VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM
(Deemed to be University under section 3 of the UGC Act 1956)

Computer Science

Instructions / Note:

1. Answer all the questions. Each question carries one mark.
2. No negative marks for wrong answers.
3. Read each question carefully and answer in the OMR sheet provided for each question with only blue/ black pen to fill the circles in the OMR Sheet.
4. Return the question paper along with the OMR sheet.

Time: 90 Minutes

Venue: _____.

PART - B   [35X1=35]

1. A file is downloaded in a home computer using a 56 kbps MODEM connected to an Internet Service Provider. If the download of file completes in 2 minutes, what is the maximum size of data downloaded?

   a) 112 Mbits
   b) 6.72 Mbits
   c) 67.20 Mbits
   d) 672 Mbits

2. In _____ CSMA protocol, after the station finds the line idle, it sends or refrains from sending based on the outcome of a random number generator.
   a) Non-persistent
   b) 0-persistent
   c) 1-persistent
   d) p-persistent

3. What is the maximum length of CAT-5 UTP cable in Fast Ethernet network?
   a) 100 meters
   b) 200 meters
   c) 1000 meters
   d) 1100 meters

4. The _____ is a set of standards that defines how a dynamic web document should be written, how input data should be supplied to the program, and how the output result should be used.
   a) Hypertext Markup Language

   b) File Transfer Protocol
   c) Common Gateway Interface
   d) Simple Mail Transfer Protocol

5. The count-to-infinity problem is associated with _____
   a) Flooding algorithm
   b) Hierarchical routing algorithm
   c) Distance vector routing algorithm
   d) Link State routing algorithm

6. Consider an undirected graph G with 100 nodes. The maximum number of edges to be included in G so that the graph is not connected is _____
   a) 4851
   b) 2451
   c) 4950
   d) 9900

7. The minimum number of nodes in a binary tree of depth d (root is at level 0) is _____
   a) $2^d - 1$
   b) $2^{d+1} - 1$
   c) d
   d) $d + 1$

8. The efficient data structure to insert/delete a number in a stored set of numbers is _____
   a) Queue
   b) Doubly linked list
   c) Linked list
   d) Binary tree

9. The number of eight-bit strings beginning with either 111 or 101 is _____.
   a) 64
   b) 128
   c) 256
   d) 265

10. Consider the In-order and Post-order traversals of a tree as given below:
    In-order: j e n k o p b f a c l g m d h i
    Post-order: j n o p k e f b c l m g h i d a
    The Pre-order traversal of the tree shall be
    a) a b f e j k n o p c d g l m h i
    b) a b c d e f j k n o p g l m h i
    c) a b e j k n o p f c d g l m h i
    d) j e n o p k f b c l m g h i d a

11. Which one of the following set of gates is best suited for 'parity' checking and 'parity' generation?
    a) AND, OR, NOT
    b) EX-OR, EX-NOR
    c) NAND, NOR
    d) EX-NOR, NOR

12. In which one of the following, continuous process improvement is done?
    a) ISO 9001
    b) RMMM
    c) SPM
    d) CMM

13. Working software is not available until late in the process in _____
    a) Waterfall Model
    b) Prototyping Model
    c) Spiral Model
    d) Incremental Model

14. Equivalence partitioning is a _____ testing method that divides the input domain of a program into classes of data from which test cases can be derived.
    a) White box
    b) Regression
    c) Black box
    d) Smoke

15. Linked Lists are not suitable for _____.
    a) Binary Search
    b) Polynomial Manipulation
    c) Insertion
    d) Selection Sort

16. What is the size of the following Union?
    Assume that the size of int = 2, size of float = 4, size of char = 1
    union tag {
    int a;
    float b;
    char c;
    };
    a) 2
    b) 1
    c) 4
    d) 7

17. Usage of Preemption and Transaction Rollback prevents _____.
    a) Unauthorized usage of data file
    b) Deadlock situation
    c) Data manipulation
    d) File preemption

18. The _____ language was originally designed as the Transformation Language for Style Sheet facility
    a) XML
    b) XQuery
    c) XPath
    d) XSTL

19. Views are useful for _____ unwanted information, and for collecting together information from more than one relation into a single view.
    a) Deleting
    b) Hiding
    c) Merging
    d) Highlighting

20. A method to provide secure transmission of email is called ____.
    a) TLS
    b) SA
    c) IPSec
    d) PGP

21. Which of the following set of UNIX commands will always display "WELCOME"?
    a) Export title=WELCOME; Echo $title
    b) Title = WELCOME; export $ title; sh –c "echo $title
    c) Title = WELCOME; export title; sh –c "echo $title"
    d) Title = WELCOME; echo $title

22. Which of the following is not a part of an expert system shell?
    a) Knowledge Base
    b) Inference Engine
    c) Explanation Facility
    d) Search Technique

23. If an artificial variable is present in the 'basic variable' of optimal simplex table then the solution is _____
    a) Alternative solution
    b) Infeasible solution
    c) Unbounded solution
    d) Degenerate solution

24. _____ refers to the discrepancy among a computed, observed or measured value and the true specified or theoretically correct values.
    a) Fault
    b) Failure
    c) Defect
    d) Error

25. Which logic family dissipates the minimum power?
    a) DTL
    b) TTL
    c) CMOS
    d) ECL

26. Which of the following electronic component is not found in IC's?
    a) Inductor
    b) Diode
    c) Resistor
    d) Transistor

27. The instruction: MOV CL, [BX] [DI] + 8 represent the _____ addressing mode
    a) Based relative
    b) Indexed relative
    c) Based indexed
    d) Register indexed

28. A binary ripple counter is required to count up to 16383. How many flip-flops are required?
    a) 16382
    b) 14
    c) 8191
    d) 512

29. The time complexity of recurrence relation $T(n) = T(n/3) + T(2n/3) + O(n)$ is
    a) O(Ig n)
    b) O(n)
    c) O(n2)
    d) O(n Ig n)

30. Improving processing efficiency or performance or restructuring of software to improve changeability is known as
    a) Corrective maintenance
    b) Perfective maintenance
    c) Adaptive maintenance
    d) Code maintenance

31. In ____, modules A and B make use of a common data type, but perhaps perform different operations on it
    a) Stamp coupling
    b) Data coupling
    c) Control coupling
    d) Content coupling

32. Consider the following two function declarations:
    (i) int *f( )
    (ii) int (*f)( )
    Which of the following is true?
    a) Both are identical.
    b) The first is a correct declaration and the second is wrong.
    c) Both are different ways of declaring pointer to a function.
    d) The first declaration is a function returning a pointer to an integer and the second is a pointer to function returning integer.

