILD for shear force and bending moment and find the values of maximum shear force and bending moment at a section D, 6m from the left hand support. Also find the absolute maximum bending moment due to the given loading system.

OR

b.

Two point loads of 100KN and 150KN spaced 3m apart cross a girder of span 15m from left to right with the 100KN leading. Draw the ILD for shear force and bending moment and find the values of maximum shear force and bending moment at a section D, 6m from the left hand support. Also find the absolute maximum bending moment due to the given loading system.

16 a.   Draw the ILD for the forces in members P,Q,R,S, of the truss shown
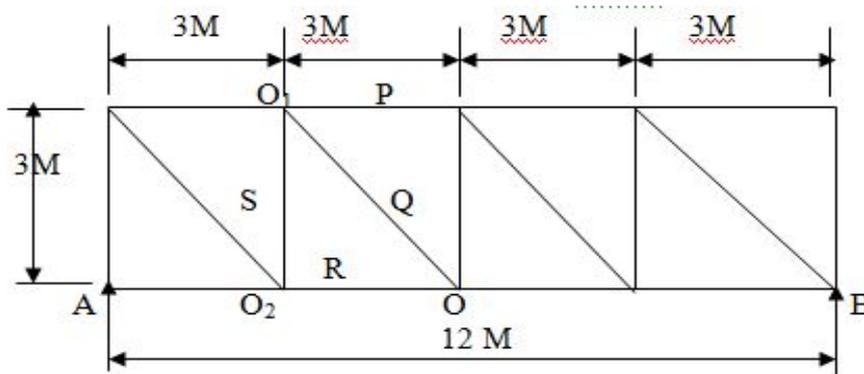
OR

b. A 3 hinged arch is circular, 25m in span with a central rise of 5m. It is loaded with a concentrated load of 10 kN at 7.5m from the left hand hinge. Find the
(a) Horizontal thrust
(b) Reaction at each end hinge
(c) Bending moment under the load.

17 a. A parabolic 3 hinged arch carries a UDL of 20kn/m on the left half of the span. It has a span of 15 m and a central rise of 3 m. Determine the resultant reaction at supports. Find the bending moment, normal thrust and radial shear at xx, 2m from left support.

OR

b. Analyse the continuous beam shown by moment distribution method. Draw the bending moment diagram and shear force diagram.
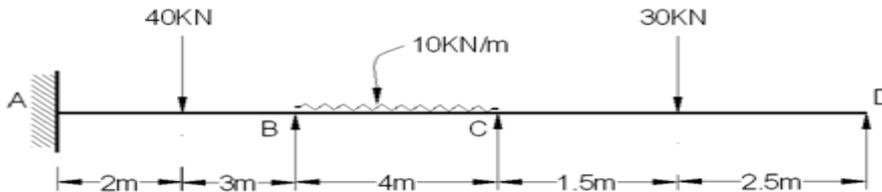
18 a. A parabolic arch hinged at the ends has a span of 50m and a rise of 10m. A concentrated load of 8 kN acts at 15m from the left hinge. The second moment of area varies as the secant of the inclination of the arch axis. Calculate the horizontal thrust and the reactions at the hinge. Also calculate the net bending moment at the section.

OR

b. A three hinged arch is circular, 20m in span with a central rise of 3m. It is loaded with a concentrated load of 10 kN at 7.5m from the left hand hinge. Find the
(a) Horizontal thrust
(b) Reaction at each end hinge
(c) Bending moment under the load

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Using the method of virtual work, determine the slope at point C of the beam shown in fig

OR
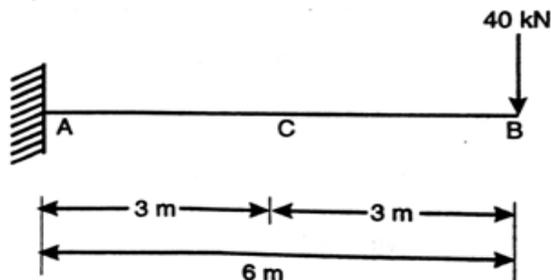
b. Analyse the portal frame loaded as shown in fig by the slope deflection method and sketch the bending moment and shear force diagrams.

10 kN/m

B | C

3 m   EI = constant

A | D

6 m
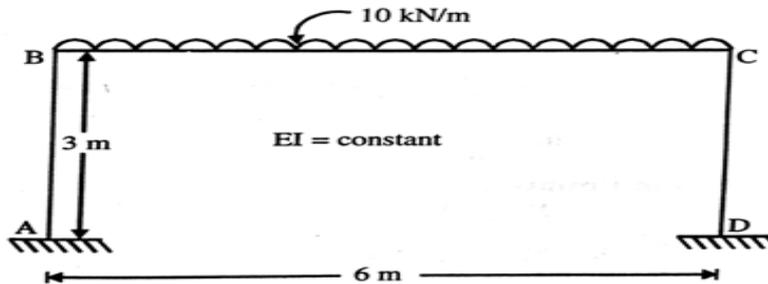
20 a.

Analyse the continuous beam loaded as shown in fig. by the moment distribution method. Sketch the bending moment and shear force diagrams.

120 kN

40 kN   10 kN/m 40 kN

100 kNm

A   B   C   D

|←3 m→|←3 m→|←3 m→|←——6 m——→|←—3 m—→|←—6 m——→|←3 m→|
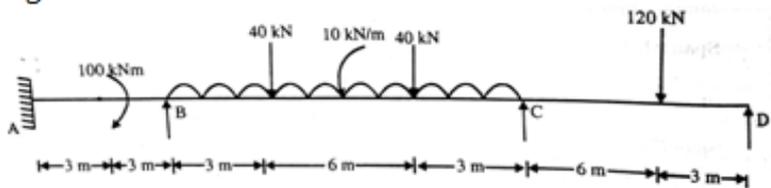
OR

b. A three hinged parabolic arch of 40m span has abutments at unequal levels. The highest point of the arch is 4m above left support and 9m above the right abutment. The arch is subjected to a u.d.l. of 25kN/m over its entire horizontal span. Find the horizontal thrust and bending moment at a point 8m from the left support

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SL.NO: 1292

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE - TYPOLOGY OF NATURAL AND MANMADE DISASTERS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define the term Risk.

2   Explain Risk Identification.

3   Mention two Risk reduction measures of Landslide.

4   Give two Characteristics of Cyclone.

5   How climate changes affect the human being in day-to-day life?

6   Write Short about Wild fire.

7   List out the causes of environmental Pollution.

8   Define Response.

9   Write Short notes about Disaster management cycle.

10   Define Mitigation.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain briefly Disaster management Act Policy in India.
                                    OR
   b.   What are the Types of Disasters? Explain in detailed about Natural Disaster.

12 a.   What are the roles and functions of District Disaster Management Authority (DDMA)?
                                    OR
   b.   Explain in detail the vulnerability profile of our country

13 a.   Explain Volcanism and discuss the causes and its effects .
                                    OR
   b.   Explain causes of drought and the mitigation measures.

                                                                    (p.t.o)

14 a.   Identify the Risk Reduction measures for cyclone

OR

   b.   Briefly explain characteristics of cyclone.

15 a.   What is mean by Ozone depletion? Explain in detail.

OR

   b.   Discuss about the types of waves.

16 a.   Explain Chemical Disaster and Nuclear and Radiological Emergency

OR

   b.   Explain techniques for reducing oil fire.

17 a.   Explain about industrial waste

OR

   b.   Describe manmade disaster and list out the types of manmade disaster.

18 a.   Explain briefly Financial arrangements.

OR

   b.   Write short notes on modern techniques used for hazard resistant construction.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   List some of the impact of development projects like Dam and establishment of roadways.

OR

   b.   Define Landslide Hazard Zonation list the role of GIS in slope stability analysis.

20 a.   What is mean by global warming? How does ozone gas affect the environment?

OR

   b.   Explain the activities during the recovery process. Explain Implementation of disaster Risk Reduction Financial aspects.

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SL.NO: 1284

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

SURVEYING I

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What is meant by geodetic surveying?
2   What are sources of local attractions?
3   What is fore sight?
4   Define Cross-Sectioning and its applications.
5   Define parallax.
6   What are the equipment used in soundings?
7   Define route surveying.
8   What are offsets? Name the types.
9   What is the use of trough compass in plane table surveying?
10   What are methods available to setting out simple curves?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain how will you construct scale of chords and construct the angles 30 $^\circ$ and 80 $^\circ$ with scale of chords.

OR

b.   The following interior angles were measured with a sextant in a closed traverse. The bearing of the line AB was measured as 60º 00' with prismatic compass. Calculate the bearings of all other line if $\llcorner$ A = 140 $^\circ$ 10'; $\llcorner$ B 99 $^\circ$ 8'; $\llcorner$ C = 60 $^\circ$ 22'; $\llcorner$ D = 69 $^\circ$ 20'

12 a.   Explain the following
        a. Location of a point by measurement from two points of reference
        b. Working from whole to part

OR

b.   What are the instruments used in chaining? Explain them briefly.

13 a.   Write notes on Field Book in detail.

(P.T.O)

OR

b.   Explain the theory of magnetic compass.

14 a.   Explain the errors in plane tabling

OR

b.   What are the instruments used in leveling. Explain them briefly.

15 a.   What are the various uses of contours?Explain in detail.

OR

b.   Explain the following.
    a. Areas computed by sub- division into triangles
    b. Ares from offset to a base line.

16 a.   Explain about the temporary adjustments done before starting the the odolite work.

OR

b.   Explain the measurement of horizontal angles by general procedure and repetition method

17 a.   Explain the following essentials of the transit theodolite surveying
    a. The telescope
    b. The vertical circle
    c. The index frame or T- frame
    d. The standards or A- frame
    e. The leveling head

OR

b.   Explain Reconnaissance survey in route surveying

18 a.   Explain the horizontal control for setting out works

OR

b.   Explain tunnel alignment and setting out work in mine surveying

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   With neat sketch explain the prismatic compass.

OR

b.

For the following traverse, compute the length CD, so that A, D and E may be in one straight line.

Line	Lengths(m)	Bearing
AB	110	83º 12'
BC	165	30º 42'
CD	-	346º 6'
EA	212	16° 18'

20 a. Write notes on the following:
a. Direct ranging
b. Indirect ranging

OR

b. Explain the temporary adjustments and permanent adjustments of surveyors compass.

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SL.NO:1279

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

MECHANICS OF SOLIDS - I

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What are the types of Elastic constants?
2   How can you define modulus of Elasticity?
3   How do you calculate thermal stress induced in a beam?
4   What are the types of loads acting on beams?
5   Write a note on method of joints.
6   What is a composite beam?
7   What is Polar Modulus?
8   What is meant by a spring? Give examples.
9   What are the uses of Mohr's circle?
10   Define: circumference (or) hoop stress.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   A steel rod of 3cm diameter is enclosed centrally in a hollow copper tube of external diameter 5cm and internal diameter of 4cm. The composite bar is then subjected to an axial pull of 45000 N. If the length of the bar is equal to 15cm, determine: (i) the stresses in the rod and tube and (ii) load carried by each bar. Take E for steel =2.1×10^5 N/mm^2 and for copper = 1×10^5 N/mm^2.

OR

b.   A load of 2 MN is applied on a short concrete column 500 mmx500mm. The column is reinforced with four steel bars of 10mm diameter, one in each corner. Find the stresses in the concrete and steel bars. Take E for steel = 2.1×10^5 N/mm^2 and for concrete = 1.4×10^5 N/mm^2.

(P.T.O)

12 a. a) Find an expression for the total elongation of a bar due to its own weight, when the bar is fixed at its upper end and hanging freely at the lower end.

(b) How will you analyze the stress produced in a composite bar

OR

b. A rod is 2m long at a temperature of 10°C. Find the expansion of the rod, when the temperature is raised to 80°C. If this expansion is prevented, find the stress induced in the material of the rod. Take $E = 1.0 \times 10^5$ MN / m^2 and $\alpha = 0.000012$ per degree centigrade.

13 a.

Find the forces in member AB, AC and BC of the truss by method of joints of the truss shown in Fig.
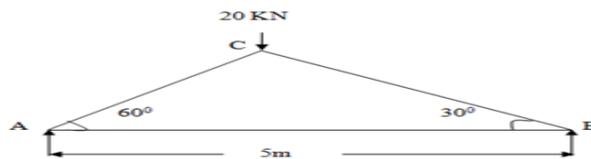
OR

b. Find the forces in member DC, BC and EB of the truss shown by method of sections
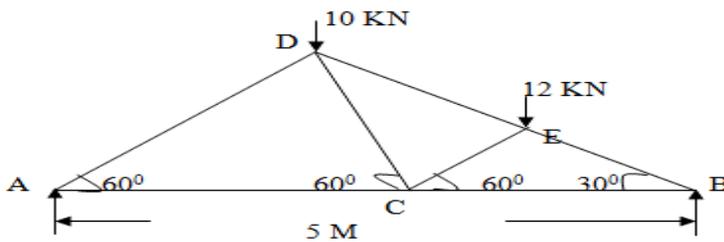
14 a. A cantilever of length 2m carries a uniformly distributed load of 1.5 KN/m run over the whole length and a point load of 2KN at a distance of 0.5m from the free end. Draw the S.F and B.M. diagram for the cantilever.

(P.T.O)

OR

b.

A closely coiled helical spring of round steel wire 10mm in diameter having 10 complete turns with a mean diameter of 12cm is subjected to an axial load of 200N. Determine : (i) the deflection of the spring (ii) Maximum shear stress in the wire, (iii) stiffness of the spring. Take $C = 8 \times 10^4 N/mm^2$.

15 a.

(a) The external and internal diameters of a hollow shaft are 40cm and 20cm. Determine the maximum strain energy stored in the hollow shaft if the maximum allowable shear stress is 50 N/mm^2 and length of the shaft is 5m. Take $C = 8 \times 10^4 N/mm^2$.

