GUJCET 2019 Question Paper

Gujarat Common Entrance Exam (GUJCET)

Answers & Solutions

Time : 2 hrs. **M.M. : 80**

for

GUJCET-2019

(Physics, Chemistry)

Important Instructions :

1. The physics and Chemistry test consists of 80 question. Each question carries 1 marks. For correct response, the candidate will get 1 marks. For each incorrect response 1/4 mark will be deducted. The maximum marks are 80.
2. This test is of 2 hours duration.
3. Use **Black Ball Point Pen only** for writing particulars on OMR Answer Sheet and marking answers by darkening the circle.
4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5. **On completion of the test, the candidate must handover the Answer Sheet to the Invigilator in the Room/Hall. The candidates are allowed to take away this Test Bookle with them.**
6. The Set No. for this Booklet is 13. Make sure that the Set No. Printed on the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7. The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet.
8. Do not write your Seat No. anywhere else, except in the specified space in the Test Booklet/Answer Sheet.
9. Use of White fluid for correction is not permissible on the Answer Sheet.
10. Each candidate must show on demand his/her Admission Card to the Invigilator.
11. No candidate, without special permission of the Superindent or Invigilator, should leave his/her seat.
12. Use of manual Calculator is permissible.
13. The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and must sign the Attendance Sheet (Patrak-01). Cases where a candidate has not signed the Attendance Sheet (Patrak-01) will be deemed not to have handed over the Answer Sheet and will be dealt with as an unfair means case.
14. The candidates are governed by all Rules and Regulations of the Board with regards to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
15. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16. The candidates will write the Correct Test Booklet Set No. as given in the Test Booklet/Answer Sheet in the Attendance Sheet. (Patrak-01)

PART–A : PHYSICS

1. The angular spread of central maximum, in diffraction pattern, does not depend on.....
   (A) Frequency of light
   (B) Wavelength of light
   (C) Width of slit
   (D) The distance between the slit and source

Answer (D)

Sol. $\frac{b}{2}\sin\theta=\frac{\lambda}{2}$

$= \sin\theta \cong \theta = \frac{\lambda}{b}$

2. The ratio of resolving power of telescope, when lights of wavelenghts $4400\,\mathring{A}$ and $5500\,\mathring{A}$ are used, is .....
   (A) 5 : 4 (B) 9 : 1
   (C) 4 : 5 (D) 16 : 25

Answer (A)

Sol. R. P $\propto \frac{1}{\lambda}$

3. In Young's experiment fourth bright fringe produced by light of $5000\,\mathring{A}$ superposes on the fifth bright fringe of an unknown wavelength. the unknown wavelength is ..... $\mathring{A}$.
   (A) 8000 (B) 5000
   (C) 6000 (D) 4000

Answer (D)

Sol. $\frac{4\lambda D}{d}=\frac{5\lambda' D}{d}$

$\lambda'=\frac{4\lambda}{5}=4000\,\mathring{A}$

4. In X-ray tube the potential difference between the anode and the cathode is 20 k V and the current flowing is 1.6 mA. The number of electrons striking the anode in 1 s is.....
   (Charge of an electron = $1.6\times10^{-19}C$)
   (A) 6.25×10^{18} (B) 10^{16}
   (C) 1.25×10^{16} (D) 10^{14}

Answer (B)

Sol. i = ne

$\eta=\frac{1.6\times10^{-3}}{1.6\times10^{-19}}$

$=10^{16}$

5. If the kinetic energy of the electron in the hydrogen atom is $\frac{e^2}{8\pi\epsilon_0 r}$, then its potential energy is.....
   (A) $\frac{-e^2}{8\pi\epsilon_0 r}$ (B) $\frac{e^2}{8\pi\epsilon_0 r}$
   (C) $\frac{-e^2}{4\pi\epsilon_0 r}$ (D) $\frac{e^2}{4\pi\epsilon_0 r}$

Answer (C)

Sol. U = –2K

$= -2\times\frac{e^2}{8\lambda\varepsilon_0 r}$

6. The wavelength of the first line of Lyman series is λ. The wavelength of the first line in Paschen series is ..... λ.
   (A) $\frac{5}{27}$ (B) $\frac{7}{108}$
   (C) $\frac{27}{5}$ (D) $\frac{108}{7}$

Answer (D)