33. MPEG involves both spatial compression and temporal compression. The spatial compression is similar to JPEG and temporal compression removes _____ frames.
    a) Temporal
    b) Voice
    c) Redundant
    d) Spatial

34. If user A wants to send an encrypted message to user B. The plain text of A is encrypted with the _____.
    a) Public Key of user A
    b) Public Key of user B
    c) Private Key of user A
    d) Private Key of user B

35. The portion of Windows 2000 operating system which is not portable is.
    a) Processor management
    b) User interface
    c) Device management
    d) Virtual memory management

English

Part-B   [35X1=35]

1. Who is the author of *The Truth About Me: A Hijra Life Story*?
    1. Bama
    b. V.Geetha
    c. A.Revathi
    d. Mukta Sarvagod

2. Who among the ancients prescribed that poetry should both instruct and delight?
    1. Longinus
    b. Plotinus
    c. Aristotle
    d. Horace

3. Who is called the national poet of England?
    1. William Wordsworth
    b. John Keats
    c. William Shakespeare
    d. T.S. Eliot

4. Find the world's longest running play?
    1. Romeo and Juliet
    b. *The Mousetrap*
    c. *Othello*
    d. *Macbeth*

5. What comes "After great pain ,_____" in the famous Emily Dickinson poem?
    1. The letting go
    b. A concrete simplicity
    c. A formal feeling
    d. Substantial light

6.Who is the author of this line? "Search the heads of the greatest rivers in the world, you shall find them but bubbles of water."
    a.John Webster
    b. Oscar Wilde
    c. Francis Bacon
    d. R.B. Sheridan

7.Who among the following is not a science fiction writer?
a.H.G.Wells
b. Victor Hugo
c. Hugo Gernsback
d. Jules Verne

8. Name Mahesh Dattani's play which was adapted for Mango Souffle, the first significantgay-themed movie in India?
a. Do the Needful
b. Bravely Fought the Queen
c. On a Muggy Night in Mumbai
d. Dance like a Man

9.Who is the first female winner of the Nobel Prize in Literature?
1. Selma Lagerlof
b. Pearl S.Buck
c. Grazia Deledda
d. Gabriela Mistral

10. In Practical Criticism I.A. Richards links four kinds of meanings in most human utterancesto four aspects. These are
a.Sense, Feeling, Tone, Intention
b. Sound, Feeling, Nuance, Intention
c. Sense, Voice, Emotion, Intention
d. Sense, Image, Tone, Intention

11. Which Anita Desai's novel features a crazy wife who murders her husband?
a. Voices in the City
b. *Cry, The Peacock*
c. *Baumgartner's Bombay*
d. *In Custody*

12.In Aristotle's *Poetics* we read that "it" is the imitation of an action that is complete and whole, and of a certain magnitude …. having a beginning, a middle, and an end'. Whatdoes "it" refers to?
a.Tragedy
b. Epic
c. Poetry
d. Farce

13.*Anna Karenina* is the creation of
a.Alexander Pushkin
b. Leo Tolstoy
c. Maxim Gorky
d. Anton Chekhov

14. What did Gramsci call the cultural consensus that supports capitalism?
   a. Monopoly
   b. Ideology
   c. Discourse
   d. Hegemony

15. Who is the author of the fantasy novel *The Lord of the Rings?*
   a. J.R.R.Tolkien
   b. Peter Jackson
   c. C.S.Lewis
   d. J.K. Rowling

16. Which of the following authors claimed that 'Commonwealth Literature' does not exist?
   a. Amitav Ghosh
   b. Salman Rushdie
   c. V.S. Naipaul
   d. Nirad Chaudhari

17. Find the blind poet from the list given below?
   a. Ben Jonson
   b. Thomas Hardy
   c. Homer
   d. H.G. Wells

18. How many digits does ISBN contain from January 2007?
   a. 9
   b. 10
   c. 12
   d. 13

19. This periodical was founded in 1709 with the goal of "exposing the false arts of life, removing the disguise of cunning, vanity, and affectation, and recommending a general simplicity in our dress, discourse, and behaviour." The periodical founder wrote under thepen name Isaac Bickerstaff. The above-mentioned periodical is_____.
   a. The Tatler
   b. The Spectator
   c. The Critical Review
   d. The Rambler

20. Who among the following is mourned in Walt Whitman's *Oh Captain! My Captain!*?
   a. R.W. Emerson
   b. Abraham Lincoln
   c. P.B.Shelley
   d. John Keats

21. Which version of Wordsworth's *Lyrical Ballads* was the first to include the Preface?
    a. 1798
    b. 1800
    c. 1802
    d. 1804

22. Which one is the first science-fiction novel?
    a. Dracula
    b. The Time Machine
    c. Frankenstein
    d. Fahrenheit 451

23. What is described by Wordsworth in the following lines of his poem, *The Thorn?*
    I've measured it from side to side;
    'Tis three feet long and two feet wide,
    a. An Infant's Grave
    b. A Cradle
    c. A cot
    d. Fallen Bough