(b) Determine the maximum strain energy stored in a solid shaft of diameter 10cm and of length 1.25m, if the maximum allowable shear stress is 50N/mm^2. Take $C = 8 \times 10^4 N/mm^2$.

OR

b.

(a) A cantilever of length 2.5m carries a uniformly distributed load of 16.4KN per meter length over the entire length. If the moment of inertia of the beam = $7.95 \times 10^7 mm^4$ and value of $E = 2 \times 10^5 N/mm^2$, determine the deflection at the free end.

(b) A cantilever 120mm wide and 200mm deep is 2.5m long. What is the uniformly distributed load which the beam can carry in order to produce a deflection of 5mm at the free end? Take $E = 200GN/m^2$.

16 a.

A cylinder of thickness 1.5cm, has to withstand maximum internal pressure of 1.5N/mm^2. If the ultimate tensile stress in the material of the cylinder is 300N/mm^2, factor of safety 3.0 and joint efficiency 80%, determine the diameter of the cylinder.

OR

b. Derive an expression for torque transmitted by a hollow circular shafts.

17 a. A hollow shaft, having an inside diameter 60% of its outer diameter, is to replace a solid shaft transmitting the same power at the same speed. Calculate the percentage saving in material, if the material to be used is also the same.

OR

b.

Determine the diameter of a solid shaft which will transmit 300 KW at 250 r.p.m. The maximum shear stress should not exceed 30 N/mm² and twist should not be more than 1degree in a shaft length of 2m. Take modulus of rigidity = 1x10⁵N/mm²

18 a.   Write down the step by step procedure for the analysis of a truss by the method of sections.

OR

b.

A beam is loaded as shown in fig. Find the reactions at A and B. Also draw the S.F.D and B.M.D and thrust diagrams.
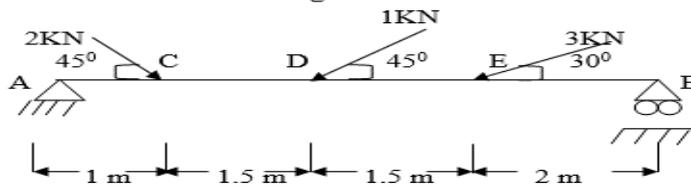
Answer ALL questions
PART-C (2 x 15 = 30)

19 a.

Analyze the cantilevered beam shown in fig. by using method joint.
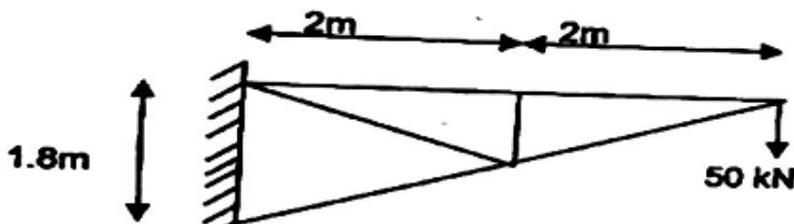
OR

b.

The stiffness of the closed coil helical spring at mean diameter 20 cm is made of 3 cm diameter rod and has 16 turns. A weight of 3 KN is dropped on this spring. Find the height by which the weight should be dropped before striking the spring so that the spring may be compressed by 18 cm. Take C= 2.1x10⁴ N/mm².

(P.T.O)

20 a. A cantilever 150mm wide and 200mm deep projects 2m out of a wall, and is carrying a point load of 40KN at the free end. Determine the slope and deflection of the cantilever at the free end.

OR

b. A cylindrical shell 1m diameter and 3m length is subjected to an internal pressure of 2MPa. Calculate the minimum thickness, if the stress should not exceed 50MPa. Find the change in diameter and volume of the shell. Poisson's ratio = 0.3 and E = 200 KN/mm^2.

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SL.NO:1272

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

MECHANICS OF SOILS

Time : Three Hours   Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

1   Define Soil mechanics.
2   What are the factors affecting permeability.
3   Write the equation for stress in soil due to uniformly loaded circular area.
4   What are the shear strength parameters?
5   What are the disadvantages of direct shear test?
6   Describe the term critical slip circle.
7   What is quick sand condition?
8   Write short notes on pre consolidation.
9   Define the term 'unique stress path.
10   What is the principle of Friction circle method?

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.   An undisturbed sample of soil has a volume of 120 cm3 and mass of 180.g. On oven drying for 24 hrs, the mass is reduced to 150 g. If the specific gravity grain is 2.68, determine the water content, voids ratio and degree of saturation of the soil.

OR

b.   The water table in a deposit of sand 8 m thick is at a depth of 3m below the surface. Above the water table, the sand is saturated with capillary water. The bulk density of sand is 19.67 KN/m^3. Calculate the effective pressure of 1m, 3m and 8m below the surface. Hence plot the variation of total pressure, neutral pressure and effective pressure over the depth of 8 m.

12 a.   A vane, 10 cm long and 8cm in diameter was pressed soft clay at the bottom of a bore hole. Torque was applied and gradually increased to 45 N-m when failure took place. Subsequently the van rotated rapidly so as to completely remold the soil. The remolded soil was sheared at a torque of 18 N-m.Calculate the cohesion of the clay in the natural and remolded states and also the value of sensitivity.

OR

b.   What are the limitations of sedimentation analysis?

13 a. Describe in detail the procedure for determination of Liquid limit of soil.

OR

b. Explain the effect of capillary rise in soil.

14 a. Explain properties of flow nets.

OR

b. What is seepage force or seepage pressure?Why seepage happens in soil?Explain.

15 a. Explain the Consolidation Process: Spring analogy.

OR

b. Explain the Laboratory Consolidation Test.

16 a. A rectangular area 2mx 4m carries a uniform load of 8 t/m^2 at the round surface.Estimate the vertical pressure at a depth of 8m vertically below a corner at the loaded area.

OR

b. Explain in detail the determination of shear strength using direct shear test.

17 a. Explain the step by step procedure of conducting vane shear test.

OR

b. Explain briefly:
   a. Vane shear test.   b. Comments on shear box test.

18 a. Write in detail about the friction circle method.

OR

b. What do you understand about stress analysis?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. The in-situ percentage void of a sand deposit is 34 percent. For determining the density index, dried sand form the stratum was first filled loosely in a 1000 cm3 mould and was then vibrated to give a maximum density. The loose dry mass in the mould was 1610 g and the dense dry mass at maximum compaction was found to be 1980 g. Determine the density index if the specific gravity of the sand particles is 2.67.

OR

b. The water tank is supported by a ring foundation having outer diameter of 10 m and inner diameter of 7.5 m.The ring foundation transmits uniform load intensity of 160 KN/m^2.Compute the vertical stress induced at a depth of 4 m,below the centre of ring foundation, using (a)Boussinesq analysis,and (b)Westergaards analysis,μ=0.

20 a. In a consolidated drained triaxial test, a specimen of clay fails at a cell pressure of 60 KN/m2.The effective shear strength parameters are c'=15 KN/m2 and φ'=20°.Determine the compressive strength.

OR   p.t.o

b.
The temporary cutting 8 m deep is to be made in a clay having a unit weight of 18 KN/m^3 and an average cohesion of 20 KN/m3.A hard stratum of rock exists at a depth of 12 m below the ground surface. Use Taylor's stability curves to estimate if a 30° slope is safe. If a factor of safety of 1.25 is considered necessary, find the safe slope angle

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SL.NO:1256

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE - WASTE WATER ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define time of Concentration.

2   What is meant by detritus tank?

3   List out the types of high rate filters.

4   Define supernatant liquor.

5   Distinguish between Self Cleaning velocity and Non-scouring velocity.

6   Discuss the biological concept taking place in septic tank.

7   What process is involved in sedimentation?

8   Explain how do you determine organic loading rate of a trickling filter?

9   Draw the oxygen deficit curve.

10   Distinguish between mesophilic digestion and thermophilic digestion.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Calculate and design an oxidation ditch for a design sewage flow of 50MLD. Assume suitable data wherever necessary. Show the neat sketch of the designed unit.

OR

b.   How will you apply sewage effluents to farms and explain their methods in detail

12 a.   i) Summarize the role of Screen Chamber in Sewage treatment plant and write its design procedure.
ii) Estiamte the settling velocity of spherical particle of specific
gravity 2.65 and diameter 0.18mm. Take kinematic viscosity of water as 1.016×10^{-2} m/s.

OR

b. Show the design a circular primary sedimentation tank to treat an average sewage flow of 5000 m^3/day, suitably assuming the design criteria. Draw a neat sketch of the designed tank.

13 a. Secondary sedimentation tank of a waste water treatment plant produces 1100kg (dry basis) solids with moisture content of 95%.Solids are of 70% volatile with specific gravity of 1.05 and 30% being fixed with specific gravity of 2.6. Determine the sludge volume as it is produced and after the incineration

OR

b. Summarize the working condition of Oxidation pond and reverse osmosis with reference to their principle, efficiency, advantages and disadvantages.

14 a. i. Write the design criteria for a grit chamber and brief its construction and functioning. .
ii. Describe the working of grit chamber and its types.

OR

b. Write short notes on soil dispersion system.

15 a. Explain in detail about gravity thickening.

OR

b.
i) Differentiate between 'sewage' and 'storm water' & Discuss the rational formula and its limitations in calculating the quantities of storm sewage.
ii) Describe the one pipe and two pipe plumbing systems. Compare them.

16 a.
i) Explain the factors influencing sanitary sewage flow and its estimation
ii) State the classification of solids present in sewage and the removal methods of each.

OR

b. i) Show the loading refers criteria of aeration tank of an activated sludge process.
ii) Describe the operational problem of activated sludge process and give the remedial suggestions

17 a. In Indian towns and cities, the land disposal method is mostly preferred. Why?

OR

b. Explain briefly about the methods of sewage disposal.

P.T.O

SL.NO:1248

18 a.   Discuss the need for sludge dewatering and explain the various sludge dewatering methods

OR

b.   Explain the anaerobic sludge digestion process and also the effects of pH and temperature on it.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   i) The BOD of sewage incubated for one day at 30°C has been found to be 400 mg/l. Calculate the 5 day 20°C BOD. Assume K10= 0.12/day at 20°C.
ii) A city with a population of 100,000 has an area of hectares. Calculate the D.W.F and storm water flow for the sewer line for the following data:
i. Rate of Water supply = 200 LPCD
ii. Average runoff coefficient for the entire area = 0.5
iii. Time of concentration = 50 min
iv. Assume 75% of water supplied reaches the sewer.

OR

b.   What is meant by sewage sickness and list out the preventive measure to control it?

20 a.   Describe with neat sketches about the typical process flow diagram of an oxidation ditch and explain its working principle

OR

b.   What are the environmental and health risks associated with sewage farming?
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VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

DESIGN OF REINFORCED CONCRETE ELEMENTS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Write short notes on RCC
2   Draw stress strain curve for various grades of steel.
3   Write about bond in bricks.
4   Explain slender columns
5   What is strap footing?
6   Discuss the merits and demerits of working stress method.
7   Write the formula for Modulus of Elasticity of Concrete
8   Write short notes on inclined stirrups
9   Explain the pitch and diameter of lateral ties
10   Explain pile driving techniques.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.
A rectangular reinforced concrete column of cross sectional dimesions 300 mm by 600 mm is to be designed to support an ultimate axial load of 2000 kN. Design suitable reinforcements in the column using M-20 grade concrete and Fe-415 HYSD bars.

OR

b.   Design a short axially loaded square column, 500 mm x 500 mm for a service load of 2000 kN. Use M20 concrete and Fe415 steel.

12 a. Explain the concept of elastic method and also write the advantages and disadvantages.

OR

b.   Explain the concept of plastic method and also write the types of limit states.

13 a. Explain the types of R.C.C. Beams and also write assumptions in theory of simple bending of R.C.C. Beams by Working Stress Method.

OR

b.   Explain basic design consideration in R.C.C. Structures.

P.T.O

14 a. Explain the stress - strain relationship for concrete and steel (with neat sketches) used in limit state method of design.

OR

b. Differentiate between balanced, Under-reinforced and Over-reinforced sections.

15 a. Explain the mechanisms of shear transfer in R.C. Beams without shear reinforcement.

OR

b. What are the factors affecting shear resistance of a R.C. member? Explain.

16 a. Discuss the minimum and maximum spacing of shear reinforcement for R.C. Beams.

OR

b. Discuss the Indian Standard recommendation on design for torsion in Reinforced Concrete Beams.

17 a.
Discuss various assuptions used in the limit state method of design of compression members.

OR

b. Write the design procedure for Isolated sloped footing.

18 a. Explain about combined trapezoidal footing with neat sketch

OR

b. Write the types of shallow foundation. Explain with neat sketch.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Design a singly reinforced concrete beam with clear span 4m, width of supports 300mm, service load 5 kN/m. Adopt M20 and Fe¬415 HYSD bars.

OR

b.
State the concept of the limit state design and also write the types of limit states.

20 a.
Explain the assembly of reinforcement in reinforced concrete structures.

OR

b. Discuss the Indian standard recommendation on design for torsion.

*****

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

SURVEYING -II

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Explain the Principle of Tacheometry.
2   What is meant by Non-stadia systems.
3   List any four corrections that may be necessary when measuring the length of a baseline.
4   List the equipments used for measurement of base line.
5   What are the classifications of errors?
6   Define conditioned quantity.
7   What are the advantages of a total station over conventional surveying instruments?
8   List out the disadvantages of total station surveying.
9   What do you understand by hydrographic surveying?
10   What is meant by solar Apparent Time?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   A steel tape 20 m long standardized at 55° F with a pull of 98.1 N was used for measuring a baseline. Find the correction per tape length, if the temperature at the time of measurement was 80° F and the pull exerted was 156.96 N. Weight of 1 cubic meter of steel = 77107 N. weight of tape = 7.85 N and E = 2.05 x 10^6 N/mm^2 . Coefficient of linear expansion of tape per degree F = 6.2 x 10^{-6} .

