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SRMJEEE 2022 Model Question Paper

SRM Joint Engineering Entrance Examination - SRMJEEE

SRMJEEE Model Question Paper

1. Which of the following is not a unit of time?
(a) Light year
(b) Nano second
(c) Micro second
(d) Second

2. If momentum (P), area (A) and time (T) are taken to be fundamental quantities, then energy has the dimensional formula
(a) $(P^1 A^{-1} T^1)$
(b) $(P^2 A^1 T^1)$
(c) $(P^2 A^{-1/2} T^1)$
(d) $(P^1 A^{1/2} T^{-1})$

3. Gravitational potential is -
(a) proportional to distance
(b) inversely proportional to distance
(c) proportional to the square of the distance
(d) inversely proportional to the square of the distance

4. If the change in the value of g at the height h above the surface of the earth is the same as at a depth x below it, then (both x and h being much smaller than the radius of the earth)
(a) x = h
(b) x = 2 h
(c) x = 4 h
(d) x = $\sqrt{2}$ h

5. If the radius of earth were to shrink by one percent (its mass remains the same), then the acceleration due to gravity on the earth's surface _____
(a) Would decrease
(b) Would remain unchanged

(c) Would increase
(d) Cannot be predicted

6. A point charge Q(C) is placed at the origin. Find the electric flux of which an area 4πm2 on a concentric spherical shell of radius R
(a) $Q/R^2\varepsilon_0$
(b) Q/ε_0
(c) $Q/4R^2\varepsilon_0$
(d) $Q/2R^2\varepsilon_0$

7. Capacitor which has a dielectric between its plates and is made of a flexible material that can be rolled into shape of a cylinder is called
(a) ceramic capacitors
(b) fixed capacitors
(c) parallel plate capacitors
(d) electrolytic capacitors

8. A 40μF capacitor in a defibrillator is charged to 3000 V. The energy stored in the capacitor is sent through the patient during a pulse of duration 2 ms. The power delivered to the patient is
(a) 45kW
(b) 90kW
(c) 180kW
(d) 360kW

9. Five balls numbered 1 to 5 are suspended using separate threads. Pairs (1, 2), (2, 4) and (4, 1) show electrostatic attraction while pairs (2, 3), (4, 5) show repulsion. Therefore, ball 1 must be
(a) neutral
(b) metallic
(c) positively charged
(d) negatively charged

10. An ammeter reads up to 1 A. Its internal resistance is 0.81 Ω. To increase the range of 10 A the value of the required shunt is_____.
(a) 0.032 Ω
(b) 0.3 Ω
(c) 0.9 Ω
(d) 0.09 Ω

11. Conductivity is the_____.of resistivity
(a) Opposite
(b) Equal
(c) Reciprocal
(d) Square

12. The resistance of wire is 5 Ωat 50° C and 6 Ωat 100° C. The resistance of the wire at 0° will be_____
(a) 3 Ω
(b) 2 Ω
(c) 1 Ω
(d) 4 Ω

13. The expression for the potential difference between the electrodes of a cell of emf E and internal resistance r is_____
(a) V = E-Ir
(b) V = E+Ir
(c) V = E/Ir
(d) V = EI/r

14. Which of the following statements is false?
(a) The direction of magnetic field lines is from N to S.
(b) In the region where magnetic field lines are at a close distance from one another, there will be a strong magnetic field.
(c) The magnetic field lines form closed loops.
(d) The magnetic field lines can cross one another

15. Commercial electric motors do not use
(a) An electromagnet to rotate the armature
(b) Effectively large number of turns of conducting wire in the current carrying coil
(c) A permanent magnet to rotate the armature
(d) A soft iron core on which the coil is wound

16. A magnetic field exists around
(a) iron
(b) copper
(c) aluminium
(d) (d)moving charges

17. Power factor of the following circuit will be zero
(a) Resistance
(b) Inductance
(c) Capacitance
(d) Both (b) and (c)

18. An electromagnet is
(a) Permanent
(b) Temporary
(c) Insulator
(d) Conductor

19. When current is passed through a conductor, it produces
(a) Electric field
(b) Magnetic field
(c) Electromagnetic field
(d) None of the above

20. Which of the following rays is emitted by a human body?
(a) X-rays

(b) Visible rays
(c) UV-rays
(d) IR-rays

21. An object that gives out its own light is called
(a) Non luminous
(b) Luminous
(c) Effervescent
(d) Translucent

22. Due to which phenomena the stick if immersed in water appears to be bent?
(a) Reflection
(b) Dispersion
(c) Refraction
(d) Scattering