24. Which country awards the Pulitzer Prize?
    a. France
    b. USA
    c. England
    d. Italy

25. Who is the hero of *Paradise Regained?*
    b. Satan
    b. Eve
    c. The Christ
    d. The Church

26. Milton's *Areopagitica* is
    a. a sonnet
    b. a plea for the freedom of the press
    c. a play
    d. an epic

27. "There is nothing outside the text," is a statement by
    c. Victor Shklovsky
    b. Roland Barthes
    c. Ferdinand de Saussure
    d. Jacques Derrida

28. *The Raven* by Edgar Allen Poe grieve for the death of _____
    a. lost Abigail
    b. lost Lenore
    c. pet animal
    d. lost heritage

29. Who was "untimely ripped" from his mother's womb in Shakespeare's *Macbeth*?
a. Macbeth
b. Duncan
c. Macduff
d. Malcolm

30. Nissim Ezekiel describes a "Barbaric City sick with slums / Deprived of seasons, blessed with rains / its hawkers, beggars, ironlunged / Processions led by frantic drums" in his poem *A Morning Walk*. Name the city:
a. Calcutta
b. Banares
c. Bombay
d. Agra

31. Fill the line of the poem from Shelley's *Ode to the West Wind.*
    "If_____comes, can_____be far behind?"
a. winter, spring
b. autumn, summer
c. wind, rains
d. spring, winter

32. Find which is not a revenge tragedy from the following plays?
a. Hamlet
b. The Duchess of Malfi
c. Volpone
d. Gorboduc

33. Material feminism investigates inequality in terms of
a. only gender
b. only class
c. both class and gender
d. only patriarchy

34. "The pen is mightier than the sword" is an example of
a. simile
b. image
c. conceit
d. metonymy

35. What was the centre set up for studying culture at the University of Birmingham called?
a. Centre for Contemporary Cultural Studies
b. Centre for Cultural Studies
c. Centre for New Cultural Studies
d. Centre for New Studies

Physics

Part-B [35x1=35]

1. At what height above the earth's surface is the acceleration due to gravity 1% less than its value at the surface? [$R \approx 6400$ km]
(a) 16 km
(b) 32 km
(c) 64 km
(d) $32\sqrt{2}$ km

2. A satellite going round the earth in a circular orbit loses some energy due to a collision. Its speed is v and distance from the earth is d.
(a) d will increase, v will increase.
(b) d will increase, v will decrease.
(c) d will decrease, v will decrease.
(d) d will decrease, v will increase.

3. When cooking oil is heated in a frying pan, the oil moves around in the pan more easily when it is hot. The main reason for this isthat with rise in temperature, there is a decrease in
(a) surface tension
(b) viscosity
(c) angle of contact
(d) density

4. The average translational kinetic energy of O_2 (molar mass 32) at a particular temperature is 0.048 eV. The average translational kinetic energy of N_2 (molar mass 28) molecules in eV at the same temperature is
(a) 0.0015
(b) 0.003
(c) 0.048
(d) 0.768

5. A closed vessel is maintained at a constant temperature. It is first evacuated and then vapour is injected into it continuously. The pressure of the vapour in the vessel
(a) increases continuously
(b) first increases and then remains constant
(c) first increases and then decreases
(d) none of the above

6.Two cylinders A and B, fitted with pistons, contain equal amounts of an ideal diatomic gas at 300 K. The piston of A is free to move, while that of B is held fixed. The same amount of heat is given to the gas in each cylinder. If the rise in temperature of the gas in A is 30 K then the rise in temperature of the gas in B is

       (a) 30 K

       (b) 18 K

       (c) 50 K

       (d) 42 K

7.A body cools from 50□C to 40□C in 5 minutes. The surrounding temperature is 20□C. what will be its temperature 5 minutes after reaching 40□C?

       (a) 35□C

       (b)100/3□C

       (c) 32□C

       (d) 30□C

8.The equation $y = a\cos^2(2\pi nt - 2\pi x)$ represents a wave with

       (a) amplitude a, frequency n and wavelength λ

       (b) amplitude a, frequency $2n$ and wavelength 2λ

       (c) amplitude $a/2$, frequency $2n$ and wavelength λ

       (d) amplitude $a/2$, frequency $2n$ and wavelength $\lambda/2$

9.A wave travelling in a material medium is described by the equation $y = A\sin(kx - \omega t)$. The maximum particle velocity is

       (a) $A\omega$

       (b) ω/k

       (c) $d\omega/dk$

       (d) x/t

10.An open pipe is suddenly closed at one end, as a result of which the frequency of the third harmonic of the closed pipe is found to be higher by 100 Hz than the fundamental frequency of the open pipe. The fundamental frequency of the open pipe is

       (a) 200 Hz

       (b) 300 Hz

       (c) 240 Hz

       (d) 480 Hz

11.In the most general case, which one of the following quantities is NOT a second order tensor?

       (a) Stress

       (b) Strain

       (c) Moment of inertia

       (d) Pressure

12. The eigenvalues of a matrix are i, 2i and 3i. the matrix is
    (a) unitary
    (b) anti-unitary
    (c) Hermitian
    (d) anti-Hermitian

13. The trace of a 3 x 3 matrix is 2. Two of its eigenvalues are 1 and 2. The third eigenvalue is
    (a) - 1
    (b) 0
    (c) 1
    (d) 2

14. An electron is accelerated from rest by 10.2 million volts. The percent increase in its mass is
    (a) 20000
    (b) 2000
    (c) 200
    (d) 20

15. A particle of mass m moving with speed v collides with a stationary particle of equal mass. After the collision, both the particles move. Let θ be the angle between the two velocity vectors. If the collision is inelastic, then
    (a) θ is always less than 90˚
    (b) θ is always equal to 90˚
    (c) θ is always greater than 90˚
    (d) θ could assume any value in the range 0˚ to 180˚

16. The homogeneity of time leads to the law of conservation of
    (a) linear momentum
    (b) angular momentum
    (c) energy
    (d) parity