OR

b.   Find the most probable value of the following. A = 28° 24' 27.4" B = 32° 14' 16.3" C = 51° 18' 18.8" A+B = 60° 38' 45.6" B+C = 83° 32' 28.2".

12 a.   Explain how you would determine the constants of a tacheometer.

OR

b.   How do you calculate the horizontal and vertical distances between a instrument station and a staff station when the line of collimation is inclined to the horizontal and the staff is held vertically?   p.t.o

13 a. Explain the objectives and theory of anallatic lens.

OR

b. Explain the criterion of strength of a figure with reference to a well conditioned triangle.

14 a. Briefly explain the following: i) Satellite stations ii) Phase of a signal.

OR

b. What is meant by weight of an observation? Enumerate laws of weights giving examples.

15 a. Explain the laws of weight.

OR

b. How will you obtain error from direct observations of unequal weights on a single quantity?

16 a. Explain in detail about the properties of electromagnetic waves.

OR

b. Explain the working principle of "Tellurometer"

17 a. Explain in detail about the sources of errors in Total station and EDM.

OR

b. What is the equation of time? Show that it vanishes four times a year.

18 a. Explain Tilt distortion with neat sketch in photographic method.

OR

b. Write short notes on i) Electro-magnetic distance measurement ii) Aerial photograph iii) Stereoscopy.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. The altitude of two proposed stations A and B, 100 km apart, are respectively 420 m and 700 m. The intervening obstruction situated at C, 70 km from A as an elevation of 478 m. Ascertain if A and B are intervisible, and if necessary find how much B should be raised so that the line of sight must be less than 3 m above the surface of the ground.

OR

b. The following reciprocal observations were made at two points M and N. Angle of depression of N at M = 0° 7' 35'' Angle of depression of M at N = 0^o9' 05'' Height of signal at M = 4.820 m Height of signal at N = 3.950 m Height of instrument at M = 1.150 m Height of instrument at N = 1.280 m Distance between M and N = 36320 m. Calculate: i) The R. L. of N if that of M is 395.460 m ii) The average Co-efficient of refraction at the time of observation. Take R sin 1'' = 30.880 m.

p.t.o

20 a. The following angles were measured at a station 'O' so as to close the horizontal angles:
Adjust the angles by method of correlates.

Inst station	Angle	Weight
AOB	83 ° 42' 28.75"	3
BOC	102 ° 15' 43.26"	2
COD	94 ° 38' 27.2"	4
DOA	79 ° 23' 23.77"	2

OR

b. Explain in detail about the properties of electromagnetic waves.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE- AIR POLLUTION MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   How Ozone is formed?
2   What s the word MINAS stands for?
3   What are the principles behind settling chambers?
4   Define Impinger.
5   Name some NOx control units
6   What are the methods to control noise pollution?
7   What is meant by Inversion?
8   Define Fumigation.
9   What are the common causes of IAQ problems?
10   What is a decibel?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Write and explain Effects of Air Pollutants.
                          OR
   b.   Explain the Principles of Sampling and analysis.

12 a.   Explain various Secondary pollutants produced by human activity.
                          OR
   b.   Explain atmospheric stability and turbulence.

13 a.   Explain the Gaussian Plume Mode with neat sketch.
                          OR
   b.   Describe how to interpret a wind rose diagram.

14 a.   Briefly explain dense gas dispersion mode
                          OR
   b.   Explain the Various selection criteria for air pollution Control Equipment.

15 a.   Briefly explain the principle behind settling chambers.   p.t.o

OR

b. Describe the air Pollution Control in Petroleum Refineries.

16 a. Describe the detailed about Air Quality index (AQI).

OR

b. Write the various types and objectives of Environment impact Assessment (EIA).

17 a. List of Project requiring the Environmental Clearance from the Central Government.

OR

b. Explain detailed about the Effects of Noise Pollution?

18 a. Explain the Noise Standards for Fire – Crackers.

OR

b. Explain the most common sources of noise pollution.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Briefly explain Correlate between weather variables and ozone concentrations.

OR

b. Explain with neat sketch Wind rose diagram.

20 a. Explain the various Control of Gaseous Pollutants from Stationary Sources.

OR

b. Describe the guidelines for Conducting Plant Noise Survey.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE-AIR POLLUTION MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What are natural contaminants?
2   What is Mixing Height?
3   What is dense gas dispersion mode?
4   State the Principle of cyclone filter.
5   Define Pollutant Standard Index (PSI).
6   Write short notes on infrasonic and Ultrasonic.
7   What is global warming?
8   Define Fumigation.
9   List out the Effective Methods to Control Air Pollution.
10   What is the loudest sound possible?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain various Sources of Air Pollution.
                                OR
   b.   Write and explain ambient air quality standards in India.

12 a.   Explain various Secondary pollutants produced by human activity.
                                OR
   b.   Explain atmospheric stability and turbulence.

13 a.   Explain detailed about the Dispersion models.
                                OR
   b.   Describe how to interpret a wind rose diagram.

14 a.   Explain the principles of Control Pollution.
                                OR
   b.   Explain the Air Pollution Control in Cement industries.

15 a.   Define ESP. What are the advantages and disadvantages of ESP   p.t.o

OR
b.   Briefly explain the Control equipment in air pollution.

16 a.   Describe the Air Quality Standards in India.
OR
b.   Write the various types and objectives of Environment impact Assessment (EIA).

17 a.   Explain the indoor air contaminants?
OR
b.   Explain detailed about the Effects of Noise Pollution?

18 a.   Explain detailed about the Control Measures of Noise Pollution?
OR
b.   Explain the most common sources of noise pollution.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Briefly explain Global Warming?
OR
b.   Explain various sources of Air pollutant emission.

20 a.   Explain the various Measures to Control Air Pollution.
OR
b.   What is air quality management? Discuss the air quality management in India for mobile sources?

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SL.NO:1227

VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE - MUNICIPAL SOLID AND WASTE MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What is meant by solid waste?

2   Define of Bio-degradable waste.

3   Define compaction ratio

4   What is called composting pit?

5   Write short notes on waste generation.

6   List out the On- site handling methods

7   What is meant by Collection points?

8   Define SCS.

9   Give the disadvantages of an incinerator?

10   How do minimize the harmful impact from solid waste by using landfill Techniques

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain the Public health effects in MSWM

OR

b.   State variety approaches to develop public awareness?

12 a.   What is the role played by the collection equipment in MSWM.

OR

b.   Describe the magnetic separation method with neat sketch.

13 a.   Write a short notes on types of transfer stations.

OR

b.   Explain about vermi composting.

14 a.   Explain about indore method of composting.

OR

b.   Explain briefly the selection of landfill site.

15 a.   Explain briefly the Remedial action for disposal of MSW.

OR

b.   Explain the sources and types of solid wastes.

16 a.   Explain the classification of solid waste?

OR

b.   Explain the On-Site Handling of Solid Waste.

17 a.   Explain about magnetic separation technique.

OR

b.   Explain the TRANSFER operations.

18 a.   Explain with neat sketches of different types of land fill section

OR

b.   Explain the leachate collection and treatment.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   What are the impacts during composting and biogasification?

OR

b.   Explain the Improper handling of wastes.

20 a.   Explain onsite storage and segregation of soilid waste

OR

b.   Write shortly about Moisture Content Character and Value of the Compost

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SL.NO:1221

VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

MECHANICS OF SOLIDS - II

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Compute the strain energy per unit volume, the tensile stress for a material is given as 15N/mm². Take $E = 2 \times 10^5$ N/mm ².

2   Define Proof Resilience.

3   Define the term Continuous beam.
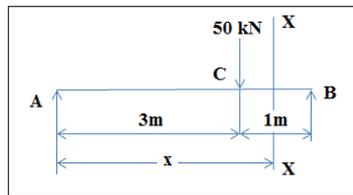
4   Define columns

5   State the total strain energy theory.

6   State the assumptions made in Winkler's Bach Theory.

7   State the reasons for stress- concentration.

8   Write down the formula to calculate the strain energy due to pure shear, if shear stress given.

9   Write the expression for buckling load for the column with one fixed and other end free.

10   Write the maximum principal stress theory.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a. A beam 8m length carries loads of 40kN each at a distance of 2m and 6m from one end. The beam is simply supported at the ends. The beam is of rectangular section with breadth b and depth d. If d=2b, and the shear stress is not to exceed, Take c=80MN/m².Analyse
i size of beam
ii energy stored
iii deflection due to shear under the load of 40kN

OR

b. Analyse propped cantilever of span 6m having the prop at the is subjected to two concentrated loads of 24 kN and 48 kN at one third points respective from left end (fixed support) draw SFD and BMD.

12 a. Compute the expression for strain energy in pure shearing

OR

b. A beam of span 4m is simply supported at the ends and carries an udl of 6 kN/m over the entire length. Determine the strain energy stored in the beam due to bending. Take $E=200GN/m^2$ and $I=1440 cm^4$.

13 a. Explain Castigliano's theorem and compute the expression of Castigliano's theorem.

OR

b. A cantilever of length 4m carries a udl of 1kNm run over whole length. The cantilever is propped rigidly at the free end. If the value of $E=2x10^5 N/mm^2$ and I of the cantilever $= 10^8$ mm^4, then determine
 i Reaction at the rigid prop
 ii Deflection at the centre of the cantilever.
 iii Magnitude and position of maximum deflections.

14 a. A continuous beam consists of three successive spans of 6m, 12m and 4m and carries load of 2 kN/m, 1 kN/m and 3 kN/m respectively on the spans. Chart BMD and SFD for the beam.

OR

b. Determine Eulers crippling load for an I section joist 40cm x 20cm x 1cm and 5m long which is used as a strut with both ends fixed. Take $E=2.1x10^5 N/mm^2$.

15 a. A 1.5 m long cast iron column has a circular cross-section of 50mm diameter. One end of the column is fixed and other end is free. Taking factor of safety as 3, Calculate the load using Rankine formula. Take yield stress as 560 MPa and a=1/1600.

OR

b. A hollow cast iron column whose outside diameter is 200mm has a thickness of 20 mm. It is 4.5 m long and it is fixed at both ends. Calculate the slenderness ratio and the ratio of Euler's and Rankine's critical loads. For cast iron yield stress 550 N/mm2, a= 1/1600, E = 8x104 N/mm2.

(p.t.o)
SL.NO:1215

16 a. A rectangular block of material is subjected to a tensile stress of 110N/mm^2 on one plane and a tensile stress 47N/mm^2 on the plane at right angle to the former each of above stress in accompanied by a shear stress of 63N/mm^2 and that associated with the former tensile stress tends to rotate the block anticlockwise. Calculate :
i) The direction and magnitude of each of principal stress
ii) Magnitude of the greatest shear stress

OR

b. For the state of stress shown in fig. Calculate the principal plane and principal stress.
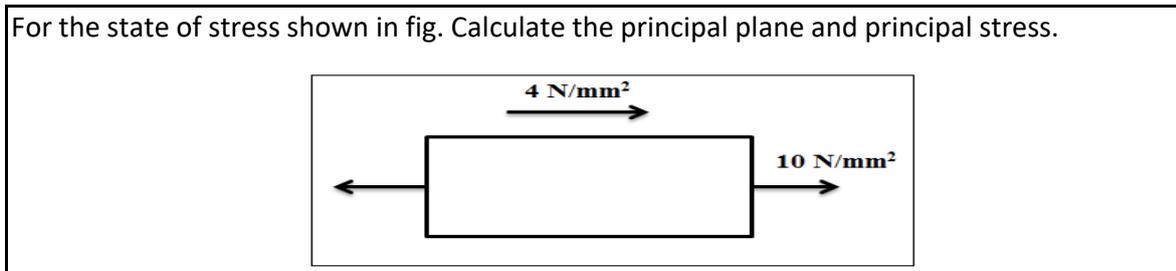
17 a. In a material, the principal stresses are 50 kN/m^2, 40 kN/m^2, and -30 kN/m^2. Calculate the total energy, volumetric strain energy, shear strain energy and factor of safety on the total strain energy criteria if the material yields at 100 N/mm^2.

OR

b. A curved bar is formed of a tube of 120 mm outside diameter and 7.5 mm thickness. The centre line of this is a circular arc of radius 225 mm. The bending moment of 3 kNm tending to increase curvature of the bar is applied. Calculate the maximum tensile and compressive stresses set up in the bar.

18 a. Compute the equation of Shear centre for channel section

OR

b. Explain the stresses induced due to unsymmetrical bending.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. A beam of 4 m length is simply supported at the ends and carries a uniformly distributed load of 6 kN/m length. Analyse the strain energy and hence deflection. Take E = 200 GPa and I = 1440 cm^4 .Use Strain energy method

OR

b. A fixed beam AB of span 10 m carries point load of 180 kN and clockwise moment of 160 kNm at distances 3 m and 6 m from left end respectively. If the left end support sinks by 15 mm, Examine the fixed end moments and reactions at the supports. Draw also SFD and BMD for the beam. Take EI = 6000 kNm^2.

20 a. Determine Euler's Crippling load for an I-section joist 40cmx20cmx1cm and 5m long which is used as a strut with both ends fixed. Take Young's Modulus for the joist as $2.1x10^5$N/mm^2.

OR

b. Determine the position of the shear centre for a channel section of 120mm by 120mm outside and 10mm thick.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

DESIGN OF REINFORCED CONCRETE AND MASONRY STRUCTURES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What are the types of retaining walls?
2   Write the three types of joints between tank walls and tank floor.
3   What is Tendon?
4   Define Yield line.
5   What are the methods available for designing RCC structures?
6   Write the cases of cohesionless backfill.
7   What are the forces acting on a retaining wall?
8   Define creep coefficient.
9   How to calculate the limiting moment of resistance?
10   Define capital.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   A reinforced right angled concrete slab is simply supported at the adjacent edges AB and
        BC.The side AB = 4m and BC =3m and CA =5m`and is reinforced with 10 mm diameter bars
        spaced at 100mm centres both ways at an average depth of 120mm. Determine the safe
        permissible service live load on the slab. Use M20 concrete and Fe 415 HYSD bars .

