

**VINAYAKA MISSIONS RESEARCH FOUNDATION  
(Deemed to be University)**

**M.E- DEGREE EXAMINATIONS – APR/MAY-2019**

**MANUFACTURING ENGINEERING**

**First Semester**

**NUMERICAL METHODS AND GRAPH THEORY**

(Candidates admitted under 2017 Regulations-CBCS)

Time: Three hours

Maximum:100Marks

Answer **ALL** questions

**PART – A (10 x 2 = 20 marks)**

1. Explain Gauss-elimination method to solve  $AX = B$ ?
2. Explain the direct methods of solving simultaneous linear equation?
3. Write down the Simpson's  $\frac{3}{8}$  Rule
4. Evaluate  $\int_0^1 e^{-x^2} dx$  by dividing the range of integration into 4 equal parts using Trapezoidal Rule
5. Using Taylor's series formula, Find  $y$  at  $x = 0.1$  if  $\frac{dy}{dx} = 3x + \frac{y}{2}$  and  $y(0) = 1$ .
6. What is the condition to apply Adams-Bashforth methods?
7. Explain briefly about Konigsberg Bridge problem.
8. Define the term tour of a graph, Eulerian graph.
9. State Dijkstra's Algorithm.
10. State the Maximum flow problem.

**PART – B (5 x 16 = 80 marks)**

11. a) Solve the system of equation by Gauss-Jordan method

$$x - y + z = 1, -3x + 2y - 3z = -6, 2x - 5y + 4z = 5$$

**OR**

- b) Solve the following system of equation by Gauss-Jacobi method (correct to 3 decimal places)

$$8x - 3y + 2z = 20, 4x + 11y - z = 33, 6x + 3y + 12z = 35$$

12. a) Express 'y' as a polynomial in 'x' from the following data using Hermite's interpolating polynomial

$x$	0	1	2
$y$	1	3	21
$f'(x)$	0	3	36

**OR**

- b) Fit the following four point by cubic splines

$i$	0	1	2	3
$x_i$	1	2	3	4
$y_i$	1	5	11	8

Use the end conditions  $y_0'' = y_3'' = 0$  Hence compute (i)  $y(1.5)$  and (ii)  $y'(2)$

13. a) Find the Taylor series solution of  $y(0.1)$  given that

$$\frac{dy}{dx} + y^2 = e^x; y(0) = 1. \text{ Compute using the first five terms.}$$

**OR**

- b) By applying the fourth order R.K Method, Find the  $y(0.2)$  from

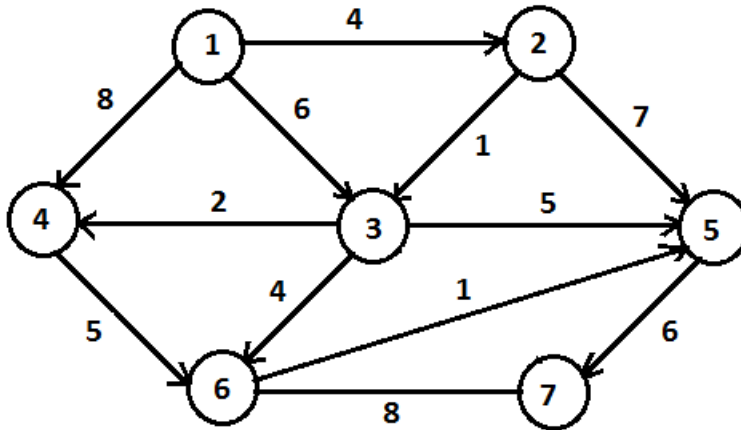
$$y' = y - x, y(0) = 2 \text{ taking } h = 0.1$$

14. a) Show that a connected graph  $G$  is an Euler graph iff it can be decomposed into circuits.

**OR**

- b) Prove that in a connected graph ' $G$ ' any minimal set of edges containing at least one branch of every spanning tree of  $G$  is a cut set.