17. The stimulated emission is dominant over stimulated absorption by the process is called

    (a) Direct conversion

    (b) Optical Pumping

    (c) Population Inversion

    (d) Stimulated emission

18. How long an atom can stay in excited state?

   (a) 10^{-3} s
   (b) 10^{-5} s
   (c) 10^{-8} s
   (d) 10^{-9} s

19. Laser source has a line width of
   (a) 10 Hz
   (b) 100 Hz
   (c) 10^3 Hz
   (d) Laser

20. The de Broglie wavelength λ for an electron of energy 150 eV is
   (a) 10^{-8} m
   (b) 10^{-10} m
   (c) 10^{-12} m
   (d) 10^{-14} m

21. The time-independent Schrodinger equation of a system represents the conservation of the
   (a) total binding energy of the system
   (b) total potential energy of the system
   (c) total kinetic energy of the system
   (d) total energy of the system

22. A spinless particle movies in a central potential V(r).
   (a) The kinetic energy and the potential energy of the particle cannot simultaneously have sharp values.
   (b) The total energy and the potential energy of the particle can simultaneously have sharp values.
   (c) The total energy and the square of the orbital angular momentum about the origin cannot simultaneously have sharp values.
   (d) The total energy of the particle can have only discrete eignevalues.

23. The order of magnitude of the energy gap of a typical superconductor is
   (a) 1 MeV
   (b) 1 KeV
   (c) 1 eV
   (d) 1 meV

24. The Hall coefficient, R_H, of sodium depends on
    (a) the effective charge carrier mass and carrier density
    (b) the charge carrier density and relaxation time
    (c) the charge carrier density only
    (d) the effective charge carrier mass

25. In a one-dimensional Kronig Penny model, the total number of possible wave functions is equal to

    (a) twice the number of unit cells
    (b) number of unit cells
    (c) half the number of unit cells
    (d) independent of the number of unit cells

26. A piece of semiconducting material is introduced into a circuit. If the temperature of the material is raised, the circuit current will
    (a) increase
    (b) remain the same
    (c) decrease
    (d) cease to flow

27. A neutron passing through a detector is detected because of
    (a) the ionization it produces
    (b) the scintillation light it produces
    (c) the electron-hole pairs it produces
    (d) the secondary particles produced in a nuclear reaction in the detector medium

28. Suppose that a neutron at rest in free space decays into a proton and an electron. This process would violate
    (a) conservation of charge
    (b) conservation of energy
    (c) conservation of linear momentum
    (d) conservation of angular momentum

29. If the peak output voltage of a full wave rectifier is 10V, its d.c. voltage is
    (a) 10.0 V
    (b) 7.07 V
    (c) 6.36 V
    (d) 3.18 V

30. A field effect transistor is a
    (a) unipolar device
    (b) special type of bipolar junction transistor
    (c) unijunction device
    (d) device with low input impedance

31. An unpolarised light wave is incident from air on a glass surface at the Brewster angle. The angle between the reflected and the refracted wave is
    (a) 0□
    (b) 45□
    (c) 90□
    (d) 120□C

32. A charged capacitor (C) is connected in series with an inductor (L). When the displacement current reduces to zero, the energy of the LC circuit is
    (a) stored entirely in its magnetic field
    (b) stored entirely in its electric field
    (c) distributed equality among its electric and magnetic fields
    (d) radiated out of the circuit

33. Although mass-energy equivalence of special relativity allows conversion of a photo to an electron-positron pair, such a process cannot occur in free space because
    (a) the mass is not conserved
    (b) the energy is not conserved
    (c) the momentum is not conserved
    (d) the charge is not conserved

34. A Michelson interferometer is illuminated with monochromatic light. When one of the mirrors is moved through a distance of 25.3 µm, 92 fringes pass through the cross-wire. The wavelength of the monochromatic light is
    (a) 500 nm
    (b) 550 nm
    (c) 600 nm
    (d) 650 nm

35. If the photon were to have a finite mass, then the Coulomb potential between two stationary charges separated by a distance r would
    (a) be strictly zero beyond some distance
    (b) fall off exponentially for large values of r
    (c) fall off as $1/r^3$ for large values of r
    (d) fall off as $1/r$ for large values of r

Chemistry

Part-B [35x1=35]

1. On which factors the vibrational stretching frequency of diatomic molecule depend?
a) Force constant
b) Atomic population
c) Temperature
d) Magnetic field

2. The δ-bond is formed via the overlap of
a) dx^2-y^2 and dx^2-y^2 orbitals
b) dxz and dxz orbitals
c) dxy and dxy orbitals
d) dyz and dyz orbitals

3. The decreasing order of dipole moment of molecules is
a) $NF_3 > NH_3 > H_2O$
b) $NH_3 > NF_3 > H_2O$
c) $H_2O > NH_3 > NF_3$
d) $H_2O > NF_3 > NH_3$

4. The molecule with highest number of lone-pairs and has a linear shape based on VSEPR theory is:
a) CO_2
b) I_3^-
c) NO_2^-
d) NO_2^+

5. The number of antibonding electrons in NO and CO according to MO theory are respectively.
a) 1, 0
b) 2, 2
c) 3, 2
d) 2, 3

6. The formation constant for the complexation of M^+(M = Li, Na, K and Cs) with cryptant, C222 follows the order
a) $Li^+ < Cs^+ < Na^+ < K^+$
b) $Li^+ < Na^+ < K^+ < Cs^+$
c) $K^+ < Cs^+ < Li^+ < Na^+$
d) $Cs^+ < K^+ < Li^+ < Na^+$

7. Under physiological condition, oxygen is binding to deoxyhemoglobin and deoxymyoglobin, the binding curve and its pH dependence, respectively, are

a) Sigmoidal and pH dependent;
b) Hyperbolic and pH independent;hyperbolic   and pH independent sigmoidal and pH Dependent
c) Sigmoidal and pH independent;
d) Hyperbolic and pH dependent ; hyperbolic and   pH dependent sigmoidal and pH independent