23. A symmetric double convex lens is cut in two equal parts by a plane perpendicular to the principle axis. If the power of the original lens is 4 D, the power of a cut lens will be
(a) 2 D
(b) 3 D
(c) 4 D
(d) 5 D

24. Colors in thin films are because of
(a) Dispersion
(b) Interference
(c) Compton effect
(d) Diffraction

25. A proton, a neutron, an electron and an α-particle have same energy. Then their de Broglie wavelengths compare as
(a) $\lambda_p = \lambda_n > \lambda_e > \lambda_\alpha$

(b) $\lambda_\alpha < \lambda_p = \lambda_n > \lambda_e$

(c) $\lambda_e < \lambda_p = \lambda_n > \lambda_\alpha$

(d) $\lambda_e = \lambda_p = \lambda_n = \lambda_\alpha$

26. An electron is moving with an initial velocity and is in a magnetic field Then it's de Broglie wavelength

(a) remains constant.

(b) increases with time.

(c) decreases with time.

(d) increases and decreases periodically.

27. Sodium and Copper have different work functions such as 2.3 eV and 4.6 eV respectively. Then the ratio of threshold wavelengths is .....

(a) 2:1

(b) 1:2

(c) 4:1

(d) 1:4

28. What is the name of the series of visible lines in the hydrogen spectrum?

(a) Balmer series

(b) Lyman series

(c) Barackett series

(d) None of above

29. Which of the following is the alpha particle?

(a) ${}^{-1}_{0}e$

(b) ${}^{1}_{0}e$

(c) ${}^{1}_{1}H$

(d) ${}^{4}_{2}He$

30. A particle with spin angular momentum $\hbar/2$ is called a

(a) lepton
(b) hadron
(c) fermion
(d) boson

31. In new spectrometers each ion hits a
(a) detector
(b) ionizer
(c) collector
(d) graph

32. Which isotope on bombardment with α-particles will give ${}_8O^{17}$ and ${}_1H^1$
(a) ${}_6C^{14}$
(b) ${}_8O^{16}$
(c) ${}_7N^{15}$
(d) ${}_7N^{14}$

33. The base of a transistor is ..... doped
(a) heavily
(b) moderately
(c) lightly
(d) none of the above

34. The output impedance of a transistor connected in ..... arrangement is the highest
(a) common emitter
(b) common collector
(c) common base
(d) none of the above

35. $I_C = \beta I_B$ + ...
(a) I_{CBO}
(b) I_C

(c) I_{CEO}
(d) αI_E

CHEMISTRY

1. . A solution is obtained by dissolving 12 g of urea (mol.wt.60) in a litre of water. Another solution is obtained by dissolving 68.4 g of cane sugar (mol.wt. 342) in a litre of water at the same temperature. The lowering of vapour pressure in the first solution is
(a) Same as that of 2nd solution
(b) Nearly one-fifth of the 2nd solution
(c) Double that of 2nd solution
(d) Nearly five times that of 2nd solution

2. The binary mixture in which partial miscibility increases with rise in temperature is
(a) Phenol-water
(b) Diethyl ether-water
(c) Diethyl amine-water
(d) Nicotine-water

3. The difference between the electrode potentials of two electrodes when no current is drawn through the cell is called _____.
(a) Cell potential
(b) Cell emf
(c) Potential difference
(d) Cell voltage

4. Which is a buffer reagent?
(a) Calcium chloride
(b) Boric acid
(c) Sodium chloride
(d) None of above

5. The electric charge for electrode decomposition of one gram equivalent of a substance is

(a) One ampere per second
(b) 96500 coulombs per second
(c) One ampere for one hour
(d) Charge on one mole of electrons

6. The platinum electrodes were immersed in a solution of cupric sulphate and electric current passed through the solution. After some time it was found that colour of copper sulphate disappeared with evolution of gas at the electrode. The colourless solution contains
(a) Platinum sulphate
(b) Copper hydroxide
(c) Copper sulphate
(d) Sulphuric acid

7. The rate of a reaction is found to double when the concentration of one reactant is quadrupled. The order of the reaction with respect to this reactant is
(a) First.
(b) One-half.
(c) Second.
(d) Third.