Sol. $\frac{1}{\lambda_{L_1}}=R\times\frac{3}{4}$

$\lambda_{L_1}=\frac{4}{3R}=\lambda$

$\frac{1}{\lambda_{P_1}}=R\left(\frac{1}{9}-\frac{1}{16}\right)$

$\frac{1}{\lambda_{P_1}}=R\frac{7}{144}$

$$\lambda_{P_1} = \frac{144}{7R}$$

$$= \frac{36 \times 3}{7}$$

$$\lambda_{P_1} = \frac{108}{7}\lambda$$

7. For a radioactive element, τ = ... $\tau\frac{1}{2}$.

(A) 1.44 (B) 144

(C) 693 (D) 0.693

Answer (A)

Sol. $\tau = \frac{1}{\ell n_2} \cdot t_{\frac{1}{2}}$

$\tau = 1.44\, t_{\frac{1}{2}}$

8. For the following nuclear disintegration process

$^{238}_{92}U \rightarrow ^{206}_{82}Pb + x\left[^{4}_{2}He\right] + 6\left[^{0}_{-1}e\right]$

the value of x is.....

(A) 10 (B) 4

(C) 6 (D) 8

Answer (D)

Sol. $92 = 82 + 2x - 6$

$x = 8$

9. If the radii of $^{64}_{30}Zn$ and $^{27}_{13}Al$ nuclei are R_1 and R_2 respectively then $\frac{R_1}{R_2}$ = ...

(A) $\frac{27}{64}$ (B) $\frac{3}{4}$

(C) $\frac{4}{3}$ (D) $\frac{64}{27}$

Answer (C)

Sol. $R = R_0 A^{\frac{1}{3}}$

$\frac{R_1}{R_2} = \left(\frac{64}{27}\right)^{\frac{1}{3}} = \frac{4}{3}$

10. For PN junction, the intensity of electric field is $1\times10^6\, V/m$ and the width of deplection region is $5000\,\overset{0}{A}$. The value of potential barrier = ...V.

(A) 5 (B) 0.5

(C) 0.005 (D) 0.05

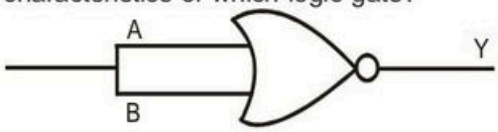
Answer (B)

Sol. $\Delta V = E \times d$

$= 10^6 \times 5 \times 10^{-7}$

$= 0.5$ V

11. The logic circuit shown in the figure represents characteristics of which logic gate?



(A) NOT (B) NAND

(C) OR (D) NOR

Answer (A)

Sol.

A	B	$\overline{A+B}$
0	0	1
1	1	0

12. For PN junction, the width of space charge region is approximately..... μm.

(A) 0.005 (B) 5

(C) 6 (D) 0.5

Answer (D)

Sol. $0.5\,\mu m$

13. A modulating signal of frequency 5 kHz and peak voltage of 8 V is used to modulate a carries of frequency 10 MHz and peak voltage 10 V. Then the amplitude of USB is .....V.

(A) 5 (B) 2

(C) 4 (D) 3

Answer (C)

Sol. $M.I. = \frac{8}{10} = 0.8$

Amplitude of USB = $\frac{mV_e}{2}$

$= \frac{0.8 \times 10}{2}$

$= 4V$

14. The propagation of radio waves with frequency 2 MHz to 30 MHz is due to.....

(A) Sky wave (B) Ground wave

(C) Optical fibre (D) Space wave

Answer (A)

Sol. Sky wave

15. When two sppheres having 4Q and $-2Q$ charge are placed at a certain distance, the force acting between them is F. Now they are connected by a conducting wire and again separated from each other. Now they are kept at a distance half of the previous one. The force acting between them is .....

(A) $\frac{F}{8}$ (B) $\frac{F}{2}$

(C) $\frac{F}{4}$ (D) F

Answer (B)

Sol. $F = \frac{8KQ^2}{r^2}$

Final charge on each sphere = Q

$F' = \frac{KQ^2}{\left(\frac{r}{2}\right)^2} = 4\frac{KQ^2}{r^2}$

$= \frac{4F}{8}$

$F' = \frac{F}{2}$

16. Charge of 1 μC each is placed on the five corners of a ragular hexagon of side 1m. The electric field at its centre is .....N/C.