8.A system consists of gaseous H_2, O_2, H_2O and CO_2 where the amount of CO_2 is specified and the equilibrium constant for the reaction $2H_2$ g + O_2 g $\rightarrow$ $2H_2O$ g is known. The number of degrees of freedom of the system is
a) 2
b) 3
c) 4
d) 5

9.The energy of a hydrogen atom in a state is $-hcR_H/25$ (R_H = Rydberg constant). The degeneracy of the state will be
a) 5
b) 10
c) 25
d) 50

10.Silver crystallizes in face-centered cubic structure. The 2nd order diffraction angle of a beam of X-ray ($\lambda = 1$Å) of (111) plane of the crystal is 30°. Therefore, the unit cell length of the crystal would be
a) a = 3.151Å
b) a = 3.273 Å
c) a = 3.034Å
d) a = 3.464 Å

11.A system consists of gaseous H_2, O_2, H_2O and CO_2 where the amount of CO_2 is specified and the equilibrium constant for the reaction $2H_2$ g + O_2 g $\rightarrow$ $2H_2O$ g is known. The number of degrees of freedom of the system is
a) 2
b) 3
a) 4
d) 5

12. The Langmuir adsorption isotherm is given by $\theta = K_p / 1 + K_p$, where P is the pressure of the adsorbate gas. The Langmuir adsorption isotherm for a diatomic gas A_2 undergoing dissociative adsorption is:

(a) $\theta = \dfrac{Kp}{1+Kp}$

(b) $\theta = \dfrac{2Kp}{1+2Kp}$

(c) $\theta = \dfrac{(Kp)^2}{1+(Kp)^2}$

(d) $\theta = \dfrac{(Kp)^{1/2}}{1+(Kp)^{1/2}}$

13. The Maxwell's relationship derived from the equation dG= VdP– SdT is

(a) $\left(\dfrac{\partial V}{\partial T}\right)_P = \left(\dfrac{\partial S}{\partial P}\right)_T$

(b) $\left(\dfrac{\partial P}{\partial V}\right)_T = \left(\dfrac{\partial T}{\partial S}\right)_P$

(c) $\left(\dfrac{\partial V}{\partial T}\right)_P = -\left(\dfrac{\partial S}{\partial P}\right)_T$

(d) $\left(\dfrac{\partial P}{\partial V}\right)_T = -\left(\dfrac{\partial T}{\partial S}\right)_P$

14. A thermodynamic equation that relates the chemical potential to the composition of a mixture is known as

a) Gibb's-Helmholtz equation
b) Gibbs-Duhem equation
c) Joule-Thomson equation
d) Debye-Huckel equation

15. The Daniel cell is

(a) $Pt_I(s)\,|\,Zn(s)\,|\,Zn^{2+}(aq)\,\|\,Cu^{2+}(aq)\,|\,Cu(s)\,|\,Pt_{II}(s)$

(b) $Pt_I(s)\,|\,Zn(s)\,|\,Zn^{2+}(aq)\,\|\,Ag^{+}(aq)\,|\,Ag(s)\,|\,Pt_{II}(s)$

(c) $Pt_I(s)\,|\,Fe(s)\,|\,Fe^{2+}(aq)\,\|\,Cu^{2+}(aq)\,|\,Cu(s)\,|\,Pt_{II}(s)$

(d) $Pt_I(s)\,|\,H_2(s)\,|\,H_2SO_4(aq)\,\|\,Cu^{2+}(aq)\,|\,Cu(s)\,|\,Pt_{II}(s)$

16. Which is correct Nernst equation for redox reaction $O + ne^- \rightarrow R$?

(a) $E = E^0 - \dfrac{RT}{nF}\ln\dfrac{[O]}{[R]}$

(b) $\dfrac{[O]}{[R]} = e^{\frac{nF}{RT}(E-E^0)}$

(c) $\dfrac{[O]}{[R]} = e^{-\frac{nF}{RT}(E-E^0)}$

(d) $\dfrac{[O]}{[R]} = e^{\frac{RT}{nF}(E-E^0)}$

17.In a potentiometric titration, the end point is characterized by, Where E is the emf of the titration cell and V is the volume of the titrant added

(1) $\frac{dE}{dV} = 0, \frac{d^2E}{dV^2} = 0$

(2) $\frac{dE}{dV} \neq 0, \frac{d^2E}{dV^2} = 0$

(3) $\frac{dE}{dV} = 0, \frac{d^2E}{dV^2} \neq 0$

(4) $\frac{dE}{dV} \neq 0, \frac{d^2E}{dV^2} \neq 0$

18.X-ray diffraction doesnot give any structural information for
a) Mettallic solids
b) Ionic solids
c) Molecular Solids
d) Amorphous solids

19.In zeigler- Natta catalysis the most commonly used catalyst system is
a) $TiCl_4$, $AlEt_3$
b) $TiCl_4$, BF_3
c) VO, Me_3
d) CrO_2, Et_3

20.The reaction of 1-brom-2-flurobenzene with furan in the presence of one equivalent of Mg give

a)   b).   c)   d.
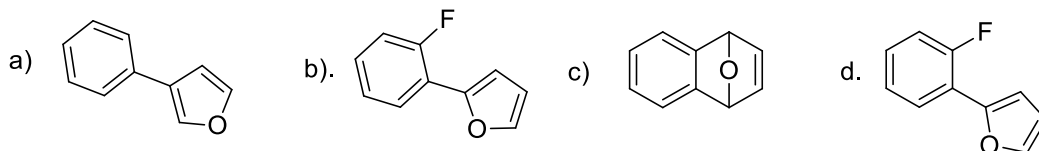
21.Identify the correct reagent required for the following transformation
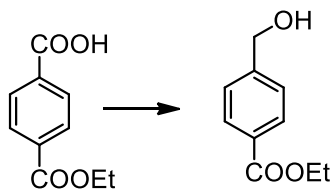
a) $LiAlH_4$ b) $NaBH_4$ c) $BH_3.SMe_2$ d) H_2, Pd/C