8. A first order reaction is 50% completed in 3.26×10^{14} s. How much time would it take for 100% completion?
(a) Infinite
(b) 3.26×10^{28} s
(c) 6.52×10^{14} s
(d) 3.26×10^{15} s

9. A solid that takes up a gas or vapour or solute is called _____
(a) Adsorbate
(b) Adsorbent
(c) Sorption
(d) Physorption

10. The rate of adsorption on Langmuir theory is _____
(a) $\theta k_a p_A N(1-)$
(b) $k_a N(1-\theta)$

(c) $k_d / N\theta$
(d) $k_d N\theta$

11. Among the following which is the strongest oxidizing agent?
(a) Cl_2
(b) Br_2
(c) F_2
(d) I_2

12. Which phosphoric acid is tetrabasic in nature
(a) Metaphosphoric acid
(b) Orthophosphoric acid
(c) pyrophosphoric acid
(d) Hypophosphorous acid

13. Transitional elements are
(a) All metals
(b) Few metals and few non-metals
(c) All solids
(d) All highly reactive

14. In a reaction the ferrous (Fe^{++}) iron is oxidised to ferric (Fe^{+++}) ion. The equivalent weight of the ion in the above reaction is equal to
(a) Half of the atomic weight
(b) 1/5 of the atomic weight
(c) The atomic weight
(d) Twice the atomic weight

15. $KMnO_4$ acts as an oxidising agent in alkaline medium. When alkaline $KMnO_4$ is treated with KI, iodide ion is oxidised to
(a) I_2
(b) IO_4^-
(c) IO_3^-
(d) IO^-

16. Which one of the following is not a transition metal

(a) Chromium
(b) Titanium
(c) Lead
(d) Tungsten

17. Geometrical shapes of the complexes formed by the reaction of Ni^{2+} with H_2O, CN^- and Cl^-, respectively are
(a) Octahedral, tetrahedral and square planar
(b) Tetrahedral, square planar and octahedral
(c) Square planar, tetrahedral and octahedral
(d) Octahedral, square planar and tetrahedral

18. The complex showing a spin-only magnetic moment of 2.83 B.M. is
(a) $Ni(CO)_4$
(b) $[NiBr_4]^{2-}$
(c) $Ni(PPh_3)_4$
(d) $[Ni(CN)_4]^{2-}$

19. Which complex cannot ionize in solution?
(a) $[Pd(NH_3)_6]Br_4$
(b) $Na_2[PtF_6]$
(c) $(NH_4)_4[Fe(CN)_6]$
(d) $[CrBr_3(NH_3)_3]$

20. Ethylenediamine tetraacetate ion is a
(a) Hexadentate ligand
(b) Bidentate ligand
(c) Tetradentate ligand
(d) Monodentate ligand

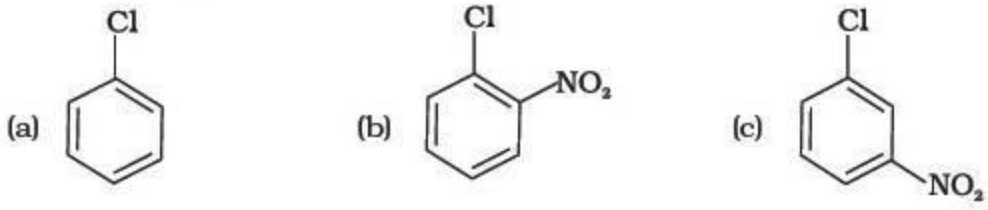
Which reagent will you use for the following reaction?

$$CH_3CH_2CH_2CH_3 \longrightarrow CH_3CH_2CH_2CH_2Cl + CH_3CH_2CHClCH_3$$

21.
(a) Cl_2/UV light
(b) NaCl + H2SO4
(c) Cl_2 gas in dark

(d) Cl_2 gas in the presence of iron in dark

22. Arrange the compounds in increasing order of rate of reaction towards nucleophilic substitution



(a) (a) < (b) < (c)
(b) (c)< (b) < (a)
(c) (a) < (c) < (b)
(d) (c)< (a) < (b)

23. Chlorobenzene can be prepared by reacting aniline with
(a) hydrochloric acid
(b) cuprous chloride
(c) chlorine in presence of anhydrous aluminium chloride
(d) nitrous acid followed by heating with cuprous chloride

24. The following alcohol on heating with periodic acid gives

(a) 2 HCHO
(b) CHO-CHO
(c) 2 HCOOH
(d) 2 CO_2

25. Phenol can be converted to o-hydroxybenzaldehyde by
(a) Riemer-Tiemann reaction
(b) Tischenko reaction
(c) Sandmeyer reaction
(d) Wurtz reaction

26. What will be the products of the reaction when anisole reacts with HI
(a) methanol and iodobenzene

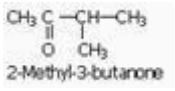
(b) methyl iodide and benzene
(c) methyl iodide and phenol
(d) methyl iodide and iodobenzene

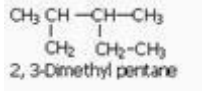
27. Which of the following has maximum viscosity?
(a) acetone
(b) glycol
(c) ethanol
(d) water