(A) 10^{-6}K (B) $\frac{6}{5}\times10^{-6}$K

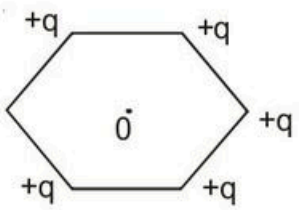
(C) 5×10^{-6}K (D) $\frac{5}{6}\times10^{-6}$K

Answer (A)

Sol. $E = \frac{Kq}{r^2}$

$q = 1\mu c$

$r = 1m$



$= 10^{-6}$K

17. An electric dipole is placed in a nonuniform electric field, then.....

(A) Torque acting on it is always zero

(B) The resultant force acting on the dipole may be zero

(C) Torque acting on it may be zero

(D) The resultant force acting on the dipole is always zero

Answer (B) & (C)

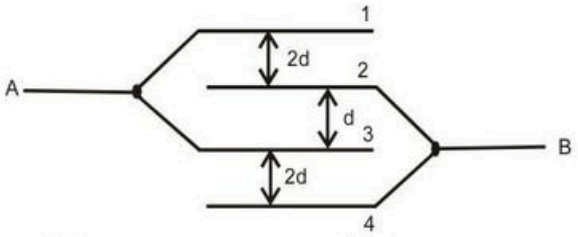
18. The unit of Intensity of polarization is .....

(A) $\frac{m^2}{C}$ (B) $\frac{C^2}{m}$

(C) $\frac{C^2}{m^2}$ (D) $\frac{C}{m^2}$

Answer (D)

19. In the figure area of each plate is A and the distance between consecutive plates is as shown in the figure. What is the effective capacitance between points A & B.



(A) $\frac{4A\varepsilon_0}{d}$ (B) $\frac{2A\varepsilon_0}{d}$

(C) $\frac{3A\varepsilon_0}{d}$ (D) $\frac{A\varepsilon_0}{d}$

Answer (B)

Sol. $C = \frac{\varepsilon_0 A}{2d} + \frac{\varepsilon_0 A}{d} + \frac{\varepsilon_0 A}{2d}$

$= \frac{2\varepsilon_0 A}{d}$

20. A moving positive charge approaches a negative charge. What will happen to the potential energy of the system?

(A) May increase or decrease

(B) Will increase

(C) Will decrease

(D) Will remain constant

Answer (C)

Sol. Potential energy of the system is decreasing

21. The heat produced per unit time, on passing electric current through a conductor at a given temperature, is directly proportional to the .....

(A) Reciprocal of electric current

(B) Square of electric current

(C) Reciprocal of square of electric current

(D) Electric current

Answer (B)

Sol. $P = I^2R$

$P \propto I^2$

22. A carbon resistor has three bands as brown, black and green in order, What will be the range of resistance it offers?

(A) $7\times10^5\Omega$ ——— $13\times10^5\Omega$

(B) $9\times10^5\Omega$ ——— $11\times10^5\Omega$

(C) $8\times10^5\Omega$ ——— $12\times10^5\Omega$

(D) None of these

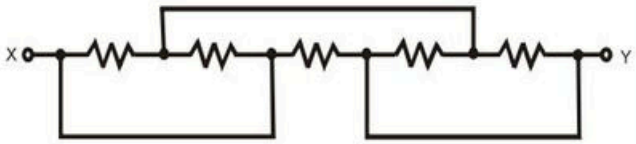
Answer (C)

Sol. $R = 10\times10^5 \pm 20\%$

$= 1\times10^6 \pm 20\%$

Range is $8\times10^5\Omega$ ——— $12\times10^5\Omega$

23. In the network shown in the figure the equivalent resistance between points X & Y will be ..... Ω. Value of each resitance is 2Ω.

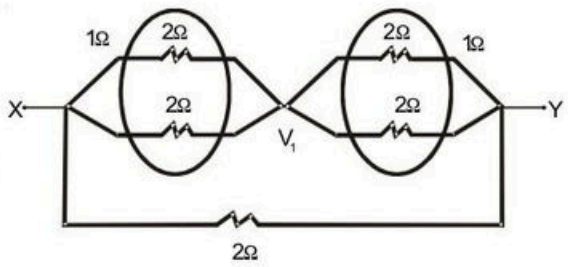


(A) $\frac{2}{3}$ (B) 1

(C) 4 (D) 2

Answer (B)

Sol.