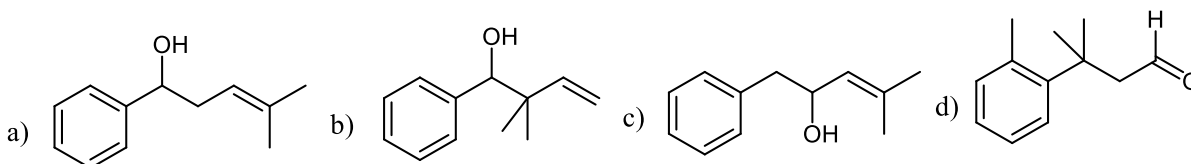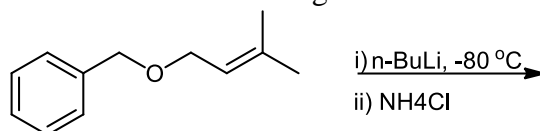22.Reaction of cyclohexhyl benzyl ether with hydrogen in the presence of 10% Pd/C yields
a) Cyclohexanol and toluene
b)Cyclochexanol and benzyl alcohol
c) Cyclohexane and benzyl alcohol
d) Cyclohexane and toluene

23. Predict the product in the given

i) $BrCH_2OMe/P(OEt)_3/DME$

ii. NaH/DMF

iii) H_3O^+

a)

b) HO CH₂OMe

c) CHO

d) CH₂OMe
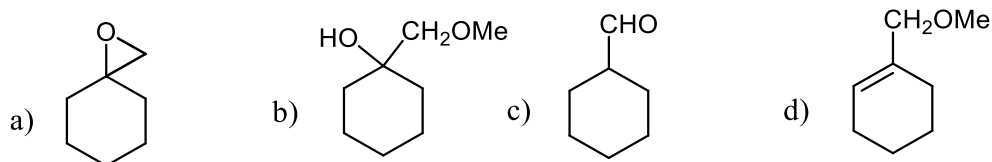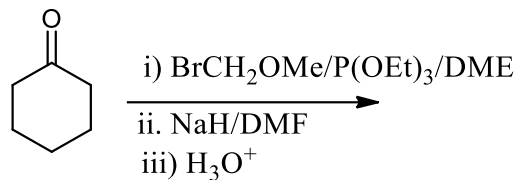
24. The major product formed in the following reaction is

i) n-BuLi, -80 °C

ii) NH4Cl

a) OH

b) OH

c) OH

d)

25. The shape of XeF2 is
a). Linear
b) Triangular
c) Tetrahedron
d) Octahedron

26. Among the following the strongest oxidizing anion is

a). CrO_4^{2-}
b) VO_4^{3-}
c) FeO_4^{2-}
d) MnO_4^{2-}

27. The separation of lanthanides in ion exchange method is based on

a) Oxidation state of the ion
b) Size of the hydrated ions
c) Basicity of lanthanides
d) the solubility of nitrates

28. Which of the following belongs to the C_{3v} point group?
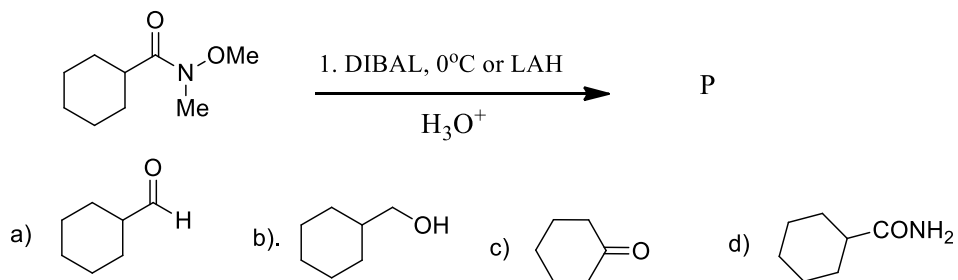
a) SO_3

b) BBr_3

c) NH_3

d) $AlCl_3$

29. The pKa of a weak acid (HA) is 4.5. The pOH of an aqueous buffer solution of HA in which 50% of the acid ionized

a). 4.5

b) 2.5

c) 9.5

d) 7.0

30. In the X-ray diffraction pattern for a bcc lattice, h,k,l can have

a) Any value

b) Even value

c) h+k+l even

d) odd value
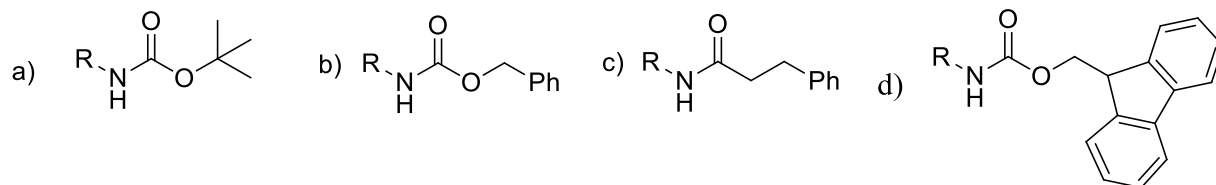
31. The major product of the below transformation is

32. In the IR spectrum of p-nitro phenoxy acetate, the carbonyl absorption band at

a) 1660 cm^{-1}

b) 1700 cm^{-1}

c) 1730 cm^{-1}

d) 1770 cm^{-1}

33. Among the following the compound that undergoes de-protection easily on treatment with hydrogen in the presence of 10% Pd/C to generate RNH_2 is

a)   b)   c)   d)