OR

   b.   A reinforced concrete slab 4m x 6m is reinforced with 10mm dia bars at 150mm spacing in the
        short direction and 200mm spacing in the long direction. The slab is 100mm thick with a
        average effective depth of 80mm. If the yield line are inclined at 45o to either direction of
        reinforcement, Find the ultimate moments muαn and muαt for unit length along yield line.Use
        m20 grade concrete and Fe415 steel.

12 a.   Write the assembly of pre-stressing and reinforcing steel.

OR

   b.   Write the assumptions of yield line theory for analysis of reinforced concrete.

13 a.   Write the design principles of cantilever retaining wall.

OR   p.t.o

b.   Write the design procedure of cantilever retaining wall.

14 a.   Explain forces on a cantilever retaining wall with neat sketch.

OR

b.   Write the design philosophy and requirements of water tanks.

15 a.   Explain in detail the design procedure of an overhead circular and rectangular water tank.

OR

b.   What are joints in water tanks? Explain briefly with neat sketch.

16 a.   Write merits and demerits of prestressed concrete.

OR

b.   Explain the load balancing concept of prestressed concrete.

17 a.   What are methods of analysis by yield line theory of slabs.

OR

b.   Explain the components of flat slab construction with neat sketch?

18 a.   Explain the Indian code IS 456:2000 recommendations of flat slab design with neat sketches.

OR

b.   Explain about deep beams with neat sketch.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Design a circular tank with a fixed base for capacity of 400000 liters. The depth of water is to be 4 m. free board = 200 mm. Use M-20 grade concrete and Grade-I mild steel. Permissible direct tensile stress in concrete = 1.2 N/mm^2. Permissible stress in steel in direct tension = 100 N/mm^2. Sketch the details of reinforcement in tank walls. Adopt IS Code Tables for coefficients..

OR

b.   A reinforced concrete slab 5m x 5m is simply supported along the four edges and is reinforced with 10mm dia. Fe415 steel bar at 150mm c/c both ways the average effective depth of the slab is 100mm and overall depth of slab is 130mm the slab carry's a flooring of 50mm thick having unit weight of 2.2kN/m2 . Determine the maximum permissible service load if m20 concrete is used.

20 a.   Design a dog legged stair case for a residential building hall measuring 2.5 m x 5.0 m. The distance between floor to floor is 3.6 m. The live load may be taken as 2500 N/m2. Use M20 grade concrete and Fe415 grade steel.

OR

b.   Explain briefly mechanical prestressing systems with neat sketch.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

FLUID MECHANICS AND STRENGTH OF MATERIALS

Time : Three Hours   Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

1   Calculate the maximum deflection of a simply supported beam carrying a point load of 100kN
     at mid span. Span = 6m and EI = 20000 KN/m².
2   State the different types of elastic constants.
3   Write the assumption in the theory of simple bending.
4   State the term mass density.
5   List out different types of fluids.
6   Give the relation for change in length of a bar hanging freely under its own weight.
7   What do you mean by thrust diagram?
8   What are the limitations of Euler's formula?
9   State the term Specific Volume.
10   Write about frictional loss in pipe flow

Answer Any FIVE questions
Part-B (5 x10 =50 Marks)

11 a.   A rod of 150cm long and of diameter 2.0cm subjected to an axial pull of 20 kN. If the modulus
         of elasticity of the material of the rod is $2x10^5 N/mm^2$. Determine:
         1. Stress   2.Strain 3.Elongation of the rod.

OR

   b.   Derive an expression of the extension in a uniform tapering rod.

12 a.   Derive a relationship between bulk modulus and young's modulus.

OR   p.t.o

2

b.   A cantilever beam of length 3m carries a UDL load of 3 KN/m over a whole length and a point load of 2KN at the free end. Draw the SF and BM diagrams
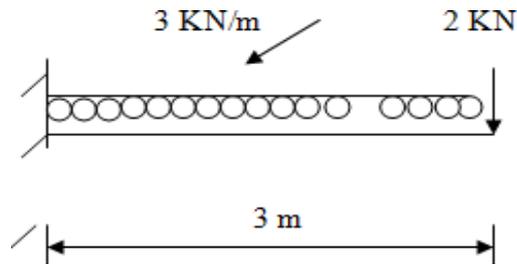
13 a.   A beam 12m long is supported at two points 2m from each end, So that there are two equal Overhanging portions. It carries concentrated loads of 4KN, 3KN and 5KN at 1m, 8m and 12m respectively from the left end. Draw the SF and BM diagrams. What are the Values of Maximum BM and SF?

OR

b.   A timber beam 100mm wide and 200mm deep is to be reinforced by bolting on two steel flitches each 150mm by 12.5mm in section. Calculate the moment of resistance in the following cases: i) Flitches attached symmetrically at the top and bottom ii) Flitches attached symmetrically at the sides. Allowable stress in timber is $6N/mm^2$. What is the maximum stress in the steel in each case? Take E for steel=$2x10^5N/mm^2$ and E for tensile=$1x10^4N/mm^2$.

14 a.
   A beam of length 12m is simply supported at two supports which are 8m apart, with an overhang of 2m on each side. The beam carrying uniformly distributed load of 2kN/m over the entire length of the beam. Draw the S.F. and B.M. and also locate the point of contra flexure.

OR

b.
   A simply supported beam of 8m span carries a point load of 10kN at its centre. It also subjects to a uniformly distributed load of 1kN/m over its entire span. Find the maximum deflection of the beam. Take E = 200 KN/mm^2 and I = 200 x 10^6 N/mm^4.

15 a.
   A simply supported beam of 6 m span carries a uniformly distributed load of 5kN/m over a length of 3m from left end. Calculate the deflection at mid span. Take E = 200 KN/mm^2 and I = 6.2 x 10^6 N/mm^4.

OR   p.t.o

b. A 1.5 m long column has a circular cross-section of 5cm diameter. One of the ends of the column is fixed in direction and position and other end is free. Taking factor of safety as 3, calculate the safe load using:
☐ Rankin's formula, take yield stress, σc=560N/mm2 and a=1/6000 for pinned ends.
☐ Euler's formula, take young's modulus for C.I=1.2x105N/mm2.

16 a. Determine the viscosity of a liquid having kinematic viscosity 6 stokes and specific gravity 1.9.

OR

b. Explain properties of fluids.

17 a. Analyze the expression for Capillary Rise.

OR

b. Write in detail about Reynolds Experiment.

18 a. Explain in Detail about the working principle of Orifice Meter.

OR

b. Analyse the momentum equation.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Three planks of each 50mm x200 mm timber are built up to a symmetrical I section for a beam. The maximum shear force over the beam is 4KN. Propose an alternate rectangular section of the same material so that the maximum shear stress developed is same in both sections. Assume then width of the section to be 2/3 of the depth.

OR

b. A beam of uniform section 10 m long carries a UDL of KN/m for the entire length and a concentrated load of 10 KN at right end. The beam is freely supported at the left end. Find the position of the second support so that the maximum bending moment in the beam is as minimum as possible. Also compute the maximum bending moment

20 a. A 15 cm diameter vertical cylinder rotates concentrically inside another cylinder of diameter 15.10 cm. Both cylinders are 25 cm high. The space between the cylinders is filled with a liquid whose viscosity is unknown. If a torque of 12.0 Nm is required to rotate the inner cylinder at 100 rpm determine the viscosity of the fluid.

OR

b. A horizontal venturimeter with inlet diameter 20cm and throat dia 10cm is used to measure the flow of oil of specific gravity 0.8, the discharge of oil through venturimeter is 60 lit/sec. Find the reading of the oil – mercury differential manometer. Take C_d= 0.98.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

IRRIGATION ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What are the disadvantages of irrigation?
2   Write short notes on the Water relationship.
3   What are the factors affecting duty?
4   Write short notes on inundation irrigation.
5   Define the term weir.
6   What are the forces acting on a gravity dam?
7   Define meandering of rivers.
8   What are the causes of meandering?
9   Define Water storage efficiency.
10   What are the factors to be considered during the selection of particular type of lining?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a. Explain the necessity and scope of irrigation.
OR
   b. Explain in detail about crop period.

12 a. Explain in detail about various Crops and cropping seasons in India.
OR
   b. What are the factors to be considered in the process of Crop rotation? Explain.

13 a. Describe briefly check flooding and basin flooding.
OR
   b. What are the process to be followed in perennial irrigation? Explain.

14 a. Explain broadly tank sluice.
OR
   b. Write in detail about the component parts of diversion works.

15 a. What are the causes of failure of earth dams and its remedies?   p.t.o

OR

b.   Explain in detail about the Sprinkler and Drip irrigation.

16 a.   What is meant by a fall in a canal? Why it is necessary? How do you select its location?

OR

b.   Explain aqueduct and super passage.

17 a.   What are the process involved in Canal regulation works.

OR

b.   What are the causes of water logging? Explain in detail.

18 a.   Write in detail about land drainage.

OR

b.   What are the Roles and responsibilities of farmer's and government agencies in Turn Over?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Describe in detail about the G.C.A., C.C.A., Kor depth.

OR

b.   Describe border strip method of irrigation. Derive the expression for the time required to cover a given area by this method, for a given rate of discharge and the rate of infiltration of water in the soil.

20 a.   What do you understand by level crossing? Explain with a neat sketch.

OR

b.   Explain need for canal irrigation management.

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SL.NO:1202

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

STRENGTH OF MATERIALS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Calculate the maximum torque that a shaft of 125mm diameter can transmit, if the maximum angle of the twist is $1°$ in a length of 1.5m. Take $C=70\times10^3$ N/mm^2.

2   A cantilever beam of span 2 m is carrying a point load of 20kN at its free end. Calculate the slope at the free end. Assume EI = $12x10^3$ kN-m^2.

3   Define strain.Illustrate about compressive strain and tensile strain.

4   Draw the shear force diagram for a cantilever beam of span 4 m and carrying a point load of 50 KN at mid span.

5   Define crippling load.

6   Define principal planes.

7   Show the cantilever beam. With a simple sketch.

8   Differentiate between close-coiled and open-coiled helical springs.

9   Write down the equation for the maximum shear stress of a solid circular section in diameter 'D' when subjected to torque 'T'.

10   State the applications of the cylindrical and spherical shells used?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   The stresses at a point in a bar are 200 N/mm^2 (tensile) and 100 N/mm^2 (compressive). Analyze the resultant stress in magnitude and direction on a plane inclined at 60° to the axis of the major stress. Also determine the maximum intensity of shear stress in the material at the point.

OR

b.   A beam 12m long is supported at two points 2m from each end, So that there are two equal Overhanging portions. It carries concentrated loads of 4KN, 3KN and 5KN at 1m, 8m and 12m respectively from the left end. Draw the SF and BM diagrams. Analyze the values of maximum BM and SF?

12 a. A steel rod of 3cm diameter is enclosed centrally in a hollow copper tube of external diameter 5cm and internal diameter of 4cm.The composite bar is than subjected to an axial pull of 45000N.If the length of each bar is equal to15cm.Determine: i) the stress in the rod and tube ii) load carried by each bar Take E for steel as $2.1x10^5 N/mm^2$ and E for copper as $1.1x10^5 N/mm^2$

OR

b. A steel tube of 30mm external diameter and 20mm internal diameter encloses a copper rod of 15mm diameter to which it is rigidly joined at each end. If the at temperature of $10^o c$ there is no longitudinal stress, calculate stresses in the rod and tube when the temperature is raised to $200^o c$.Take E for steel and copper as $2.1x10^5 N/mm^2$ and $1x10^5 N/mm^2$ respectively. The value of co-efficient of linear expansion for steel and copper is given as $11x10^{-6}$ per $^o C$ and $18x10^{-6}$ per$^o C$ respectively.

13 a. A Simply supported beam of 6m, carries point load of 3KN and 6KN at distance of 2m and 4m from the left end. Chart the SFD and BMD for the beam.

OR

b. Compute the shearing stress distribution over beam of rectangular section.

14 a. Calculate the maximum stress induced in a cast iron pipe of external diameter 40mm, of internal diameter 20mm and of length 4m when the pipe is supported at its ends and carries a point load of 80N at its centre.

   □

OR

b. A hollow shaft of diameter ratio 3/8 is required to transmit 588kW at 100rpm. The maximum torque exceeds the mean by 20%. The shear stress is limited to $63N/mm^2$ and the twist should not be more than 0.0081rad. Calculate the external diameter required satisfying both the conditions. Take G=84Gpa. Length 3m.

15 a. A close coil helical spring of round steel wire 10mm in diameter has a mean radius of 120mm. The spring has 10 complete turns and is subjected to an axial load of 200N. Determine (i) deflection of the spring (ii) maximum shear stress in the wire and (iii) stiffness of the spring. G=80 kN/mm^2.

OR

b. A composite shaft consists of copper rod of 25mm diameter enclosed in a steel tube of external diameter 45mm and 5mm thick. The shaft is required to transmit a torque of 1100Nm and both the shafts have equal lengths, welded to a plate at each end, so that their twists are equal. If the modulus of rigidity for steel as twice that of copper, Determine (i) shear stress developed in copper (ii) shear stress developed in steel.

16 a. A cantilever beam 50mm wide 80mm deep is 2m long. It carries a UDL over the entire length along with a point load of 5kN at its free end. Determine the slope at the free end when the deflection is 7.5 mm at the free end. Take $E = 2 \times 10^5$ N/mm^2.

OR

b. A simply supported beam of 8m span carries a point load of 10kN at its centre. It also subjects to a uniformly distributed load of 1kN/m over its entire span. Calculate the maximum deflection of the beam. Take $E = 200$ kN/mm^2 and $I = 200 \times 10^6$ N/mm^4.

17 a. A hollow alloy tube 5 m long with external diameter 40mm and 25mm respectively was found to extend 6.4 mm under a tensile load of 60KN. Calculate the buckling load for the tube when used as a column with both ends pinned. Also find the safe load for the tube, taking a factor of safety=4.