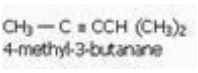
28. Benzaldehyde + NaOH $\longrightarrow$
(a) Benzyl alcohol
(b) Benzoic acid
(c) Hydrobenzamide
(d) Aniline

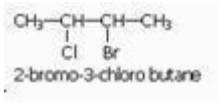
29. The compound which forms acetaldehyde when heated with dilute NaOH is
(a) 1- chloro ethane
(b) 1,1- dichloro ethane
(c) 1,2- dichloro ethane
(d) 1,1,1- trichloro ethane

30. Hydrolysis of an ester gives a carboxylic acid which on Kolbe's electrolysis yields ethane. The ester which of the following
(a) Ethyl methanoate
(b) Methyl ethanoate
(c) Propylamine
(d) Ethylamine

31. The incorrect IUPAC name is
(a) 

(b) 

(c) 

(d) 

32. The reagent needed to convert is/are: Benzenamide to acetanilide
(a) KOH/Br_2, $LiAlH_4$
(b) KOH/Br_2, CH_3COCl
(c) HONO, Cu_2Cl_2, $(CH_3CO)_2O$
(d) KOH/Br_2, Ni/H_2, CH_3COCl

33. In $(CH_3)_3N$ the state of hybridization of N-atom and the spatial rearrangement of methyl groups around it are respectively.
(a) SP^3, Tetrahedral
(b) SP^3, Pyramidal
(c) SP^2, trigonal planar
(d) SP^3, trigonal planar

34. DNA Multiplication is called
(a) Translation
(b) Transduction
(c) Transcription
(d) Replication

35. Which is not a macromolecule
(a) DNA
(b) Starch
(c) Palmitate
(d) Insulin

MATHEMATICS (BTech)

1. The domain of definition of the function $y = f(x) = \sqrt{-x}$ is
(a) $(0, \infty)$
(b) $[0, \infty)$
(c) $(-\infty, 0)$
(d) $(-\infty, 0]$

2. Domain of $f(x)=\sqrt{\log(2x-x^2)}$
(a) (1, ∞)
(b) (0, ∞)
(c) (0, 1) ∪(1, ∞)
(d) None of these.

3. Let A = {1, 2, 3}, B = {1, 3, 5}. If relation R from A to B is given by {(1, 3), (2, 5), (3, 3)} then R^{-1} is
(a) {(3, 3), (3, 1), (5, 3)}
(b) {(1, 3), (2, 5), (3, 3)}
(c) {(1, 3), (5, 2)}
(d) None of these

4. $A=\{x:x\neq x\}$ represents
(a) {0}
(b) {}
(c) {1}
(d) {x}

5. if $x^2 - x + 1 = 0$, then the value of $\sum_{n=1}^{5}\left(x^n+\frac{1}{x^n}\right)^2$ is
(a) 8
(b) 10
(c) 12
(d) 0

6. If $(1 + x + x^2)^n = a_0 + a_1x + a_2x^2 + ... + a_{2n}x^{2n}$, then value of $a_0 + a_3 + a_6 +$ ..... is
(a) 1
(b) 2^n
(c) 2^{n-1}
(d) 3^{n-1}

7. Value of $x = \sqrt{6+\sqrt{6+\sqrt{6+\cdots\ldots\ldots up\ to\ \infty}}}$ is

(a) 3
(b) 2
(c) 1
(d) 4

8. If the quadratic equation $x^2 - 11x + a = 0$ and $x^2 - 14x + 2a = 0$ have a common root, then values of "a" are

(a) 0,24
(b) 0, -24
(c) 1,-1
(d) -2, 1

9. For what value of x the matrix $A = \begin{vmatrix} 1+x & 7 \\ 3-x & 8 \end{vmatrix}$ is singular?

(a) 12/15
(b) 13/15
(c) 14/15
(d) 1

10. The value of $\begin{vmatrix} 4785 & 4787 \\ 4789 & 4791 \end{vmatrix}$ is

(a) -6
(b) 6
(c) 8
(d) -8

11. If A and B are two square matrices such that $B = -A^{-1}BA$, then $(A+B)^2$ is equal to

(a) A+B
(b) 0
(c) $A^2+2AB+B^2$
(d) A^2+B^2

12. If $A=\begin{pmatrix}\alpha & 2\\ 2 & \alpha\end{pmatrix}$ then $|A^3|=125$, then α is equal to

(a) ± 3

(b) ± 2

(c) ± 5

(d) 0

13. Number of ways to arrange 6 papers is

(a) 30

(b) 5!

(c) 6!

(d) 6

14. On a railway line there are 20 stops. A ticket is needed to travel between any 2 stops. How many different tickets would the government need to prepare to cater to all possibilities?