34. The major product formed in the reaction of styrene with an excess of lithium in liquid ammonia and t-butyl alcohol is

a)   b)   c)   d)
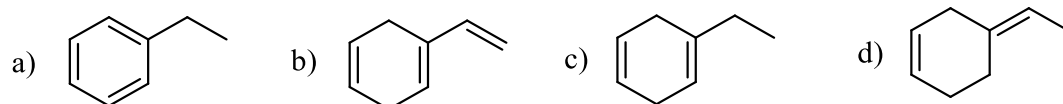
35. Among the following drugs the anticancer agent is

    a). captopril
    b) chloroquine
    c) camptothecinc
    d) ranitidine

Biotechnology

Part – B [35x1=35]

1.For getting a large amount of proteins to crystallize, which of the following should be used as an expression system?
a) Bacterial system
b) Yeast systems
c) Eukaryotic systems
d) Both eukaryotic and bacterial systems can be used

2. If controlled inactivation of a gene is carried out and some of the consequences when inactivation of a target gene is deleterious are avoided. It is referred as
a) specialized gene targeting
b) controlled gene targeting
c) conditional gene targeting
d) specific gene targeting

3. Constitutive promoters are majorly obtained from _____
a) fungi
b) bacteria
c) mammalian cells
d) viral cells

4. What are primers?
a) Primers are the short sequences at the end of the nucleotide sequences which are used for amplification
b) Primers are the short sequences which are complementary to the nucleotides at the end of the sequence which is to be amplified
c) Primers are the short sequences present anywhere in the nucleotide sequence to be amplified
d) Primers are the short sequences which are complementary to the nucleotides anywhere in the sequence to be amplified

5. A reaction mixture for PCR consists of _____
a) heat unstable polymerase
b) primers in a limited amount
c) deoxynucleoside triphosphate (dNTPs)
d) a region complementary to the sequence to be amplified

6. Weakness in muscles and increase in the fragility of red blood cells is caused due to the _____.
(a) Deficiency of vitamin E
(b) Deficiency of vitamin D
(c) Deficiency of vitamin C
(d) Deficiency of vitamin A

7. Which of the following is the major point of regulation on the pathway to cholesterol?
a) Thiolase
b)HMG co-A synthase
c) HMG co-A reductase
d)Pyruvate kinase

8. fermentation to produce alcohol by yeast saccharomyces is due to
A) zymase
B) trysaccharide
C) galactose
D) saccharide

9. Nanomembranes have a pore size of _____.
A. 1nm-10nm.
B. 10nm-100nm.
C. 0.1nm-1nm.
D. 100nm-1000nm

10. Which technique is used in the making of biochips?
A. Nanolithography.
B. Microlithography.
C. Nanotechnology.
D. DNA chip technology.

11. Compounds that lower the surface tension of a liquid are called as _____.
A. Detergents.
B. Surfactants.
C. Wetting agents.
D. Soaps.
12. The culturing of cells in liquid agitated medium is called
a) liquid culture
b) micro propagation
c) Agar culture
d) suspension culture

13. Immobilized cell bioreactors are based on
a) cells cultures in solid medium
b) cells cultured in liquid medium
c) cells entrapped in gels
d) cells cultured in semisolid medium
14. Elicitors are molecules that
a) induce cell division
b) stimulate secondary metabolites production
c) stimulate primary metabolites production
d) stimulate production of callus

15. Artificial seeds are
a) seeds produced in laboratory condition
b) seeds encapsulated in a a gel
c) somatic embryos encapsulated in a gel
d) zygotic embryos encapsulated in a gel

16. Hairy root cultures for secondary metabolite production are induced by transforming plant cells with
 a) virus
b) *Agrobacterium tumefaciens*
c) *Bacillus thuringiensis*
d) *Agrobacterium rhizogenes*

17. A gene produced for recombinant DNA technology contains a gene from one organism joined to the regulatory sequence of another gene. Such a gene is called
a. oncogene
b. junk gene
c. chimeric gene
d. Expression gene

18. Which group of enzymes are popularly called "Molecular stichers"
a. restriction Endonuclease
b. ligases
c. RNA polymerase
d. DNA polymerase

19. Electrophoresis, a technique used in DNA fingerprinting helps to separate
a. DNA segments
b. cells from DNA
c. Tissues
d. RNA from DNA

20. During DNA finger printing, DNA nucleotides hybridized with probe can be detected through
a. electrophoresis
b. polymerase chain reaction
c. autoradiography
d. hybridoma

21. Gene therapy, a technique that helps in
a. saving endangered species
b. curing genetic disorders
c. clonal propagation
d. producing monoclonal antibodies

22. The genes introduced through somatic cell gene therapy are
a. heritable
b. non-heritable
c. partially heritable
d. occasionally heritable

23. The main aim of human genome project is
a. to identify and sequence of all the genes present in the human body
b. to introduce new genes to human beings
c. to remove disease causing genes from humans
d. to improve techniques of finger printing

24. Golden rice is
a. hybrid rice developed by traditional plant breeding
b. a rice variety obtained by plant tissue culture
c. a rice variety obtained by recombinant DNA technology
d. a rice variety obtained by protoplast fusion

25. Increased activity of an organism due to a chemical substance, called as.
a) Chemokinesis
b Omnikinesis
c Hydrokinesis.
D Haemokinesis.

26. Prokaryotic cells have a specialized material with them called as?
(a) Peptidoglycan
(b) Peptidoaminase
(c) Pectin
(d) Peptidoglucose

27. Which of the following statements is not true for plasma membrane?
(a) It is present in both plant and animal cell
(b) Lipid is present as a bilayer in it
(c) Proteins are present integrated as well as loosely associated with the lipid bilayer
(d) Carbohydrate is never found in it

28. ELISA is
a. Using radiolabelled second antibody
b. Usage of RBCs
c. Using complement-mediated cell lysis
d. Addition of substrate that is converted into a coloured end product

29. Animal cell cultures are used widely for the production of
a) insulin
b) somatostatin
c) Monoclonal antibodies
d) thyroxine

30. The cell line used for the production of polio vaccine was
a) Primate kidney cell line
b) CHO cell line
c) Dog kidney cell line
d) mouse fibroblast cell line