15. a) Obtain the SD and SP from vertex 1 to every other vertex in the network



**OR**

- b) Prove that the Dijkstra's algorithm finds the SD from a fixed vertex  $v$  to any vertex  $i$  in the network, if there is a path from  $v$  to  $i$ .

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**VINAYAKA MISSIONS RESEARCH FOUNDATION**  
**(Deemed to be University)**  
**M.TECH -DEGREE EXAMINATIONS- APR/MAY - 2019**  
**MANUFACTURING ENGINEERING**  
**FIRST SEMESTER**  
**ADVANCED MATERIALS TECHNOLOGY**  
(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

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

- 1 Define the term plasticity.
- 2 What is meant by precipitation hardening?
- 3 What are the factors affecting creep?
- 4 List some important destructive tests carried out on a material.
- 5 Define the term stiffness.
- 6 Why material selection and processing are considered to be interrelated?
- 7 How do cast iron differ from steels in terms of carbon content?
- 8 What are the required properties of a tool steel?
- 9 What meant by polymers?
- 10 Classify the different types of polymers

**PART-B (5 x 16 = 80 )**

- 11 a. Explain in detail about viscoelasticity with graph  
**OR**  
b. Discuss in detail about super plasticity with its advantages and applications.
- 12 a. Explain the mechanism of fatigue fracture in detail.  
**OR**  
b. What are the variables that affect the fatigue life?
- 13 a. What is the classification of the properties of engineering materials?  
**OR**  
b. Discuss the various issues connected to material selection.
- 14 a. Explain about nanophase materials in detail.  
**OR**  
b. Give a discussion about dual phase steels in detail.
- 15 a. Discuss about the polymer processing in detail.  
**OR**  
b. Write down the classifications of ceramics based on end application.

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**VINAYAKA MISSIONS RESEARCH FOUNDATION**  
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**M.TECH -DEGREE EXAMINATIONS- APR/MAY - 2019**  
**MANUFACTURING ENGINEERING**  
**FIRST SEMESTER**  
**AUTOMATED COMPUTER INTEGRATED MANUFACTURING**  
**SYSTEMS**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

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

- 1 What is communication?
- 2 Write down the advantages of Asynchronous Transmission.
- 3 What are the benefits of automated production line?
- 4 Name the 6 storage systems included in storage system performance.
- 5 What is mean by “ Part family”?
- 6 Write short notes on random ordered FMS?
- 7 Define Decision tree coding.
- 8 Write down the disadvantages of generative CAPP systems?
- 9 What is mean by DAS?
- 10 Write down the types of Voice recognition.

**PART-B (5 x 16 = 80 )**

- 11 a. Explain briefly CIM as concept and technology.  
**OR**  
b. In detail, explain the CIM data transmission methods.
- 12 a. Explain the different types of Load Transfer of AGVs.  
**OR**  
b. Explain the fundamentals of automated production lines
- 13 a. Explain the MICLASS system of parts classification and coding.  
**OR**  
b. Discuss in detail about the Factory data collection system.
- 14 a. Explain the role of process planning in CAD/CAM integration?  
**OR**  
b. With the help of flow diagram ,explain in detail about Hybrid approach of CAPP.
- 15 a. Write detailed notes on Contact bar code readers.  
**OR**  
b. Explain in detail about the Machine vision system used in AIS.

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**M.TECH -DEGREE EXAMINATIONS- APR/MAY - 2019**  
**MANUFACTURING ENGINEERING**  
**FIRST SEMESTER**  
**ADVANCED MANUFACTURING PROCESSES**  
(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

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

- 1 What are Application Of AJM?
- 2 What are the advantages of WJC over conventional cutting methods?
- 3 What are the advantages of ECM?
- 4 Define electrical discharge machining.
- 5 What are the characteristics of Laser used in Laser machining?
- 6 Write the advantage of EBM?
- 7 Define semi-conductor
- 8 List various machining operations.
- 9 Define Wafer preparation.
- 10 What meant by monolithic processing?