(a) 760

(b) 190

(c) 380

(d) 72

15. Rajdhani express going from Bombay to Delhi stops at five intermediate stations ten passengers enter the train during the journey with ten different tickets of two classes. The number of different sets of tickets they may have is

(a) $15C_{10}$

(b) $20C_{10}$

(c) $30C_{10}$

(d) $40C_{10}$

16. If ${}^{n-1}C_r = (k^2 - 3)\,{}^{n}C_{r+1}$, then k belongs to:

(a) $(-\infty, -2)$

(b) $(2, \infty)$

(c) $[-\sqrt{3}, \sqrt{3}]$

(d) $[\sqrt{3}, 2]$

17. If $(1+ax)^n = 1 + 8x + 24x^2 + \ldots$, then

(a) **a** =2, **n** = 4

(b) **a** = 4, **n** = 2

(c) **a** =2, **n** = 6

(d) **a** = 6, **n** = 2

18. The ratio of the sum of n terms of two A.Ps are in the ratio **3n + 8: 7n + 15**. The ratio between their 12^{th} term is:

(a) $\frac{7}{8}$

(b) $\frac{8}{11}$

(c) $\frac{7}{16}$

(d) $\frac{5}{16}$

19. The domain of $f(x) = -\sqrt{-2x+3}$ is

(a) $D = \{x: x \leq 1.5\}$

(b) $D = \{x: x \geq 1.5\}$

(c) $D = \{x: x \leq 5\}$

(d) $D = \{x: x \geq 5\}$

20. The function $f(x) = |x|$ is

(a) Discontinuous $\forall x$

(b) Continuous $\forall x$

(c) Continuous at x=0 only

(d) Discontinuous only at x=0

21. The equation for the tangent line to the curve $y = \frac{3x^2 - 1}{x}$ at the point (1, 2) is

(a) 4x - y - 2 = 0
(b) 4x - y - 1 = 0
(c) x - y - 1 = 0
(d) 4x + y + 2 = 0

22. If $2^x + 2^y = 2^{x+y}$, then the value of $\frac{dy}{dx}$ at x = y = 1 is

(a) 1
(b) -2
(c) 2
(d) -1

23. If $I = \int \frac{7x-6}{x^2-3x+2} dx$, then I equals

(a) $-\log(x-1) + 8\log(x-2) + C$
(b) $\log(x-1) + 8\log(x-2) + C$
(c) $\log(x-1) - 8\log(x-2) + C$
(d) $-\log(x-1) - 8\log(x-2) + C$

24. If $I = \int x \sec x \tan x dx$, then I equals

(a) $x\sec x - \log(\sec x + \tan x) + C$
(b) $\sec x + \log(\sec x + \tan x) + C$
(c) $-x\sec x - \log(\sec x + \tan x) + C$
(d) $\sec x - \log(\sec x + \tan x) + C$

25. If $I=\int \frac{\cos x}{\sqrt{\sin x}}dx$, then I equals

(a) $\sqrt{\sin x}+x+C$

(b) $\sqrt{\sin x}+C$

(c) $\sqrt{\sin x}-x+C$

(d) $2\sqrt{\sin x}+C$

26. If $I=\int_1^2 x\log x dx$, then $I=?$

(a) $2\log 2$

(b) $2\log 2-\frac{3}{4}$

(c) $2\log 2-\frac{1}{2}$

(d) $2\log 2-\frac{1}{4}$

27. The straight line y=x-2 rotates about a point where it cut x-axis and becomes perpendicular on the straight line ax+by+c=0 ,then its equation is

(a) ax+by+2a=0

(b) ay-bx+2b=0

(c) ax+by+2b=0

(d) ay-bx-2b=0

28. The medians AD and BE of the triangle with vertices A(0,b), B(0,0) and C(a,0) are mutually perpendicular if

(a) $b=\sqrt{2}\,a$

(b) $a = \sqrt{2}\, b$

(c) $b = -\sqrt{2}\, a$

(d) $a = 5\sqrt{2}\, b$

29. If $u = a_1x + b_1y + c_1 = 0, v = a_2x + b_2y + c_2 = 0$ and $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, then the curve u+kv = 0 is

(a) the same straight line
(b) different straight line
(c) parallel straight lines
(d) not a straight line

30. The shortest distance of the point (2, 10, 1) from the plane $\vec{r}.(3\vec{i} - \vec{j} + 4\vec{k}) = 2\sqrt{26}$ is

(a) $2\sqrt{26}$

(b) $\sqrt{26}$

(c) 2

(d) $\frac{1}{\sqrt{26}}$

31. If $\vec{u} = \vec{a} \times (\vec{b} \times \vec{c}) + \vec{b} \times (\vec{c} \times \vec{a}) + \vec{c} \times (\vec{a} \times \vec{b})$, then