31. An example of a digestive hormone is
(a)Lipase
(b)Pepsin
(c)Amylase
(d)Gastrin

32. Name the cytokines which released in response to virus infection?
a) Interferons
b) Monokines
c) Lymphokines
d) Interleukins

33. Name the first cell which recruited at the place of infection.
a) Nk cells
b) Basophils
c) Neutrophils
d) Macrophages

34. What is the name of MHC in humans?
a) HLA
b) H2
c) Adjuvants
d) Haplotype

35. What is a mode of replication in E.coli?
a) Intermediate
b) Dispersive
c) Conservative
d) Semiconservative

Microbiology

Part – B [35x1=35]

1. Histon protein present in
(A) Bacterial genome
(B) Plant genome
(C) Human genome
(D) (B) and (C)

2.Replication occurs once every cell generation during
(A) S phase
(B) T phase
(C) C phase
(D) A phase

3.A phosphate group is added by protein enzyme called
(A) kinase
(B) helicase
(C) gyrase
(D) polymerase

4.Synthesis of all protein chains in prokaryotic and eukaryotic cells begins with amino acid
(A) methionine
(B) adenine
(C) proline
(D) arginine

5.Process of genetic information flowing from DNA to RNA to proteins is called
(A) gene annealing
(B) gene mutation
(C) gene expression
(D) gene therapy

6.Initiation codon is
(A) AUG
(B) AUU
(C) AUC
(D) AAU

7.In prokaryotes small 30S ribosomal subunit contains the
(A) 16S ribosomal RNA
(B) 20S ribosomal RNA
(C) 24S ribosomal RNA
(D) 28S ribosomal RNA

30

8.Chromatography is a physical method that is used to separate and analyse —————————

(A) Simple mixtures
(B) Complex mixtures
(C) Viscous mixtures
(D) Metals

9.In thin layer chromatography, the stationary phase is made of ————————— and the mobile phase is made of —————————
(A) Solid, liquid
(B) Liquid, liquid
(C) Liquid, gas
(D) Solid, gas

10.In SDS PAGE migration of protein is affected by
(A) Charge of the protein
(B) Size of the protein
(C) Net size of the protein
(D) All of these

11.Polymerase chain reaction basically consists of
(A) two steps
(B) three steps
(C) four steps
(D) five steps

12.DNA finger printing was developed by
(A) Francis Crick
(B) Khorana
(C) Alec Jeffery
(D) James Watson

13.70S ribosomes present in
(A) Plant cell
(B) Animal cell
(C) Bacterial cell
(D) None of the above

14.Following method is used for separation of proteins
(A) Agarose gel electrophoresis
(B) SDS-PAGE electrophoresis
(C) Ion exchange chromatography
(D) None of the above

15. Most spoilage bacteria grow at
(A) acidic pH
(B) alkaline pH
(C) neutral pH
(D) any of the pH

16. What are the intrinsic factors for the microbial growth?
(A) pH
(B) Moisture
(C) Oxidation-Reduction Potential
(D) All of these

17. Fermentation which is carried by bacteria is called
(A) lactic acid fermentation
(B) alcoholic fermentation
(C) pyruvic fermentation
(D) acrylic fermentation

18. Common example of fermented beverage product is
(A) pickles
(B) beer
(C) bread and buns
(D) cheese and yogurt

19. Fermentation which is carried by yeast is called
(A) pyruvic fermentation
(B) acrylic fermentation
(C) lactic acid fermentation
(D) alcoholic fermentation

20. Batch fermentation is
(A) Closed system
(B) Open system
(C) Fed batch system
(D) Sub merger system

21. Pasterurization process proposed by
(A) Louis Pasteur
(B) Robert Koch
(C) Robert brown
(D) Okava

22.Endo toxin is released by
(A)   Gram +ve bacteria
(B)   Gram –ve bacteria
(C)   Acid fast bacteria
(D)   Cell wall less bacteria

23.Attenuation means
(A)   Increase in virulence
(B)   Reduction in virulence
(C)   Reduction in antigenicity
(D)   None

24.Father of chemotherapy
(A)   Louis Pasteur
(B)   Robert Koch
(C)   Leewenhoek
(D)   Paul Ehrlich

25.pH of the normal skin is
(A)   7 to 8
(B)   8 to 12
(C)   3 to 5
(D)   5 to 10

26.Accumulation of bacterial toxins in the blood stream is called
(A)   Bacteremia
(B)   Toxaemia
(C)   Septicaemia
(D)   Pyaemia

27.The region where the soil and roots make contact is called
(A)   Rhizosphere
(B)   Humus
(C)   Heterosphere
(D)   Halosphere

28.The following are examples for denitrification bacteria except
(A)   Agrobacterium
(B)   Alkaligenus
(C)   Clostridum
(D)   Chromobacterium

29.One of the cause of global warming is
(A) CO_2 depletion
(B) Nitrous oxide
(C) O_2 depletion
(D) Ozone depletion

30.Hybrid cell derived from fusion of two or more cells is called
(A) Recombinant
(B) Hybridoma
(C) Myeloma
(D) Mortal

31.Commonly used cryoprotectant in cell culture preservation is
(A) Acetone
(B) 2% Glycerol
(C) DMSO
(D) 5% CO_2

32.The medium used for the production of monoclonal antibodies are
(A) MEM medium
(B) Eagles medium
(C) RPM medium
(D) HAT medium

33.Bacteria used for insect control is
(A) Bacillus cereus
(B) Bacillus subtilis
(C) Bacillus thuringiensis
(D) Bacillus verricosum

34.Plasmid vectors used for plant cell transformation are
(A) Arcano bacterium pyogens
(B) Agrobacterium tumefaciens
(C) Aerobacter aerogenus
(D) Agrobacterium hepaticus

35.The following organisms is an example of phosphate solubilizing biofertilizer
(A) Azospirillum
(B) Nostoc
(C)   Thiobacillus
(D)   Plectonema