OR

b. A 1.5 m long column has a circular cross-section of 5cm diameter. One of the ends of the column is fixed in direction and position and other end is free. Taking factor of safety as 3, calculate the safe load using:

(i)Rankin's formula, take yield stress, σ_c=560N/mm^2 and a=1/6000 for pinned ends.

(ii)Euler's formula, take young's modulus for C.I=1.2x10^{5}N/mm^2.

18 a. At a point within a body subjected to two mutually perpendicular directions, the stresses are 80N/mm^2 tensile and 40 N/mm^2 tensile. Each of the above stresses is accompanied by a shear stress of 60 N/mm^2. Determine the normal stress, shear stress and resultant stress on an oblique plane inclined at an angle of 45° with the axis of major tensile stress.

OR

b. The intensity of resultant stress on a plane AB at a point in a material under stress is 800 N/cm^2 and it is inclined at 30° to the normal to that plane. The normal component of stress on other plane BC at right angles to plane AB is 600N/cm^2.Determine the following:
(i)The resultant stress on a plane BC,
(ii)The principal stresses and their directions,
(iii)The maximum shear stresses and their planes.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. A rod of 250 cm long and diameter 3.0cm is subjected to an axial pull of 30 KN.If the modulus of elasticity of the material of the rod is 2x 10^5 N/mm^2.Determine 1. Stress 2. Strain 3. the elongation of the rod

OR

b. The extension in a rectangular steel bar of length 400mm and thickness 3mm is found be 0.21mm .The bar tapers uniformly in width from 20mm to 60mm E for the bar is 2x 10^5 N/mm^2. Determine the axial load on the bar.

p.t.o

20 a. A 2m long cantilever made of steel tube of 150 mm external diameter and 10mm thick is loaded. If E=200 GN/m^2 calculate (1) The value of W so that the maximum bending stress is 150 MN/m (2) The maximum deflection for the loading.

OR

b. A rectangular block of material is subjected to a tensile stress of 210 N/mm^2 on one plane and a tensile stress of 28N/mm^2 on the plane at right angle to the former plane and a tensile stress of 28 N/mm^2 on the plane at right angle to the former. Each of the above stress is accompanied by a shear stress of 53 N/mm^2. Calculate (i) The direction and magnitude of each of the principal stress (ii) Magnitude of greatest shear stress.

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SL.NO:1199

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

FLUID MECHANICS AND MACHINERY

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define the term specific weight of fluid.
2   Define Vapour Pressure.
3   State the applications of pitot tube.
4   Write the explain pipe in parallel.
5   Define the term laminar sub layer.
6   Define net head of turbine.
7   Define outward flow reaction turbine.
8   List out the the main parts of centrifugal pump.
9   Write down the expression for capillary fall.
10   Define specific speed of turbine.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Analyze the expression for Capillary Rise.
                            OR
   b.   Derive the expression for loss of head due to sudden contraction in pipes.

12 a.   Derive an expression for flow through pipes in series.
                            OR
   b.   Examine whether the flowing velocity components represent a physically possible flow? u r = r sin ϴ, u ϴ = 2r Cos ϴ.

13 a.   A 25 cm diameter pipe carries oil of Sp.gr 0.9 at a velocity of 3m/s. At another section the diameter is 20 cm. Find the velocity at this section and also mass rate of flow of oil.
                            OR
   b.   The pipe line 60cm diameter bifurcates at y junction into two branches 40cm and 30cm diameter. If the rate of flow in the main pipe is 1.5m³/sec and mean velocity of flow is 30cm diameter pipe is 7.5m/sec. Determine the rate of flow in 40cm diameter pipe.

14 a. A single acting reciprocating pump running at a 50rpm speed delivers 0.1m³/s of water. The diameter of the piston is 200mm and stroke length 400mm. Determine (i) The theoretical discharge of the pump, (ii) Co-efficient of discharge, and (iii) slip and percentage slip of the pump .

OR

b. Discuss in detail about separation of boundary layer.

15 a. Explain in detail about various types of draft tube with neat sketches.

OR

b. Write in detail about the various head and efficiencies of centrifugal pump.

16 a. Explain in detail the classifications of fluid flow.

OR

b. Explain in detail about Stream Function with their Properties.

17 a. Distinguish between Impulse turbines and reaction turbine with neat sketch.

OR

b. Discuss in detail about the working Principle and applications of Pelton wheel turbine with neat sketches.

18 a. Explain the working Principle of Single Acting Reciprocating Pump with neat sketch.

OR

b. What are the types of casings of a centrifugal pump and explain them with neat sketches?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Water flows through a pipe AB 1.2m diameter at 3 m/s and then passes through a pipe BC 1.5m dia at C the pipe branches. Branch CD is 0.8m diameter and carries one third of flow in AB. The flow velocity in branch CE is 2.5m/s. Find the volume of flow in AB, the velocity in BC, the velocity in CD and the Diameter of CE.

OR

b. An orifice meter with orifice diameter 15cm is inserted in a pipe of 30cm diameter. The pressure difference measured by mercury and oil differential manometer on the two side of the orifice meter gives a reading of 50cm of mercury find the rate of flow of oil of specific gravity 0.9 when the coefficient of discharge of the meter 0.64.

20 a. The rate of flow through a horizontal pipe is 0.25 m^3/s. The diameter of the pipe which is 200mm is suddenly enlarged to 400mm. the pressure intensity in the smaller pipe is 11.772 N/cm^2. Determine (i). Loss of head due to sudden enlargement (ii). Pressure intensity in large pipe. (iii). Power lost due to enlargement.

OR

b.

Find the power required to drive a centrifugal pump which delivers 0.04 cm³/s of water to a height of 20 m through a 15 cm diameter pipe and 100m long. The overall efficiency of the pump is 70%, and co-efficient of friction 'f' = 0.15 in the formula hf=4fLV²/d*2g

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SL.NO:1190

VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ENGINEERING GEOLOGY

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Describe mantle.
2   Explain deflation.
3   Briefly explain Cleavage of a mineral
4   What is Magma?
5   Write about structural geology.
6   Briefly explain Reservoirs.
7   Define plate tectonics.
8   Define Granites.
9   What are the various types at structure in igneous rock?
10   What are coral reefs?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Describe in detail, the process of weathering of rocks. Add a note on the effect of weathering
        on the strength of rocks.
                                    OR
   b.   Briefly explain the origin and occurrence of ground water.

12 a.   Explain in detail about physical weathering and Mechanical Weathering with sketches.
                                    OR
   b.   Write advantages and disadvantages of remote sensing application in engineering.

13 a.   Define the following terms with sketches i) Parameter ii) Indices iii) Symbols iv) Forms
                                    OR
   b.   Explain any three crystal systems with sketches.

14 a.   Describe following Rock properties in detail: (i) Basalt, (ii) Marble, (iii) Phyllite. (iv) Lime
        stone.
                                    OR
   b.   Discuss the influence of structural attitudes of sedimentary rocks on dam stability.   p.t.o

15 a. Briefly explain the Sedimentary rocks of Clastic and Non-Clastic origin.

OR

b. Describe the structure and textures of Metamorphic Rocks

16 a. Explain the following with neat sketches: (i) Open and closed folds, (ii) Graded Bedding, (iii) Current Bedding and   (iv) Anticline and syncline.

OR

b. Explain, with neat sketches, the principal types of Faults as recognized on the basis of apparent movement and mode of occurrence

17 a. What are landslides? Discuss briefly their types, causes and preventive measures.

OR

b. Explain with neat sketches about Outcrop, True dip and apparent dip?

18 a. Explain in detail about the geological conditions necessary for construction of dams.

OR

b. Explain in detail the role of Aerial photographs and Satellite images in planning and execution of Civil Engineering projects.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain the work of a river and describe the various erosional and depositional landforms created by a river

OR

b. Describe the composition, Texture, characteristics, occurrence and uses of limestone and Slate

20 a. How are folds classified? Describe different types of folds with neat sketches

OR

b. Explain briefly about the various methods of geophysical investigations

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SL.NO:1191

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

HIGHWAY ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Write short notes on CRF?
2   How do you calculate the ESWL at a given depth below the pavement for a dual wheel assembly?
3   Define ESWL.
4   What is traffic index?
5   Why joints are provided in cement concrete pavements?
6   What are the operations involve in road construction?
7   What are the important modifications made in Macadam's method of road construction?
8   What are the factors considered in horizontal alignment?
9   What are the major effects in climatic variations?
10   What are the failures in wearing course?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Calculate the safe stopping sight distance for design speed of 50kmph for a) two way traffic on a two lane road b) two way traffic on a single plane road. Assume co-efficient of friction as 0.37 and reaction time of driver as 2.5 seconds.

OR

b.   The radious of horizontal circular curve is 100m.The design speed is 50kmph and the design coefficient of lateral friction is 0.15

12 a.   Explain medians along highways? State its purpose and requirements.

OR

b.   Briefly explain the Tresaguet and Macadam's method of road construction.

13 a.   Explain necessity and principles of realignment of highway project.

OR

b.   What are the objectives of widening of road pavement at horizontal curves? Derive an expression for   p.t.o
        the extra widening

14 a. Explain what are the factors affecting friction or skid resistance.

OR

b. Describe the factors influencing the design of flexible pavements.

15 a. Explain briefly about the factors governing the structural design of pavements.

OR

b. Explain 'Flexible and Rigid' pavements and bring out the points of difference.

16 a. Explain the importance and procedure of field density test and crushing strength test.

OR

b. Specify the design approach for the surface drainage system of highways.

17 a. Explain the uses of emulsion. How are they prepared? Discuss in brief the tests carried out on emulsion?

OR

b. Write short notes on;
a)Map(alligator) cracking b)Reflection cracking   c) Skidding of pavement surfaces d) Scaling of cement concrete e) Mud pumping

18 a. What are the various types of General failures in flexible pavement? Explain the Causes.

OR

b. Explain the failures in sub-base or base courses.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Briefly explain the process of engineering surveys for a highway alignment through conventional and modern methods.

OR

b. Briefly explain the various Engineering surveys needed for road alignment.

20 a.
(i) Different between flexible and rigid pavements
(ii) Explain the design consideration's for spacing of expansion and construction joints

OR

b. Classify the different types of failures in flexible pavement and mention the important causes of each.

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SL.NO:1181

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

MODERN METHODS OF STRUCTURAL ANALYSIS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What is meant by flexibility?

2   What is a primary structure?

3   Write down the equation of element stiffness matrix as applied to 2D plane element.

4   List the properties of the stiffness matrix.

5   What are the basic steps in FEM?

6   Define aspect ratio.

7   What is a plastic hinge?

8   What are symmetric frames and how they analyzed?

9   What are the components in suspension bridge with stiffening girder?

10   What is a catenary?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Analyze the continuous beam shown in figure using force method. EI = 1.
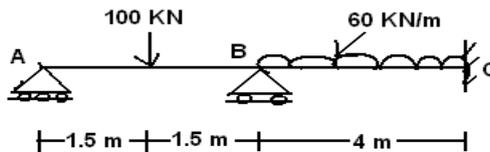
OR

                                                                 P.T.O

b. A two span continuous beam ABC is hinged at A and B and roller at C. Span AB = BC = 10m. Analyze the continuous beam using force method.UDL=14 kN/m is acting from A to B and a point load of 20kN is acting in the middle of BC.EI= Constant.

12 a. Analyze the continuous beam ABC shown in figure by stiffness method and also draw the shear force diagram.
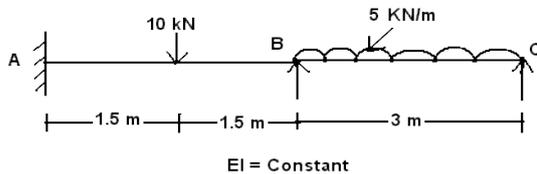
OR

b. Analyze the portal frame ABCD shown in figure by stiffness method and also sketch the bending moment diagram.
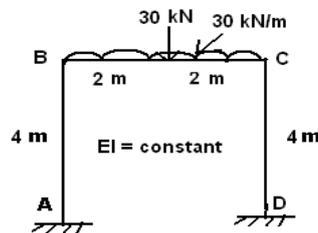
13 a. A portal frame ABCD with supports A and D are fixed at same level carries a uniformly distributed load of 8 tons/m on the span AB. Span AB = BC = CD = 9 m. EI is constant throughout. Analyze the frame by stiffness matrix method.

OR

b. Explain the General procedure of Finite Element Analysis.

14 a. Explain one dimensional and two dimensional displacement fields. Also write notes on Pascal triangle.

OR

b. Describe the shape functions for plane stress and strain element.

P.T.O

SL.NO:1177

15 a. Derive the shape factor for I section and circular section.

OR

b. A simply supported beam of span 5 m is to be designed for an udl of 25 kN/m. Design a suitable section using plastic theory, assuming yield stress in steel as fy = 250 N/mm2.

16 a. Determine the shape factor of a T-section beam of flange dimension 100 x 12 mm and web dimension 138 x 12 mm thick.

OR

b. Using the method of tension coefficients Analyze the plane truss shown in fig and find the forces in the members.
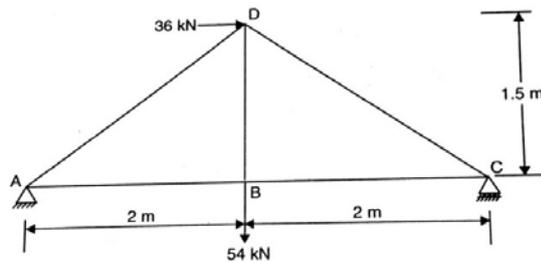
17 a. A three hinged stiffening girder of a suspension bridge of 100 m span subjected to two point loads 10 kN each placed at 20 m and 40 m respectively from the left hand hinge. Determine the bending moment and shear force in the girder at section 30 m from each end. Also determine the maximum tension in the cable which has a central dip of 10 m.