$R_{XY} = 1\Omega$

24. Shunt wire should be.....

(A) Thick and short (B) Thin and long

(C) Thin and short (D) Thick and long

Answer (A)

Sol. $R = \frac{\rho\ell}{A}$

25. The dimensional formula of effective torsional constant of spring is.....

(A) $M^0L^0T^0$ (B) $M^1L^2T^{-2}$

(C) $M^1L^2T^{-2}A^{-2}$ (D) $M^1L^2T^{-3}$

Answer (B)

Sol. Torque $= c\theta$, θ is dimension less

$[C] = [\text{torque}] = [M^1L^2T^{-2}]$

26. There are 50 turns per cm length in a very long solenoid. It carries a current of $2.5A$. The magnetic field at its centre on the axis is ..... T.

(A) $4\pi\times10^{-3}$ (B) $2\pi\times10^{-3}$

(C) $6\pi\times10^{-3}$ (D) $5\pi\times10^{-3}$

Answer (D)

Sol. $B = \mu_0 ni$

$= 4\pi\times10^{-7}\times(50\times100)\times2.5$

$= 4\pi\times5\times2.5\times10^{-4}$

$= 5\pi\times10^{-3}\,(T)$

27. The gyromagnetic ratio of an electron =..... specific charge of an electron.

(A) 4 (B) $\frac{1}{2}$

(C) 2 (D) 1

Answer (B)

Sol. $\frac{M}{L} = \frac{e}{2m_e} = \frac{1}{2}\times$ Specific charge of an electron

28. Alnico is an alloy of.....

(A) Al, As, P, Pt (B) Al, Ni, As, P

(C) Al, Ni, Cu, Co (D) Al, Ni, Cu, P

Answer (C)

Sol. Al, Ni, Cu, Co

29. The focal length of a thin lens made from the material of refractive index 1.5 is 15 cm. When it is placed in a liquid of refractive index $\frac{4}{3}$, its focal length will be .....cm.

(A) 60 (B) 78.23

(C) 50 (D) 80.31

Answer (A)

Sol. $\frac{1}{15}=\left(\frac{3}{2}-1\right)\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$

$\frac{1}{f}=\left(\frac{3/2}{4/3}-1\right)\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$

$\frac{1}{f}=\frac{1}{8}\times\frac{2}{15}=\frac{1}{60}$

f = 60 cm

30. Time taken by the sunlight to pass through a slab of 4 cm and refreactive index 1.5 is ..... sec.

(A) 2×10^{11} (B) 2×10^{-10}

(C) 2×10^{-11} (D) 2×10^{-8}

Answer (B)

Sol. $t=\frac{d}{v}=\frac{\mu d}{c}$

$=\frac{1.5\times4\times10^{-2}}{3\times10^{8}}$

31. If the tube length of astronomical telescope is 96 cm and magnifiying power is 15 for normal setting then the focal length of the objective is ..... cm.

(A) 92 (B) 105

(C) 90 (D) 100

Answer (C)

Sol. $\frac{f_0}{f_e}=15$

$= f_0+f_e=96$

$= f_0+\frac{f_0}{15}=96$

$=\frac{16f_0}{15}=96$

$f_0=90$ cm

32. Photons of energy 2eV and 2.5 eV successively illuminate a metal whose work function is 0.5 eV. The ratio of maximum speed of emitted electron is.....

(A) $2:\sqrt{3}$ (B) 1 : 2

(C) 2 : 1 (D) $\sqrt{3}:2$

Answer (D)

Sol. $KE_1=2-0.5=1.5eV$

$KE_2=2.5-0.5=2.0eV$

$\frac{V_1}{V_2}=\sqrt{\frac{KE_1}{KE_2}}\sqrt{\frac{15}{20}}=\frac{\sqrt{3}}{2}$

33. To increase de Broglie wavelength of an electron from 0.5×10^{-10} m to 10^{-10}m, its energy should be.....

(A) Decreased to fourth part

(B) Doubled

(C) Halved

(D) Increased to 4 times

Answer (A)