(a) u is a unit vector

(b) $\vec{u} = \vec{a} + \vec{b} + \vec{c}$

(c) $\vec{u} = \vec{0}$

(d) $\vec{u} \neq \vec{0}$

32. Find the unit vector parallel to the vector $-3\vec{i} + 4\vec{j}$

(a) $\pm\left(\frac{-3\vec{i} - 4\vec{j}}{5}\right)$

(b) $\pm\left(\frac{3\vec{i}+4\vec{j}}{5}\right)$

(c) $\pm\left(\frac{-3\vec{i}+4\vec{j}}{5}\right)$

(d) $\pm\left(\frac{-3\vec{i}+4\vec{j}}{-5}\right)$

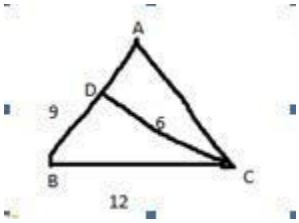
33. The mean of 5 observations x, x+2, x+4, x+6 and x+8 is 11, then the value of x is
(a) 6
(b) 4
(c) 7
(d) 11

34. The mean deviation of the scores 12, 15, 18 is:
(a) 6
(b) 0
(c) 3
(d) 2

35. A coin is biased so that a head is twice as likely to occur as a tail. If the coin is tossed 3 times, what is the probability of getting 2 tails and 1 head?
(a) 5/9
(b) 4/9
(c) 7/9
(d) 2/9

36. A lot consists of 10 good articles 4 with minor defects and 2 with major defects. Two articles are chosen from the lot at random (without replacement). Find the probability that at most one is good
(a) 8/5
(b) 5/8
(c) 3/8
(d) 2/8

37. Consider the triangle shown in the figure where BC = 12cm, DB = 9cm, CD = 6cm and what is the ratio of the perimeter of the triangle ADC to that that of the triangle BDC?



(a) 8:9
(b) 5:9
(c) 7:9
(d) 6:9

38. Define the domain and range of cosine function
(a) R ⟶ [-1,0]
(b) R ⟶ [-1,1]
(c) R ⟶ [-1,2]
(d) R ⟶ [-2,-1]

39. Find the value of $cos^{-1}\left(\frac{1}{2}\right) + sin^{-1}\left(\frac{1}{2}\right)$
(a) $\pi/6$
(b) 1
(c) 2 $\pi/3$
(d) 3$\pi/4$

40. An angle has how many bisectors
(a) 2
(b) 0
(c) 1
(d) 3

BIOLOGY

1. Which one belongs to Intermediate position in kingdom classification from

phylogenetic point of view?
(a) Monera
(b) Plantae
(c) Protista
(d) None of the above

2. Half of the total carbon dioxide fixation on earth is carried out by
(a) Algae
(b) Bryophytes
(c) Pteridophytes
(d) Angiosperms

3. Which of the following phylum consists of asymmetrical animals
(a) *Porifera*
(b) *Coelenterata*
(c) *Ctenophora*
(d) *Platyhelminthes*

4. The earliest primitive neural system is seen in
(a) Platyhelminthes
(b) Aschelminthes
(c) Annelida
(d) Arthropoda

5. The last region of cockroach leg consists of ___ segments.
(a) 5
(b) 6
(c) 7
(d) 8

6. The correlation between the windpipe of mammals and cockroach is _____.
(a) Head origin
(b) Lining
(c) Non collapsible walls
(d) Paired

7. Cockroach has _____ vision.
(a) Monocular
(b) Binocular
(c) Mosaic
(d) Super position

8. The head of cockroach is _____ in shape.
(a) Trianglar
(b) Circular
(c) Cuboidal
(d) Rectangular

9. Zymogen granules are synthesized in
(a) Chloroplast
(b) Mitochondria
(c) Golgi bodies
(d) Cell wall

10. _____ is the amount in picograms of DNA contained within a haploid nucleus.
(a) A value
(b) Z value
(c) C value
(d) D value

11. Fructose syrup is produced by using the enzyme
(a) Penicillin acylase
(b) Beta galactosidase
(c) Protease
(d) Glucose isomerase

12. Which of the following is not a disachhride?
(a) Maltose
(b) Starch
(c) Lactose
(d) Sucrose

13. On the basis of symptoms of chlorosis in leaves, due to deficiency of nitrogen the yellowing of leaves appeared first in
(a) Young leaves
(b) Old leaves
(c) Mature leaves followed by young leaves
(d) Young leaves followed by mature leaves