**PART-B (5 x 16 = 80 )**

- 11 a. (i) Explain the principle of USM with neat diagram.  
(ii) List the commonly used abrasive powder for the tooling of USM and their Properties.

**OR**

- b. (i) Discuss the influence process parameters and applications of USM [10]  
(ii) Give a note o the various types of transducers.[6]
- 12 a. (a) What are the various process parameters which influence the MRR?  
(b) What materials are used for Electrodes? Mention the relative advantages.

**OR**

- b. (a) What is the influence of Electro Chemical Machining on the Mechanical properties of machined components.  
(b) Comment on the fatigue strength of machined components in Electro Chemical Machining. Describe the methods tailored to improve fatigue strength.

- 13 a. (i) Explain the principle of LBM with neat sketch  
(ii) List out the advantage and limitation of LBM process

**OR**

- b. Discuss the ion-beam machining parameters and its working principle.
- 14 a. Explain the Process of Film Purification?

**OR**

**(P.T.O)**

**2**

- b. Write Short notes on (1) bulk machining (2) hardening
- 15 a. Define moulding. Explain various types of moulding process.

**OR**

- b. Short notes on (1) PCB Board (2) MOM technology

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Sl.No. E-648

**VINAYAKA MISSIONS RESEARCH FOUNDATION**  
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**M.TECH -DEGREE EXAMINATIONS- APR/MAY - 2019**  
**MANUFACTURING ENGINEERING**  
**FIRST SEMESTER**  
**ELECTIVE - FLUID POWER AUTOMATION**  
(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

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

- 1 Define fluid power.
- 2 Draw the hydraulic symbol for the following. (i)Unloading valve. (i) Counter balancing valve
- 3 Name any three positive displacement pumps.
- 4 What is the pressure intensifier? List one application.
- 5 What is a direction control valve?
- 6 How does the pilot check valve differ from a simple check valve?
- 7 What is hydraulic fuse?
- 8 What is electro hydraulics?
- 9 List the major units of a PLC.
- 10 What is fluidics?

**PART-B (5 x 16 = 80 )**

- 11 a. Comment on the difference between using pneumatic fluid power and hydraulic fluid power.  
  
b. Discuss about the maintenance of the hydraulic oils.
- 12 a. Explain the working of piston pumps and discharge rates (swash plate type).  

**OR**

b. Draw a neat sketch of any one type of variable displacement reversible pump.
- 13 a. How does a pressure relief valve differ from pressure reducing valve? How does a pressure reducing valve work? Explain with sketch.  

**OR**

b. Explain the following centre conditions of spool valves (a) Open centre valve. (b) Tandem centre valve (c) Closed centre valve. (d) Float centered valve
- 14 a. Explain with neat sketch of the step counter and its principle.  

**OR**

b. What is a hi-lo pump? Show the application of such a system with a circuit diagram.



15 a. Explain with neat sketch the electrical control of a regenerative cycle.

**OR**

b. What wall – attachment theory is as applied in fluidics? Also illustrate the wall – attachment phenomenon?

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**M.TECH -DEGREE EXAMINATIONS- APR/MAY - 2019**  
**MANUFACTURING ENGINEERING**  
**FIRST SEMESTER**  
**ELECTIVE - ADVANCES IN CASTING AND WELDING PROCESSES**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

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

- 1 What is draft allowance? How is it provided for patterns?
- 2 What are the criteria to be used for designing the pouring basin?
- 3 Why directional directional solidification essential in a castings?
- 4 What is the behaviour of metallic casting due to iron carbide present in it?
- 5 Briefly explain the core making process.
- 6 During fettling operation operations, how the pollution created.
- 7 Define cracking.
- 8 Define fillet welds.
- 9 Differentiate between friction welding and inertia welding.
- 10 Define diffusion bonding.

**PART-B (5 x 16 = 80 )**

- 11 a. Explain the procedure for calculation of dimensions of a gating system. Illustrate with an example.

**OR**

- b. What design considerations are to be kept in mind during casting design? On what factors does a tolerance on casting dimensions depend?
- 12 a. How does mold design affect the quality of castings (with particular reference to shrinkage effects)? Explain with illustrations.