Sol. $\lambda=\frac{h}{\sqrt{2mK_1}}$

$=2\lambda=\frac{h}{\sqrt{2mK_2}}$

$=\frac{1}{2}=\sqrt{\frac{K_2}{K_1}}$

$=K_2=\frac{K_1}{4}$

34. A wheel of radius 2 m having 8 conducting concentric spokes is rotating about its geometrical axis with an angular velocity of 10 rad/s in a uniform magnetic field of 0.2 T perpendicular to its plane. The value of induced emf between the rim of the wheel and centre is V

(A) 8 (B) 4

(C) 6 (D) 2

Answer (B)

Sol. Emf = $\frac{Bw\ell^2}{2}$

$$= \frac{0.2 \times 10 \times (2)^2}{2}$$

$$= \frac{2 \times 4}{2} = 4V$$

35. A coil of surface area 200 cm^2 having 25 turns is held perpendicular to the magnetic field of intensity $0.02 \frac{Wb}{m^2}$. The resistance of the coil is 1Ω. If it is removed from the magnetic field in 1 s, the induced charge in the coil is .....C.

(A) 0.001 (B) 0.1

(C) 0.01 (D) 1

Answer (C)

Sol. $\Delta Q = \frac{|\Delta\phi|}{R} = \frac{NBA - 0}{R}$

$$= \frac{25 \times 0.02 \times 200 \times 10^{-4}}{1}$$

$$= 10^{-2} = 0.01\,C$$

36. The dimensional formula of JWL is ..... Take Q as the dimension of charge.

(A) $M^1L^2T^1Q^{-2}$ (B) $M^1L^2T^{-1}Q^{-2}$

(C) $M^1L^{-2}T^{-1}Q^{-2}$ (D) $M^{-1}L^2T^{-1}Q^{-2}$

Answer (B)

Sol. JWL, WL = Reactance

$$= [WL] = [R] = \left[\frac{ML^2T^{-2}}{[Q][Q]}\right][T]$$

$$= [ML^2T^{-1}Q^{-2}]$$

37. If in an A.C., L-C series circuit $X_C > X_L$. Hence potential .....

(A) Lags behind the current by π in phase

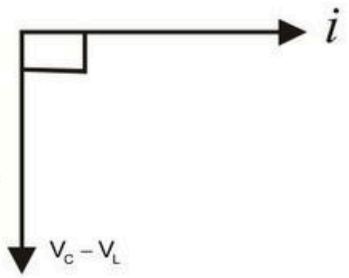
(B) Leads the current by $\frac{\pi}{2}$ in phase

(C) Leads the current by π in phase

(D) Lags behind the current by $\frac{\pi}{2}$ in phase

Answer (D)

Sol.



38. In L-C-R, A.C. series circuit, L = 9H, R = 10Ω & $C = 100\mu F$. Hence Q-factor of the circuit is .....

(A) 30 (B) 35

(C) 45 (D) 25

Answer (A)

Sol. $Q = \frac{W_0 L}{R}$

$$W_0 = \frac{1}{\sqrt{LC}}$$

$$= Q = \frac{100}{3} \times \frac{9}{10} = 30$$

39. The dimensional formula of $\sqrt{\mu_r \in_r}$ is .....

(A) $M^0L^2T^{-2}A^0$

(B) $M^0L^0T^0A^0$

(C) $M^1L^1T^{-2}A^0$

(D) $M^1L^{-1}T^{-2}A^{-1}$

Answer (B)

Sol. $\sqrt{\mu_r \varepsilon_r}$ is a dimension less quantity

40. At large distances from source $\vec{E}$ and $\vec{B}$ are in phase and the decrease in their magnitude is comparitively slower with distance r as per.

(A) r^2 (B) r^{-3}

(C) r (D) r^{-1}

Answer (D)

Sol. $E_0 \propto \frac{1}{r}$

PART–B : CHEMISTRY

41. Which of the following complex ion is the most stable?

(A) $[Co(H_2O)_6]^{3+}$ (B) $[CoF_6]^{3-}$

(D) $[CoCl_6]^{3-}$ (C) $[Co(NH_3)_6]^{3+}$

Answer (D)

Sol. The complex which have highest oxidation state on central atom and strong field ligand is the most stable.

42. The primary valency and secondary valency of central metal ion and the no. of total ions produced in aqueous solution for $K[Co(OX)_2(NH_3)_2]$ complex respectively is___

(A) 3, 6, 1 (B) 3, 6, 2

(C) 4, 4, 2 (D) 3, 4, 2

Answer (B)

Sol. In complex, $K[Co(OX)_2(NH_3)_2]$;

Primary Valency = Oxidation state on central atom, i.e., co is in +3 oxidation state.