14. The energy released metabolic process in which substrate is oxidized without an eternal electron acceptor is called
(a) Glycolysis
(b) Aerobic respiration
(c) Fermentation
(d) Photorespiration

15. One of the synthetic auxin is
(a) IBA
(b) IAA
(c) NAA
(d) GA

16. Lenticels are:
(a) Opening in the bark
(b) Epidermal structure
(c) A wax layer of leaves
(d) Channel to transfer water

17. Resting tremor, bradykinesia and muscle rigidity are three cardinal signs of _____
(a) Cry-chat syndrome
(b) Wilsons syndrom
(c) Parkinson's disease
(d) Gliosis

18. _____ activates phospholipase A which in turn converts phospholipid in to Iysophospholipid.
(a) HCL

(b) Trypsin
(c) Pepsin
(d) Pepsinogen

19. Chest pain caused by reduced blood flow to the heart is called
(a) heart attack
(b) angina pectoris
(c) ischemia
(d) atherosclerosis

20. A microscopic gap between a pair of adjacent neurons over which nerve impulses pass when going from one neuron to the next is called:
(a) Neurotransmitter
(b) Synapse
(c) Axon
(d) Microglia

21. The fusion of morphological and physiological identical gametes is called _____
(a) Merogamy
(b) Exogamy
(c) Autogamy
(d) Isogamy

22. Size of pollen grain in Myosotis is _____.
(a) 10 micrometer
(b) 20 micrometer
(c) 200 micrometer
(d) 2000 micrometer

23. Transmitting tissue is found in _____
(a) Micropylar region of ovule
(b) Pollen tube wall
(c) Stylar region of gynoecium
(d) Integument

24. Match the Following:

Orthotropous:	i Ovule is placed at right angles to the funicle.
Anatropous:	ii. Ovule is curved at the micropylar end
Hemianatropous:	iii. Micropyle, the funicle and the chalaza lie in vertical line.
Campylotropous:	iv. Micropyle and funiculus lie close to each other.

(a) I-iv; II-i; III-ii; IV-iii
(b) I-iii;II-iv;III-i;IV-ii
(c) I-iii;II-iv;III-ii;IV-i
(d) I-iii;II-i;III-iv;IV-ii

25. Which of the following histone proteins are organized to form histone octomer
(a) H2A, H2B, H3,H4
(b) H1,H2,H3,H4
(c) H1,H2A,H2B,H3
(d) H1,H2A,H2B,H4

26. The circular DNA in prokaryotes are organized to form
(a) Solenoid
(b) Genophore
(c) Nucleosome
(d) Chromatin fibre

27. During replication unwinding of DNA template is carried out by
(a) Ligase
(b) Topoisomerase
(c) Helicase
(d) Polymerase

28. Which type of double cross over does not produce any recombinant gametes?
(a) Two strand double cross over
(b) Three strand double cross over
(c) Four strand double cross over
(d) Single strand double cross over

29. Transgenic plants are produced by using Ti Plasmids from the
(a) Agrobacterium tumefaciens
(b) E. coli

(c) Bacteriophage
(d) Agrobacterium varians

30. All the given vaccines are attenuated or inactivated whole pathogen except
(a) salk
(b) sabin
(c) hepatitis A
(d) tetanus

31. Inactive cancer gene is called
(a) Transposon
(b) Proto-oncogene
(c) Tumour promoter gene
(d) Tumour suppressor gene

32. The incubation period of the dengue fever ranges from
(a) 1-12 days
(b) 3-14 days
(c) 14-28 days
(d) 28-32 days

33. Bacillus thuringiensis useful as a bacterial
(a) source of antibiotics
(b) producer of vitamins
(c) herbicide
(d) pesticide

34. Translation of mRNA into proteins takes place in the _____
(a) host cell nucleus
(b) host cell cytoplasm
(c) viral nucleus
(d) viral cytoplasm

35. In random error, r=0 refer
(a) No error
(b) lots of errors

(c) good agreement
(d) less errors

36. DNA fragments are _____ Charged
(a) Negative
(b) Positive
(c) Positive and Negative
(d) Neutral

37. Multiple copies of gene of interest, synthesis in In-vitro condition is through _____
(a) Cloning
(b) Polymerase Chain Reaction
(c) DNA Replication
(d) Condensation

38. The most important reason for decrease in biodiversity is
(a) habitat destruction
(b) introduction of exotic species
(c) over exploitation
(d) habitat pollution

39. The most biodiversity rich zone in India
(a) Gangetic planes
(b) Trans himalayas
(c) Western ghats
(d) Central India

40. Biodiversity of a geographical region represents
(a) endangered species found in the region
(b) the diversity in the organisms found in the region
(c) genetic diversity present in the dominant species of the region
(d) species endemic to the region

English

I. Heat, sweat and the sticky feeling of here we go again. There is no turning away from this unpleasant situation. It's the time of the year when summer throws its arms around you in a warm hug. For the well-heeled, the season augurs happy times-going to the beach, lolling up in the bed and watching TV all day long. But, for many, it's out-of-the- frying–pan-into-the-fire kind of situation with power outages and water scarcity adding to the misery.