**OR**

- b. Explain briefly the metallurgical characteristics of cast metals, with particular reference to  
1. Iron. 2. Steel.
- 13 a. Explain briefly the process of continuous casting. In what way is it superior to rolling process?

**OR**

- b. Explain in detail the application of computer in foundries.
- 14 a. Explain methods to reduce welding stresses.

**OR**

**(P.T.O)**

- b. Explain methods of non destructive testing of welds.
- 15 a. Briefly explain ultrasonic welding process.

**OR**

- b. With a suitable sketch explain the TIG welding process.

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Sl.No. E-600

**VINAYAKA MISSIONS RESEARCH FOUNDATION**  
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**M.TECH -DEGREE EXAMINATIONS- APR/MAY - 2019**  
**MANUFACTURING ENGINEERING**  
**SECOND SEMESTER**  
**ELECTIVE - POLYMERS AND COMPOSITE MATERIALS**  
(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

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

- 1 How thermosets are different from thermoplastics ?
- 2 How are thermosets superior to thermoplastics ?
- 3 What is co-injection moulding?
- 4 What are the raw materials used for thermal bonding?
- 5 List four specific applications of fiberglass.
- 6 Mention the significant utility of ceramic fibres in composite materials used in gas turbines.
- 7 List four different moulding methods for fabrication of polymer matrix composite.
- 8 For what kind of applications are Injection moulding suitable ?
- 9 State few reasons why fabrication of metal matrix composites are complex.
- 10 What is semi-solid casting? State an example.

**PART-B (5 x 16 = 80 )**

- 11 a. Describe the development of polyoxymethylene. List its properties and applications.

**OR**

- b. Explain engineering plastics stating their properties and applications.

- 12 a. Explain the process of producing a plastic product in a screw type Injection moulding machine with necessary diagram.

**OR**

- b. Describe Extrusion Blow Moulding.

- 13 a. Describe the different physical properties of glass fibers and detail its important applications.

**OR**

- b. Organic fibres are pollution free. Explain.

- 14 a. Briefly explain A. Sheet Moulding Compounds (SMC) and B. Bulk Moulding Compounds (BMC).

**OR**

- b. Enumerate different applications of Polymer Matrix Composites in the following sectors : A. Automotive B. Aerospace C. Construction.

- 15 a. Explain the method of diffusion bonding for fabrication of a metal matrix composite.

**OR**

- b. Explain the method of rheocasting.

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**M.TECH -DEGREE EXAMINATIONS- APR/MAY - 2019**  
**MANUFACTURING ENGINEERING**  
**THIRD SEMESTER**  
**ELECTIVE - LEAN MANUFACTURING SYSTEM AND**  
**IMPLEMENTATION**

(Candidates admitted under 2017 Regulations-CBCS)

Time : Three Hours

Maximum Marks:100 Marks

Answer **ALL** questions

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

- 1 Define lean manufacturing
- 2 Write the different types of lean manufacturing tools.
- 3 Write down the principles of TPM
- 4 Abbreviate TPM, JIT, VSM and TQM
- 5 Define setup time.
- 6 What are the principles of VSM?
- 7 What are the benefits of 6 sigma ?
- 8 Define statistical considerations.
- 9 Define 5S principle.
- 10 What are the basic elements of lean manufacturing.

**PART-B (5 x 16 = 80 )**

- 11 a. What are the elements of lean manufacturing  

**OR**

b. What are the different tools used in lean manufacturing.
- 12 a. Define TPM process in detail.  

**OR**

b. Explain the types of cell layout principles and its implementation.
- 13 a. What are the principles and elements of TQM.  

**OR**

b. Write about the evolution of 5S.
- 14 a. Write about the evolution of 6 sigma.  

**OR**

b. How is six sigma related to lean manufacturing.
- 15 a. Explain briefly about the principle, elements and tools in lean manufacturing.  

**OR**

b. Define TQM, TPM, VSM and JIT.

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