Secondry = oxidation state on central atom, i.e., Co is in +3 oxidation state.

43. Which of the following complex possess meridional isomer?

(A) $[Co(NH_3)_5Cl]$ (B) $[Co(NH_3)_2Cl_4]$

(C) $[Co(NH_3)_4Cl_2]$ (D) $[Co(NH_3)_3Cl_3]$

Answer (D)

Sol. Ma_3b_3 shows facial and meridional isomers so $[Co(NH_3)_3Cl_3]$

44. Which of the following compound undergoes aldol condensation?

(A) Acetaldehyde

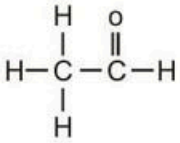
(B) Trimethyl acetaldehyde

(C) Trichloro acetaldehyde

(D) Formaldehyde

Answer (A)

Sol. There must be α - H-atoms for aldol condensation.

$\therefore$ in acetaldehyde, i.e.,  there are

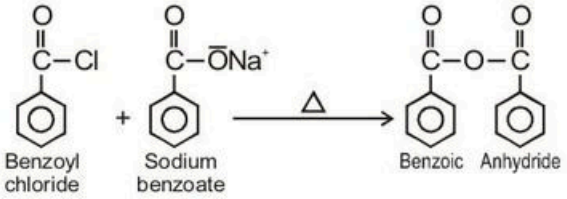
3-α-H-atoms

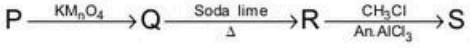
45. Benzoyl chloride + Sodium benzoate $\xrightarrow{\Delta}$ ____

(A) Benzoic anhydride (B) Benzyl benzoate

(C) Benzyl alcohol (D) Benzaldehyde

Answer (A)

Sol. 

46. 

If P and S are toluence, Q & R are ____ and ____ respectively

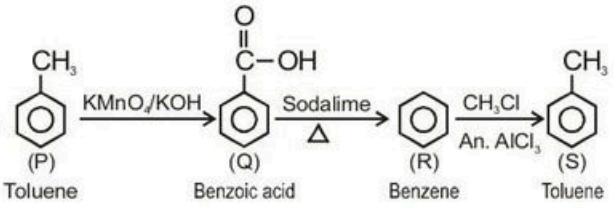
(A) Benzene, Benzoic acid

(B) Benzoic acid, Benzene

(C) Benzaldehyde, Sodium benzoate

(D) Benzaldehyde, benzoic acid

Answer (B)

Sol. 

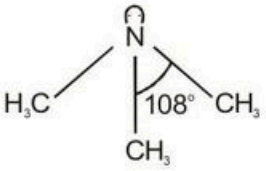
47. Type of Hybridisation of N and C – N – C bond agnle in $(CH_3)_3N$ are _____ and _____ respectively.

(A) sp^2, 117.5° (B) sp^3, 109°28'

(C) sp^2, 120° (D) sp^3, 108°

Answer (D)

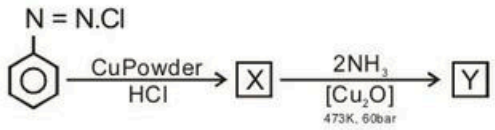
Sol. In trimethyl amine, $((CH_3)_3N)$

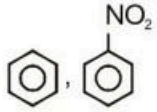


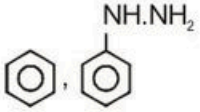
Hybridisation = SP^3

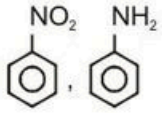
Bond angle : 108°

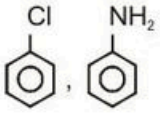
48. Identify X and Y in following reaction.



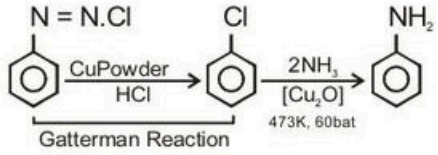
(1) 

(2) 

(3) 

(4) 

Answer (D)

Sol. 