OR

b. A suspension bridge cable has a span of 120m and a central dip 10m is suspended from the same level at two towers. The bridge cable is stiffened by a stiffening girder hinged at the end supports which carries a single concentrated load of 100kN at a point of 30 m from left end. Assuming equal tension in the suspension hangers.
Calculate:
      (i) the horizontal tension in the cable.
      (ii) the maximum positive bending moment.

18 a. Analyze the given continuous beam shown in figure using force method.
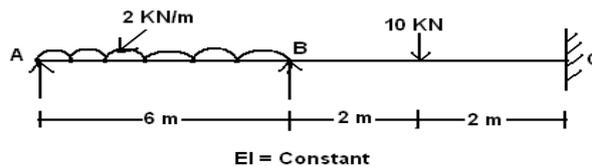
OR

b. How the assembling of force vectors and stiffness matrices done for similar elements in FEM?

P.T.O

4
Answer ALL questions
PART-C (2 x 15 = 30)

19 a. A two span continuous beam ABC is fixed at A and roller at support B and C. Span AB = BC = 15m. Set up flexibility influence coefficient matrix assuming moments at A and B as redundants. UDL=29 kN/m is acting from B to C and a point load of 30 kN is acting in the middle of AB. EI=3.

OR

b. Solve the portal frame ABCD shown in Fig. below by flexibility matrix method and sketch the bending moment diagram.
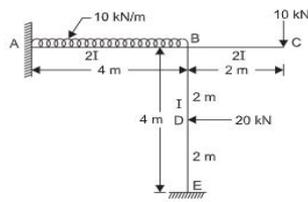
20 a. Determine the shape factor of a T-section beam of flange dimension 98 x 15 mm and web dimension 145 x 15 mm thick.

OR

b. A suspension bridge of 150m span has two three hinged stiffening girders supported by two cables with a central dip of 15m. If three point loads of 30kN each are placed along the centre line of the roadway at 10, 15 and 20m from left hand hinge, find the shear force and bending moment in each girder at 33m from each end. Calculate the maximum tension in the cable.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
HUMANITIES & SCIENCES

ENGINEERING MATHEMATICS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1. Obtain the characteristic equation of $\begin{pmatrix} 2 & -3 & 1 \\ 3 & 1 & 3 \\ -5 & 2 & -4 \end{pmatrix}$

2. Define orthogonal matrices.

3. Define evolute.

4. Find the centre of curvature of the curve $y = x^2$ at the origin.

5. If $u = x^2 y^3$ where $x = \log t$ and $y = e^t$ Find $\dfrac{du}{dt}$

6. Examine the maximum and minimum values of $3x^2 - y^2 + x^3$

7. Integrate $\displaystyle\int_0^1 \int_1^2 x(x + y)\,dy\,dx.$

8. Integrate $\displaystyle\int_0^{\pi/2} \int_0^{\pi/2} \sin(\theta + \phi)\,d\theta\,d\phi$

9. Prove that $\nabla(r^n) = nr^{n-2} \vec{r}$

10. State Stoke's theorem

(p.t.o)

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.

Find the Eigen values and Eigenvectors of the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix}$.

OR

b.

Obtain the Eigen values and Eigenvector of the matrix $\begin{pmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{pmatrix}$

12 a.

Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c).

OR

b.

Prove that the radius of curvature at any point of the cycloid

$x = a(\theta + \sin\theta); y = a(1 - \cos\theta)$ is $4a\cos\dfrac{\theta}{2}$

13 a.

Find the maximum and minimum values of the function

$x^3 y^2 (1 - x - y)$

OR

b.

(i) If $u = \sin^{-1}\dfrac{x}{y} + \tan^{-1}\dfrac{x}{y}$, then find the value of $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y}$

(ii) Find $\dfrac{du}{dt}$ as a total derivative and verify the result by the direct

substitution of $u = x^2 + y^2 + z^2$ when $x = e^{2t}, y = e^{2t}\cos 3t$, and

$z = e^{2t}\sin 3t$

14 a.

Integrate $\displaystyle\int_0^a \int_0^{\sqrt{a^2-x^2}} \int_0^{\sqrt{a^2-x^2-y^2}} \dfrac{dz\,dy\,dx}{\sqrt{a^2 - x^2 - y^2 - z^2}}$

OR

(p.t.o)
Sl.No.17MABS01

b.

Obtain the area enclosed by the parabola $y^2 = 4ax$, $x-$ axis and the latus rectum of the parabola.

15 a.

If $\vec{F} = x^2\vec{i} + xy\vec{j}$ evaluate $\int \vec{F}.d\vec{r}$ from (0, 0) to (1, 1) along the line $y=x$

OR

b.

Obtain the values of a and b so that the surfaces $ax^3 - by^2z = (a+3)x^2$ and $4x^2y - z^3 = 11$ may cut orthogonally at $(2, -1, -3)$

16 a.

Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ and $z = 0$.

OR

b.

For the given curve $x = a\cos\theta, y = b\sin\theta$ Find ρ at $\left(\dfrac{a}{\sqrt{2}}, \dfrac{b}{\sqrt{2}}\right)$

17 a.

Obtain the equation to the circle of curvature of the curve $xy = c^2$ at (c, c).

OR

b.

Prove that the radius of curvature at any point of the cycloid $x = a(\theta + \sin\theta)$; $y = a(1 - \cos\theta)$ is $4a\cos\dfrac{\theta}{2}$

18 a.

Prove that $\nabla^2(r^n) = n(n+1)r^{n-2}$ where $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$ and $r = |\vec{r}|$

OR

b.

    For the curve $x^3 + y^3 = 2$ find the co-ordinates of the centre of curvature at the point $(1, 1)$

19 a.

    Diagonalise the matrix $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ and hence find A^5

OR

b.

    Obtain the equation of the evolute of the curve $x^{2/3} + y^{2/3} = a^{2/3}$

20 a.

    Determine the value of $\int_0^1 \int_0^{x^2} (x^2 + y^2)\,dy\,dx$

OR

b.

    Change the order of integration in $\int_0^a \int_y^a \dfrac{x^2}{\sqrt{x^2 + y^2}}\,dx\,dy$ and then evaluate

it.

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SL.NO:1165

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

UNIT OPERATIONS AND PROCESSES IN WATER AND WASTEWATER TREATMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Write short note on coagulation.
2   Write the types of flotation.
3   Write about synthetic medium filters.
4   Name two types of precipitation.
5   List the Bio kinetic coefficients.
6   What is meant by discrete particle settling?
7   What is Reynolds number?
8   What is backwashing process?
9   What is ACT (Activated carbon treatment)?
10   What is the effect of substrate limited growth?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain various applications for Coagulants and flocculants.
                                OR
   b.   Explain the process of flocculation and its types.

12 a.   Explain different types of Coagulants and flocculants.
                                OR
   b.   What are the major design checks for sedimentation tank design and explain in detail.

13 a.   Derive the expression of Gas Transfer in Liquid interface by two film theory.
                                OR
   b.   Explain the different types of filter in head loss.

14 a.   Write short note on: a) Pre-precipitation b) Co-precipitation c) Post – Precipitation.
                                OR
   b.   Explain the various objectives of biological treatment.

15 a.   Briefly explain systems of aeration   p.t.o

OR

b. Briefly Explain biological unit process.

16 a. Explain the types of rapid mixing devices.

OR

b. Explain the Head loss development.

17 a. Explain the detailed about filtration and derive Carmen – Kozeny Equation

OR

b. Explain the chemical precipitation method for heavy metal removal.

18 a. What are the Mechanisms of Disinfectant and what are the factors influencing the action of disinfectant.

OR

b. Write short notes activated sludge process

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain with the help of flow sheets, possible arrangements of preliminary treatment units in waste water processes.

OR

b. Briefly explain about advanced or tertiary treatment of wastewater.

20 a. Describe in brief various unit operations for chemical clarification anlong with the design recommendations

OR

b. Discuss in brief various design parameters used for settling tanks.

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SL.NO:1157

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE - HYDROLOGY

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What is Run-off?

2   Write the Meyer's equation for estimating evaporation.

3   Define unit hydrograph.

4   Define stream density

5   Define specific yield

6   State Darcy's law

7   How the precipitation can be measured?

8   Define Direct runoff

9   What are the characteristics of IUH?

10 What are all the assumptions made in derivation of Dupuits equations?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a. Explain a procedure of deriving a synthetic unit hydrograph for a catchment by using Snyder"s method.

OR

b. Derive an expression for the steady state discharge of well fully percolated into a confined aquifer.

12 a. Describe the working principle of a non-recording type rain gauge with neat sketch, Mentioning its advantages and disadvantages

OR

b. What are the precautions to be taken in selection a site for the location of a rain gauge? Explain in detail.

P.T.O

13 a. What is meant by Probable Maximum Precipitation? Describe the methods of estimating PMP. What are its design applications?

OR

b. Discuss the application Of hydrology in practice

14 a. What are the methods available for the measurement of Infiltration? Explain it with a neat sketch.

OR

b. Differentiate the reservoir evaporation from the agricultural field Evaporation

15 a. Define Pan Coefficient. Discuss the relative merits and demerits of sunken, floating and land pans.

OR

b. What are the diffident procedures used for the base flow separation?

16 a. List the factors affecting a flood hydrograph. Discuss the role of these factors.

OR

b. Describe the analysis of the recession limb of a flood hydrograph.

17 a. Describe the various empirical methods used for the estimation of peak flood.

OR

b. Write down the procedures for determination of flood magnitude by Gumble"s method

18 a. Describe the different types of aquifers with neat sketches.

OR

b. State Dupuit-Forcheimer assumptions and its uses in groundwater hydrology?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. What do you understand by unit hydrograph? How is it derived? Explain its use in construction of flood hydrograph resulting from two or more periods of rainfall

OR

b. Describe the principle of working of a weighing bucket type recording raingauge with a neat sketch. Mention its advantages and disadvantages?

20 a. Explain with neat sketches how to evaporation is measured using evaporation pan

<div align="center">**OR**</div>

b. Describe the Muskingum method of channel routing. Assume the values of the coefficients K and X for the reach

<div align="center">*****</div>

<div align="right">**SL.NO:1147**</div>

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE - INDUSTRIAL WASTE MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Name some methods of Treatment of Effluent.
2   What are the impacts of Toxicity Materials?
3   Define Neutralization
4   Define Chemical Oxidation.
5   What is Advanced Wastewater Treatment?
6   Define sludge volume index.
7   Define centrifugal thickening.
8   Write short notes on nitrogen cycle.
9   Explain the working of anaerobic type waste stabilization bond?
10 Discuss in brief various methods used for suspended solids removable through AWT process.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Write the Short Notes on :
        a.Digestion of Sludge b. Conditioning of Sludge
                          OR
   b.   Demonstrate the Toxic Chemicals that are used in advanced wastewater treatment.

12 a.   What is the role of regulatory body in the wastewater treatment?
                          OR
   b.   Explain in detail about the Individual Treatment Plant.

13 a.   Describe Toxicity of industrial wastewater.
                          OR
   b.   Explain the different initial methods involved in the waste water treatment.

(p.t.o)

14 a. Explain in detail about Secondary Wastewater Treatment.

OR

b. Explain in detail about biological treatment process.

15 a. Describe in detail about Nutrient Removal.

OR

b. Describe in detail about the treatment of wastewater in any one industry.

16 a. Explain in Detail the process of filters in Advanced wastewater treatment

OR

b. Explain in Detail about the characteristics of Sludge Thickening.

17 a. Explain in Detail about the Disposal of Sludge?

OR

b. Being an environmental Engineer suggest suitable method for the waste water treatment of tannery Industry.

18 a. Discuss with neat diagram about the treatment of Textiles waste water.

OR

b. Describe in detail about the anaerobic biological treatment process.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. What are the advantages and disadvantages of Boilers and cooling water in detail?

OR

b. Explain the effects of the following industrial effluent on aquatic environment when discharged without treatment
       (a) Nitrogenous fertilizer plant
       (b) Molasses based distillary
       (c) Dairy effluent.

20 a. Explain the necessity of equalization and proportioning for Industrial waste water treatment.

OR

b. (a) What are the different sources of waste water in Sugar Mill. Explain in detail.
   (b) Describe biological treatment of effluent from Sugar Mill.

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SL.NO:1135

SL.NO:1125   **SUBJECT CODE:17CVPI05**

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

CONSTRUCTION PROJECT MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Write the need of project management
2   List the types of Construction.
3   Write the priciples of project manager.
4   Write down the suggestion of historical perspective
5   Explain the labour relationship in construction
6   Differenciate primary and detailed cost.
7   List the effects of project risks on organization.
8   Write the characteristics of labour
9   Write the categories of inventory control
10   What is the price index formula ?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain organization level of project engineering
                          OR
   b.   Elaborate the factors affecting job-site productivity

12 a.   Write down the details of (i) Historical cost data and (ii) Cost indices
                          OR
   b.   Explain the selection of professional services for a construction project

13 a.   Explain financing of constructed facilities
                          OR
   b.   Classify the types of Construction.

14 a.   Elaborate the moder trends in project management
                          OR
   b.   Details about the strategic positioning

15 a.   Write a brief notes on owner builder operation   p.t.o

OR

b.   Write details on the construction site environment

16 a.   Write the purpose and important of schedule

OR

b.   Explain the need of consideration of the construction site environment.

17 a.   Explain historical perspective

OR

b.   Expalin the types of measurements of materials in constrcution site.

18 a.   Write the details of estimate based on engineer's list of Quantities.

OR

b.   Briefly describe the project life cycle

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Briefly explain the labour characteristics

OR

b.   Elaborate the Need of Assessment of the structres's Life Cycle assessment

20 a.   Explain the factors to be considered in construction site environment before project starts

OR

b.   Briefly explain to the construction cost estimation and its types's

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SL.NO:1125

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
COMMON TO ALL

SMART MATERIALS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Demonstrate, how the Metallic glasses can be used for transformer core materials?