II. Summer means different things to different people. For some vacation is having nothing to do and all day to do it. But moms and dads dread its onset for a different reason. With schools closed, tranquility goes for a toss. Summer vacation and kids make a good working definition of hell. One makes you sweat and the other fret. The little ones get into the hair and there is no way you can shake them away. Hot days and hotter nights. To remain holed up in home is to tie oneself up in knots. What do you expect the kiddies to do if not let out the steam. When they turn a Kohli then the idiot box and glassware go for a six.

III. But of late children are being deprived of their well-deserved holidays. For many there is no escape from the classroom. Even as temperature soars, some schools and colleges are conducting special classes for improving the academic performance. What about children's right to holidays? On the contrary, some educational institutions are holding summer camps that impart skills and hone the innate talent of students. Summer Samurai, the holiday special programme of Telengana Social Welfare Residential Educational Institutions Society, has become a good hunting ground for talent. MalavathPoorna, the tribal girl who ended up scaling Mount Everest, discovered her mountaineering skills here. Such programmes of course help kids get into a positive frame of mind and imbibe the can-do-spirit.

IV. Time was when summer vacation meant a grand get-together of families-catching up with cousins, recalling granny's tales and indulging in oodles of fun and frolic. Unfortunately smartphones have snatched away this good clean fun too. Today's kids live in virtual world. They would rather go for gaming on mobiles than play outdoors. A few love to bury their nose in a thriller while some like to just laze around. Of course summer is when languor finds respectability. Whatever happened to games like gilli-danda, marbles, kho-kho and chor-sipahi? These favourite activities of the 1960s and 70s are on the verge of extinction now. Time the traditional Indian games are revived.

1. The author of the above passage is-

(a) empathetic towards children devoid of their holidays
(b) Joyous towards holidays
(c) Mournful for the unpleasant summer
(d) Critical towards parents

2. Summer vacation in old time means-
(a) Grand get together with friends
(b) Recalling father's tales
(c) Playing modern Indian games
(d) Enjoying with family members

3. What does 'fret' mean in para II?
(a) Angry and annoyed
(b) Welcome and happy
(c) Depressed
(d) Critical

4. 'Tranquility' in para II means-
(a) Occupation
(b) Peacefulness
(c) Annoyance
(d) Comfort

5. "Laze around" in para IV means
(a) Doing something positive
(b) Moving here and there without any intention
(c) To be idle and do nothing
(d) Full of activity

Aptitude

1. Find the least number which when divided by 27, 35, 45 and 49 leaves a remainder 6 in each case.
(a) 6609
(b) 6615
(c) 6621
(d) 2211

2. In the first ten overs of a cricket game the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?

(a) 6.25
(b) 6.5
(c) 6.75
(d) 7

3. Thirty five percent of 740 is 34 more than a number, what is two fifth of that number?
(a) 45
(b) 90
(c) 180
(d) 120

4. Calculate a single discount equivalent to a series of discounts of 5%, 10% and 20%
(a) 35%
(b) 68.4%
(c) 31.6%
(d) 30%

5. The common root of the equation $x^2-7x+10=0$ and $x^2-10x+16=0$ is
(a) -2
(b) 3
(c) 5
(d) 2

6. If a vertical stick 12 m long casts a shadow 8 m long on the ground and at the same time a tower casts a shadow 40 m long on the ground, then the height of the tower is
(a) 40 m
(b) 50 m
(c) 75 m
(d) 60 m

7. A party consists of grandmother, father, mother, four sons and their wives and one son and two daughters to each of the sons. How many females are there in all?
(a) 16
(b) 14

(c) 24
(d) 18

8. Pratibha, who is facing north, turns 90° in clockwise and then 135° in anticlockwise direction. In which direction is she facing now?
(a) North-east
(b) South-west
(c) North-west
(d) South-east

9. The cost of 5 pens and 9 erasers is Rs. 380. What is the cost of 15 pens and 27 erasers?
(a) 380
(b) 760
(c) 1140
(d) 520

10. If cosA + SecA = 5/2 , then sinA + cosecA is
(a) $2\sqrt{3}/5$
(b) $7/\sqrt{3}$
(c) $5/2\sqrt{3}$
(d) $7/2\sqrt{3}$