49. Why glucose is called gluco-pyranose?

(A) Glucose is a cyclic compound contaning six carbon atoms

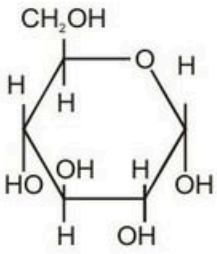
(B) Glucose is ketohexose

(3) Glucose is a cyclic compound containing five carbon atoms and one oxygen atom

(4) Glucose is aldohexose

Answer (C)

Sol. Glucose in the form of α - D - Glucopyranose



50. Which protein present in muscles is insoluble in water?

(A) Myosin (B) Albumin

(C) Insulin (D) Carotene

Answer (A)

Sol. Myosin protein present in muscle is insoluble in water

51. Giving 'T' symbol for true statement and 'F' symbol for false statement, select suitable option from the given options for following statements.

(i) Cytosine base is the derivative of pyrimidine

(ii) β- D Ribose sugar is present in DNA.

(iii) The message for the synthesis of a specific protein in present in RNA.

(iv) DNA is responsible for maintaining the identity of different species of organisms for one century

(A) FFTF (B) FTFF

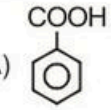
(C) FFFT (D) TFFT

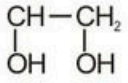
Answer (D)

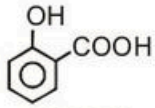
Sol. (i), (iv) are true statements

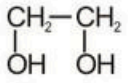
(ii), (iii) are false statements

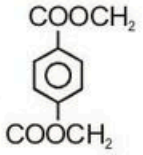
52. Terylene is a condensation polymer of _____ and _____

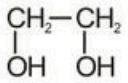
(A) 

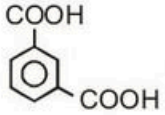
and 

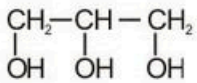
(B) 

and 

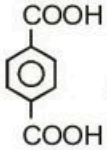
(C) 

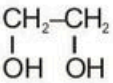
and 

(D) 

and 

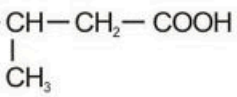
Answer (No option is correct)

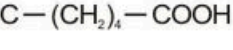
Sol. Terylene is condensation polymer of Terephthalic acid 

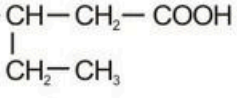
and ethane –1, 2–diol 

53. Which of the following acid has property of flexibility?

(A) $HOOC - (CH_2)_2 - COOH$

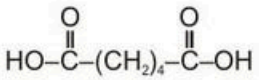
(B) 

(C) 

(D) 

Answer (C)

Sol. Adipic acid has the property of flexibility, i.e.



54. What is cellulose diacetate?

(A) Synthetic polymer (B) Natural polymer

(C) Plasticizer (D) Semisynthetic polymer

Answer (D)

Sol. Cellulose diacetate is semisynthetic polymer

55. What is the packing efficiency of arrangment in a body centred unit cell.

(A) 64.00% (B) 68.00%

(C) 74.00% (D) 53.26%

Answer (B)

Sol. The packing efficiency of arrangement in BCC unit cell is $\frac{\sqrt{3}\pi}{8}$, i.e. 68%

56. Which one of the following compounds show both Schottky and Frenkel defects?

(A) KCl (B) AgI

(C) AgBr (D) AgCl

Answer (C)

Sol. AgBr shows both schottky and frenkel defects

57. Calculate Van't Hoff factor (i) for an aqueous solution of $K_3[Fe(CN)_6]$ having a degree of dissociation (α) equal to 0.778.

(A) 2.334 (B) 0.222

(C) 3.334 (D) 4.334

Answer (C)

Sol. $K_3[Fe(CN)_6] \rightarrow 3K^+_{(aq)} + [Fe(CN)6]^{3-}_{(aq)}$

t = o 1

t = t $1-\alpha$ 3α α

$i = \frac{1-\alpha+3\alpha+\alpha}{1}$

$i = 1 + 3\alpha$

$i = 1 + 3(0.778)$

$i = 3.334$

58. Ifmolality of a solution is 0.05 and elecation in boiling point is 0.16 K then, what is the molal elevation constant of the solven?