2   Explain briefly about transformation temperature in SMA.

3   Distinguish between Type I and Type II Superconductors.

4   Interpret unit cell.

5   Demonstrate top-down and bottom-up approach for producing nanoparticles.

6   Interpret any two techniques for the synthesis of nanophase materials.

7   Explain briefly about top-down approach.

8   Describe coercivity and retentivity.

9   Explain briefly about soft magnetic materials.

10   Identify the reason, why the superconductor exhibits the property of diamagnetism?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Categorize metallic glasses? Give examples. Mention the properties of metallic glasses.

OR

b.   Draw the unit cells of SC, BCC, FCC and HCP structures

12 a.   Examine the effects of temperature, magnetic field and current on the superconductivity.

OR

b.   Schedule the following for SC, BCC, FCC and HCP structures

13 a.   Explain the properties of diamagnetic materials with neat diagram.

OR

b.   Explain two characteristics of SMA with neat diagrams.

14 a.   Explain the properties of Ni-Ti alloy.   p.t.o

OR

b.   Express the outline of magnetic and electrical properties of metallic glasses. Mention any two applications of metallic glasses.

15 a.   Describe the following (i) unit cell (ii) coordination number (iii) nearest neighbour distance (iv) packing factor

OR

b.   Explain the advantages, disadvantages and applications of ball milling method.

16 a.   Explain Carbon Nano Tubes? How are they classified? Explain.

OR

b.   Explain in detail about any one of the methods of fabrication of CNT.

17 a.   Differentiate the properties of dia, para and ferromagnetic materials

OR

b.   Discuss the properties of superconductors.

18 a.   Describe about Type – I super conductor. Write down its characteristics.

OR

b.   Discuss Isotope Effect and Meissner effect.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Categorize hard and soft magnetic materials? Mention their applications.

OR

b.   Generalize the properties of metallic glasses.

20 a.   Illustrate sol-gel method of preparing nanophase materials and mention its advantages.

OR

b.   Illustrate hysteresis on the basis of domain theory.

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SL.NO:1119

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E.DEGREE EXAMINATIONS- FEB - 2022
COMMON TO ALL
PHYSICAL SCIENCES
(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks
PART A - ENGINEERING PHYSICS

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   Tell about population inversion.
2   Schedule any two applications of laser in industrial field.
3   Report about step index fiber.
4   Tell about the characteristics of graded index multimode fiber.
5   Interpret about X-ray Fluoroscopy.

Answer **Any FIVE** questions
Part-B (2 x12 =24 Marks)

6 a.   Predict the applications of laser in communication, military and chemical fields.
OR
   b.   Recognize the following terms: population inversion, pumping process and laser action.

7 a.   Express the various types of fibers based on refractive index profile.
OR
   b.   Express the characteristics of penetrant.

Answer ALL questions
PART-C (1 x 16 = 16)
8 a.   Demonstrate the construction and working of semiconductor laser with necessary diagram.
OR
   b.   Illustrate the working of X-ray radiography.

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P.T.O

PART A - ENGINEERING CHEMISTRY

(Candidates admitted under 2017 Regulations-SCBCS)

Time : 1 1/2 Hours   Maximum Marks:50 Marks

Answer **ALL** questions
Part-A (5 x 2 =10 Marks)

1   Brief the terms electrolytic and electrochemical cell.
2   What is helmholtz's electrical double layer?
3   Show the structure of EDTA and Ca-EDTA complex.
4   Mention the causes of boiler corrosion
5   Write a note on solar energy

Answer **Any FIVE** questions
Part-B (2 x12 =24 Marks)

6 a.   Explain standard electrode potential in detail.

OR

   b.   Calculate the emf of the cell Mg/Mg^{2+} $//Cd^{2+}$ (aq) $/Cd(s)$ at 25^0C where, $[Cd^{2+}]$=0.7M, $[Mg^{2+}]$ =1.0M and E^0cell =1.97 V.

7 a.   Discuss in detail dry corrosion with mechanism.

OR

   b.   Describe producer gas in detail.

Answer ALL questions
PART-C (1 x 16 = 16)

8 a.   Explain the working principle of H_2-O_2 fuel cell with reactions.

OR

   b.   Elaborate the non-conventional energy sources.

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S.No.1118

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

MATHEMATICS FOR CIVIL ENGINEERS

Time : Three Hours   Maximum Marks:100 Marks

Answer ALL questions
Part-A (10 x 2 =20 Marks)

1   Find the complementary function of $(D^2-3D+5)y = 5 \sin 5x$

2   Solve $\left(x^2 D^2 - 2\right) y = 0$

3   Prove that $L[\cosh at] = \dfrac{s}{s^2 - a^2}$

4   Find $L\left[e^{2t} + 7e^{-7t}\right]$

5   Find $L^{-1}\left[\dfrac{s}{(s+2)^2 + 1}\right]$

6   Define convolution theorem

7   Find the Fourier Sine transform of $e^{-ax}, a > 0$

8   Prove that $F_c[f(ax)] = \dfrac{1}{a} F_c\left(\dfrac{s}{a}\right)$

9   Find $Z\left[\dfrac{a^n}{n!}\right]$

10   State Initial and Final value theorems of Z transform

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Solve $(D^3 + 3D^2 + 3D + 1)y = 5 + \cos 2x$

OR

b.   Solve $(D^2 + 4)y = x^4 + \cos^2 x \cdot x$

12 a.   Solve the simultaneous equations $\dfrac{dx}{dt} + y = e^t,\ x - \dfrac{dy}{dt} = t$

OR

b.   (i) Prove that $L[\sinh at] = \dfrac{a}{s^2 - a^2}$

(ii) Find $L[\sin 3t \cos t]$

13 a.   (i)Find $L(t\cos^3 t)$

(ii) Find the Laplace transform of $\dfrac{\sin at}{t}$

OR

b.   (i) Find $L[t^2 e^{3t} \sinh t]$

(ii) Find $L\left[\dfrac{1 - \cos t}{t}\right]$

14 a.   Find $L^{-1}\left[\dfrac{1-s}{(s+1)(s^2 + 4s + 13)}\right]$ by using method of partial fractions

OR

b.   Solve $(D^2 + D)y = t^2 + 2t$ Where $y(0) = 4,\ y'(0) = -2$ using Laplace transform

p.t.o

15 a.

Solve $y'' + y = 2e^t$ Where $y(0) = 1$, $y'(0) = 2$ using Laplace transform.

OR

b.

Find the Fourier Transform of f(x) given by

$f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a > 0 \end{cases}$ and hence evaluate the integral $\int_0^\infty \frac{\sin x}{x} dx$

16 a.

Find the Fourier cosine transform of e^{-x^2}

OR

b.

Find the Fourier Sine transform of e^{-2x}, $x > 0$. Hence evaluate

$\int_0^\infty \frac{x^2}{(x^2 + 4)^2} dx$

17 a.

(i) Find (i) $Z[n^2]$ & $Z[e^{-t} \sin 2t]$

(ii) Find $Z^{-1} \left[\frac{z^3}{(z-1)^2 (z-2)} \right]$

OR

b.

Find $Z^{-1} \left[\frac{z^2}{z^2 + 4} \right]$ using Residue theorem

18 a.

Find $Z^{-1} \left[\frac{3z^2 - 18z + 26}{(z-2)(z-3)(z-4)} \right]$ by the method of partial fraction.

OR

b.

Use Power series technique, find the inverse Z-transform of

$F(z) = \frac{z}{2z^2 - 3z + 1}$, $|z| > 1$.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.

(i) Solve $\dfrac{d^2 y}{dx^2} + 4\dfrac{dy}{dx} + 4y = e^{-x}\sin 2x$

(ii) Solve $(D^3 - 3D^2 + 3D - 1)y = x^2 e^x$

OR

b.

(i) Find $L\left[\dfrac{1 - e^t}{t}\right]$

(ii)) Find $L\left[\dfrac{\sin 3t \cos t}{t}\right]$

20 a.

Solve the following initial value problem using Laplace transform

$$\dfrac{d^2 y}{dt^2} + 6\dfrac{dy}{dt} + 9y = 2e^{-3t}, \quad y(0) = 1, \; y'(0) = -2$$

OR

b.

Find $Z^{-1}\left[\dfrac{8z^2}{(2z - 1)(4z + 1)}\right]$ using convolution theorem

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SL.NO:1099

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE- REPAIR AND REHABILITATION OF STRUCTURES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define Coefficient of thermal Expansion
2   Mention the functions and properties of coatings on concrete.
3   Mention the different types of repairs.
4   Write short notes on expansive cement.
5   Write short notes on vacuum concrete.
6   Briefly explain the influence on concrete by the reaction with chloride chemical.
7   State the various methods of proportioning.
8   Define Maintenance.
9   Explain the need of quality assurance of concrete.
10   Write short notes on shotcrete

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain in detail the process of hydration in concrete.
                                    OR
   b.   Discuss in detail about types of shrinkage in concrete and fire resistance of concrete.

12 a.   Explain in details about the corrosion mechanism of steel embedded in concrete.
                                    OR
   b.   Discuss in detail about the PH value and carbonation of concrete.

13 a.   Give the flow chart for the "Assessment procedure for damage."
                                    OR
   b.   Discuss in detail about the special concrete of sulphur infiltrated concrete .

14 a.   Explain the Properties and types of accelerating admixture
                                    OR
   b.   Explain in detail about the gunite or shotcrete.

15 a. Briefly explain about water/cement ratio, Gel/space ratio gain of strength with age of concrete

OR

b. Explain in details about the factors influencing corrosion of reinforcement in concrete structures.

16 a. Discuss in details about the protection to rain for cement in new construction through coatings.

OR

b. Discuss in detail about the causes of deterioration of concrete structures.

17 a. Explain in detail about the important methods of repair to concrete structures damaged by corrosive environment.

OR

b. Discuss in detail about polymer concrete as a special concrete and its applications.

18 a. Explain in detail about repairing cracks with different application.

OR

b. Briefly explain. Overlays, Grouting, Autogeneous healing, Stitching.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain in detail about the concrete chemicals of plasticizers and super plasticizers.

OR

b. Explain in detail about the epoxy injection.

20 a. Briefly explain about corrosion inhibitors

OR

b. Describe the preliminary procedures in demolition of a structure in detail

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SL.NO:1089

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ESTIMATION AND QUANTITY SURVEYING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Differentiate abstract and detailed estimate.
2   What is Security money?
3   What do you mean by Item rate contract?
4   How will you determine the scrap value?
5   Differentiate net income and gross income.
6   How can you prepare a road estimate?
7   When a contract be terminated?
8   Differentiate between market value and book value.
9   What is Capitalized Value?
10   Define Expenditure heads.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Prepare a preliminary estimate of a building project with a total plinth area of all buildings of
        1800 sq.m. Given That- Plinth area Rate - Rs 950.00 per Sq.m., Extra for Special Architectural
        Treatment - 1.5% of the Building Cost, Extra for Water Supply and Sanitary Installations - 5%
        of the Building Cost, Extra for Internal Installations - 14% of the Building Cost, Extra for
        Services - 6% of the Building Cost, Other Charges - 3% and Supervision Charges - 8%.

OR

   b.   4. A first class building is situated on a main road of the city, having plot area 600 sq.m The
        covered area is 50% of the plot. All amenities such as water supply, sanitary and electricity are
        provided. The age of the building is 20 years. The assumed plinth area rate at the time of
        construction was rs 250/- per sq,m. Assume life of the building as 100 years and cost of the
        land as rs 70/- per sq.m. Find the total value of the property

12 a. A building costing Rs. 7, 00,000.00 has been constructed on a freehold land measuring 100sq.m. recently in a big city. Prevailing rate of the land in the neighborhood is Rs. 150.00 per qu.m. Determine the Net rent of the property if the expenditure on an outgoing including sinking fund is Rs. 24,000.00 per annum. Work out also the Gross rent of the property per mounth.

OR

b. Explain the Revised Estimate and Supplementary Estimate.

13 a. Write the detailed specifications for Plain Cement concrete and Reinforced cement concrete.

OR

b. Write the detailed specifications
a)Painting and   d) Pointing.

14 a. Prepare a model form of an Imprest cash account.

OR

b. Explain in detail about the common irregularities in writing a cash book.

15 a. Write the general specifications of a Second class building.

OR

b. Write the detailed specifications for Earthwork in excavation in foundation and Lime Concrete in Foundation.

16 a. Explain in detail about labour Contract System.

OR

b. What are the problems occur while executing the construction work in site.

17 a. What is material management? Explain the terms and condition in one contract.

OR

b. Explain method of calculating depreciation.

18 a. What are the rules to be followed in maintaining the Imprest account?

OR

b. Write the principles for report preparation

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   In a plot of a land costing Rs3, 00,000.00 a building has been newly constructed at a total cost of Rs.1,00,000.00 including sanitary and water supply works, electrical installation etc… The building consists of Four Flats for tenants. The owner expects 8 % return on the cost of construction and 5% return on the cost of land. Calculate the standard rent for each flat of the building assuming.

a) The life of the building as 60 years and sinking fund will be created on 4% interest basis.
b) Annual repairs cost at 1% of the cost of construction
c) Other outgoings including taxes at 30% of the Net return on the building.

OR

b.   Write a clear format of a Tender notice.

20 a.   What are the various methods of valuation? Explain in detail.
OR
b.   Explain the steps to be taken to control the cost of a construction project
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SL.NO:1083

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University)
B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELE-TRAFFIC ENGINEERING AND MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Explain the term Grade resistance.
2   Define weather and its effect on accidents.
3   What are the factors affecting capacity and level of service?
4   Give the uses of traffic signals.
5   What are the two important, mandatory signs?
6   Define intersection.
7   Draw the irregular shape of rotary island.
8   What does fidal flow means?
9   Where the ITS application is used in India?
10   How do you measure skid resistance?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Design 2 phase straight a head signal for a following traffic head data
        Assure an inter – green period of 8 seconds and lost time/phase of 2 seconds also draw the
        timing diagram.
OR
   b.   How the land use characteristics affect the traffic system? Explain.

12 a.   Explain the Perception- Reaction Time PRT
OR
   b.   Explain road and its effect on accidents.

13 a.   List out the various parameters of parking. Describe them in detail.
OR
   b.   Explain questionnaire type of parking usage survey.

14 a.   Explain in Detail about danger signs of prohibitory signs.
OR
   b.   Explain in detail about different categories of carriage way markings   p.t.o

15 a.   Draw the diagram of roadway delineators & explain its purpose.

OR

b.   What are the disadvantages of rotary intersection and explain?

16 a.   Describe channelized and unchannelized intersections

OR

b.   Explain the purpose of channelization.

17 a.   Explain the advantages of one way street.

OR

b.   Explain multi model travel management and traveler information system.

18 a.   Describe in detail about advanced rural transportation system.

OR

b.   What are the different types of speed studies? Explain them in detail.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Describe about the Vehicle Characteristics.

OR

b.   Explain the various types of traffic signals and their functions. How are the signal timings decided?

20 a.   Explain in detail, the various design elements of rotary type of intersection based on IRC standards with neat sketches.

OR

b.   Write short notes on few of the traffic management measures:
a) Tidal flow operation
b) Exclusive bus lane
c) Restriction on turning movement
d) Traffic calming

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SL.NO:1075

VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

ELECTIVE - GROUND IMPROVEMENT TECHNIQUES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What are the major problematic soils?

2   What are the various types of drains?

3   What do you understand from the term In-situ Densification?

4   What is Geosynthetic Clay Liners.

5   What are the Materials required for construction of a reinforced soil structure.

6   What are the various methods of Grouting?

7   What are the different types of Well Point Systems?

8   What is the principle behind pre compression?

9   Define Geocomposites .

10 What is meant by Chemical Stabilization ?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   What are the various components of drainage? Explain in detail.
OR
   b.   List out the various stages and methods of drainage. Explain in detail.

12 a.   Explain in brief the various methods of ground improvement
OR
   b.   Write the detail comparision of sand column and lime column.

13 a.   Write about the following.
        Soil reinforcement
        Electro-kinetic stabilization

OR

   b.   Explain in brief the various steps for designing a dewatering system.   (p.t.o)

14 a. With the help of neat sketches, explain in detail the application of geosynthetics as a separator.

OR

b. Write a detailed note on :
Portland cement stabilization
Bituminous stabilization

15 a. Explain in detail with a neat sketch the method of dewatering using sumps stating its advantages and disadvantages.

OR

b. Explain in detail the well point system of dewatering.

16 a. Explain in detail about the method of pre-loading. How do vertical drains improve the functioning of pre-loading technique?

OR

b. What are the various stages of operation in installation and action of a lime pile?

17 a. With neat sketches explain in detail the various applications of reinforced earth for ground improvement.

OR

b. How do geosynthetics function as a filter? How does it differ in its function for drainage?

18 a. Describe in detail about the various methods of grouting with neat sketches.

OR

b. What is grout injection measurement? Why is grout monitoring necessary?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain in brief the principle, equipment used, installation, operation and precaution adopted in Vacuum dewatering.

OR

b. Explain the methods of ground treatment in clayey soils

20 a. Explain the step by step procedure for soil nailing.

OR

b. Compare the Dynamic and Static compaction in detail.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB -2022
CIVIL ENGINEERING

PREFABRICATED STRUCTURES

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   List out the Limitation of Prefabrication.
2   What are the lateral load resisting elements in a building?
3   List out the types of prefabricated floor slabs.
4   Define Gantry Girder
5   What are the steps to be followed in the erection of prefabricated structures?
6   Show the formula for shear strength of floor slabs.
7   Select the prefabricated structural components.
8   Write about Prefabricated Roofing and flooring
9   Classify the Types of walls
10   What are some examples of shell structures?

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Write briefly about types of wall panels
                              OR
   b.   Write about two way pre fabricated slabs

12 a.   Disscuss about behavior of columns in prefabricated structures
                              OR
   b.   Explain about industry buildngs with truss and shells

13 a.   Write the design procedure for cored and panel types of floor slabs.
                              OR
   b.
         List the types of joints in precast construction also explain its behavior.

14 a.   Explain the methods of construction of floor slab.
                              OR

                                                                    (P.T.O)

b.   Describe the manufacturing Process of wall panels

15 a.   Write briefly about types of wall panels.

OR

b.   Explain the behavior of floor slab construction with suitable sketches.

16 a.

What defines an industrial building? What are the functions of industrial building?

OR

b.   Sketch the reinforcements in nibs with large loads.

17 a.

What are the assumptions that are made in corbels according to Indian practice?

OR

b.

Describe in detail about the Different Materials used and need of Prefabrication.

18 a.   Illustrate the production process of prefabricated structural elements.

OR

b.   Explain the merits and demerits of prefabrication systems.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.

Design a corbel for a 250 mm square column to support a vertical ultimate load of 400 kN with its line of action 170 mm from the face of the column. Assume M20 grade of concreteand Fe 415 steel

OR

b.   Differentiate the behavior of frame and large panel construction in precast structures.

20 a.   Explain the behavior of large panel construction with suitable sketches.

OR

b.   Write about the structural behavior of precast structure.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB-2022
CIVIL ENGINEERING

ELECTIVE - HOUSING PLANNING AND MANAGEMENT

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Define home.
2   List the principles of neighborhood planning facilities
3   Define sanitary lanes.
4   What is public-private partnership?
5   Compare between present value and net present value.
6   Discuss the national level organizations.
7   Determine the requirement of a layout.
8   What is sustainable construction material ?
9   What is the concept of micro financing in the housing sector
10   What is the procedure for appraisal by project head

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Write the salient features of the National Housing Policy.
                                OR
  b.   Explain any four state level organization for housing planning programme.

12 a.   Classify the various types of residential buildings used for living purpose.
                                OR
  b.   What are the standards for Apartments and Rental Housing for Housing Programmes.

13 a.   List the merits and demerits of co-operative housing.
                                OR

b. Explain the followinga) Difficulties slum clearance programme
b) Causes of slum
c) Preventionofslum
d) Effectsof slum

2

14 a. What are the basic concepts, contents and standards for Sites and Services and Neighborhood programs?

OR

b. What are the components of Layout design? Give the specifications of NBC.

15 a. List out the building by laws and regulation to be followed while constructing a residential building as per the provisions given by Building Bye Laws 1970.

OR

b. Explain the formulation of housing projects for Site analysis.

16 a. Explain the following with respect to the view of housing planning.

OR

b. Choose the concept, content functions and performance evaluation of building center in Tamilnadu. Evaluate the performance of any one building center you know.

17 a. Explain any three modern equipments used for construction?

OR

b. Discuss the properties of following modern materials and compare their costs and strengths with conventional materials
a) Pozzlanos
b) Light emitting concrete
c) Fibre reinforcedconcrete

18 a. Choose Appraise the performance of public and private housingagencies against the following aspects: pricing of housing unit, site suitability open spaces and other basic facilities, social obligation rents

OR

b. Explain the methodology for pricing of housing unit

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Describe in detail the housing policies that have been implemented in India.

OR

b. Describe the components of layout design and provide NBC's specifications.

20 a. Write a brief description of Green Building Materials.

OR

b. Select a concept for the building centre in Tamilnadu, as well as its content, functions, and performance evaluation. Evaluate the performance of any building centre that you are familiar with.

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VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB - 2022
CIVIL ENGINEERING

ELE - GROUNDWATER ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   Write about confined aquifiers.
2   List the objectives of Groundwater hydraulics.
3   Define well development.
4   Write any two groundwater exploration methods.
5   Define Inland Intrusion.
6   List the need of Groundwater balance equation.
7   Define Infiltration gallery.
8   What is a permeability?
9   Derive Darcy's law.
10   Write the governing equation of mathematical model for basin.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Write about the methods of estimation of groundwater?
                                OR
   b.   Write a short note on
        (1) Aquifer   (2) Aquitard
        ☐

12 a.   Describe about the well development.
                                OR
   b.   Explain the method of construction of deep wells.

13 a.   Explain in detail about the nature and formation of watertable aquifer.
                                OR
   b.   How can you explain water bearing capacity of rock?

14 a.   Write about Ground water table fluctuation and its interpretations.
                                OR
   b.   Describe about well hydraulics in detail.   p.t.o

15 a.   What is the process of interference of wells?

OR

b.   Describe in detail about the process and need of artificial recharge.

16 a.   Summarize the main factors affecting the Groundwater quality.

OR

b.   Show the preventive measure for saline Intrusion.

17 a.   Explain the measures of groundwater quality.

OR

b.   Briefly describe about the groundwater basin.

18 a.   Under what circumstances Infiltration gallery is adopted?

OR

b.   Write down the needs of groundwater model.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   Discuss about the groundwater legislation.

OR

b.   Explain in detail about equilibrium pumping test.

20 a.   Explain the electrical resistivity method.

OR

b.   Explain the model selected to perform the task
  (1) Analytical model.   (2) Numerical model

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SL.NO:1028

VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB - 2022
CIVIL ENGINEERING

CONSTRUCTION MATERIALS

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   What are the tests to evaluate the quality of stones?
2   What are the classifications of limes?
3   Write short notes on admixtures of cement.
4   What is admixture? How are they classified?
5   Write short notes on prestressed concrete.
6   Mention the usual defects which are found in the painting work.
7   Give the important uses of glass?
8   What are the special varieties of glass?
9   Define quarrying.
10   Write the types of Aggregates.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain how the following tests are carried out for bricks: a) Compressive strength test b) Water absorption test c) Efflorescence test.

OR

  b.   Describe in detail about the various classification of bricks.

12 a.   Explain the manufacturing process of lime.

OR

  b.   Explain the types of mortars.

13 a.   Write short notes on cement water proofers

OR

  b.   Explain slump test

14 a.   Explain briefly felling of tree.

OR

  b.   Explain the production of steel with a neat sketch.   p.t.o

15 a. Explain different methods of moulding plastics.

OR

b. Explain the various constituents of glass.

16 a. Explain briefly about the special types of glass.

OR

b. Describe the different types of composites.

17 a. Explain in detail about the artificial Stones.

OR

b. Briefly explain about the storage of cement.

18 a. Explain in detail about pre stressed concrete.

OR

b. What are the factors determining the mechanical behaviour of polymers?

Answer ALL questions
PART-C (2 x 15 = 30)

19 a. Explain grades of cements available in India and Tests on Cement.

OR

b. Define workability and explain about measurement of workability.

20 a. Explain in detail about Geofabrics.

OR

b. Write the criteria for selection of stones.

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SL.NO:1009

VINAYAKA MISSIONS RESEARCH FOUNDATION
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B.E./ B.TECH DEGREE EXAMINATIONS- FEB - 2022
CIVIL ENGINEERING

FOUNDATION ENGINEERING

Time : Three Hours   Maximum Marks:100 Marks

Answer **ALL** questions
Part-A (10 x 2 =20 Marks)

1   List out different types of samplers
2   Write the objectives of soil exploration
3   Derive Terzhaghi's   general equation for computing bearing capacity of soils
4   What are the factors influencing settlement?
5   What are the different types of raft foundations?
6   What do you meant by buoyancy raft foundation?
7   What is mean by group settlement ratio?
8   What are methods to determine the load carrying capacity of a pile?
9   What is mean by co-efficient of earth pressure?
10   Make an estimate of lateral earth pressure coefficient on a basement wall supports soil to a depth of 2 m. Unit weight and angle of shearing resistance of retained soil are 16 KN/m3 and 32° respectively.

Answer **Any FIVE** questions
Part-B (5 x10 =50 Marks)

11 a.   Explain any two methods of site exploration in detail.
OR
   b.   What are the important types of samplers and soil samples?

12 a.   Explain about Plate Load test.
OR
   b.   Explain disturbed sample and undisturbed sample with examples.

13 a.   Explain the test to be conducted for find out the bearing capacity.
OR
   b.   Explain minimum depth of foundation in Rankine"s analysis.

14 a.   What are the different types of raft foundations?Explain.
OR
   b.   Briefly explain how proportioning and structural design of trapezoidal combined Footing is done with diagram.

15 a.   Explain the pressure distribution of Rigid footing.
OR   p.t.o

b.   Explain the design procedure of the Combined rectangular footing.

16 a.   What are group capacity by different method?

OR

b.   A pile group consisting of four piles is in a square pattern with equal spacing in both the directions. Find the c/c spacing in terms of the diameter of the piles, if efficiency of the group is 75% as per Converse-Labarre formula.

17 a.   Explain Static formula and dynamic formula for pile.

OR

b.   Explain the Coulomb wedge theory with neat sketches

18 a.   Explain design concept of retaining wall.

OR

b.   Explain the active of earth pressure for cohesive soils.

Answer ALL questions
PART-C (2 x 15 = 30)

19 a.   A square footing 1.2m x 1.2m rests at a depth of 1m in a saturated clay layer 4m deep. The clay is normally consolidated, having an unconfined compressive strength of $40kN/m^2$. The soil has a liquid limit of 30%, γ_{sat}=17.8kN/m^3. w=28% and G=2.68. Determine the load which the footing can carry safely with FOS of 3 against shear. Also determine the settlement if the footing is loaded with the safe load. Use Terzaghi's analysis for bearing capacity. Take ϕ=0, Nc =5.7, Nq=1 and Nγ=0

OR

b.   Design a square pile group to carry a load of 1500 kN. Diameter and length of the pile are 400mm and 10m respectively. Unconfined compressive strength of soil is 50 kPa and the unit weight of soil is 18 kn/m^3. Take α =0.6, c/c spacing of piles as 1m and FOS as 2.5.

20 a.   Explain dynamic cone penetration test.

OR

b.   Explain the four common types of uncased cast in situ concrete piles.

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