(A) 2.3 (B) 2.2

(C) 1.6 (D) 3.2

Answer (D)

Sol. $\Delta T_b = K_b m$

$\Delta T_b = D.16K, m = 0.05$

$\therefore 0.16 = K_b(0.05)$

$K_b = 3.2\ K\frac{kg}{mol}$

59. The value of which of the following unit of concentration will not change with the change in temperature?

(A) Formality (B) Normality

(C) Molality (D) Molarity

Answer (C)

Sol. Molality has no volume term in its expression so it will not change with the change in temperature

60. $Zn_{(s)} / Zn^{2+}_{(aq)}(1M) / /Ni^{2+}_{(aq)}(1M) / Ni_{(s)}$

Which is incorrect for the above given cell?

(A) Daniel cell (B) Galvanic cell

(C) Voltaic cell (D) Electrochemical cell

Answer (A)

Sol. Daniel cell involves oxidation of Zn and Reduction of $Cu^{2+}_{(aq)}$ ions

$Zn(s)|Zn^{2+}_{(aq)}(1M)||Cu^{2+}_{(aq)}(1M)|Cu(s)$

61. If one mole electrons is passed through the solutions of $AlCl_3$, $AgNO_3$ and $MgSO_4$, in what ratio Al, Ag and Mg will be deposited at the electrodes?

(A) 3 : 2 : 1 (B) 1 : 2 : 3

(C) 2 : 6 : 3 (D) 3 : 6 : 2

Answer (C)

Sol. For 1 mole electrons :

mass of Al, Ag, Mg = $\frac{1}{3}:\frac{1}{1}:\frac{1}{2}$

= 2 : 6 : 3

62. At which temperature, ceramic materials behave as super conductors?

(A) 150 K (B) 200 K

(C) 15 K (D) 0 K

Answer (A)

Sol. At 150K, ceramic materials behave as super conductors.

63. Which of the following mineral of Iron is in the form of carbonate?

(A) Iron Pyrites (B) Magnetite

(C) Siderite (D) Haematite

Answer (C)

Sol. Iorn pyrites : FeS_2

Magnetile : Fe_3O_4

Siderite : $FeCO_3$

Haematile : Fe_2O_3

64. Which of the following hybride is the most stable?

(A) AsH_3 (B) NH_3

(C) SbH_3 (D) PH_3

Answer (B)

Sol. Stability of Hydrides decreases down the group

$\therefore$ NH_3 is most stable.

65. In which of the following pair of oxyacid of phosphorous, oxidation states of P are not the same?

(A) $H_4P_2O_7$ and H_3PO_3 (B) $H_4P_2O_7$ and $H_5P_3O_{10}$

(C) H_3PO_4 and $H_5P_3O_{10}$ (D) H_3PO_4 and $H_4P_2O_7$

Answer (A)

Sol. P has oxidation state of +5 in $H_4P_2O_7$

P has oxidation state of +3 in H_3PO_3

66. Which of the following order of acidic strength is correct?

(A) $HClO_4 > HClO_3 > HClO_2 > HClO$

(B) $HClO_2 > HClO > HClO_4 > HClO$

(C) $HClO_4 > HClO_2 > HClO_3 > HClO$

(D) $HClO > HClO_2 > HClO_3 > HClO_4$

Answer (A)

Sol. Correct order of acidic strength :

$HClO_4 > HClO_3 > HClO_2 > HClO$

67. 1, 2 - dichloro ethane is which type of halide?

(A) Allylic halide (B) Alkylidene halide

(C) Vicinal halide (D) Gaminal halide

Answer (C)

Sol. $\underset{Cl}{\overset{H_2C-CH_2}{|\quad|}}\underset{Cl}{}$ is a vicinal halide

68. Polarimeter is used to determine _____ of compounds.

(A) D and L configuration

(B) d and l configuration

(C) R and S configuration

(D) Both D and L as well as d & l configuration

Answer (B)

Sol. Polarimeter is used to determine

d and l-configuration of compounds

69. Which of the following group of compounds are extinguisher, antiseptic, insecticide and anesthetic respectively?

(A) CCl_4, CHI_3, CHCl, DDT

(B) CCl_4, CHI_3, DDT, $CHCl_3$

(C) DDT, $CHCl_3$, CCl_4, CHI_3

(D) $CHCl_3$, CHI_3, DDT, CCl_4

Answer (B)

Sol. Fact

70. Which of the following alcohol has the highest boiling point?

(A) Butan - 1 -ol

(B) Propan - 2 -ol

(C) 2 - Methyl propan - 2 -ol

(D) Butan - 2 -ol

Answer (A)

Sol. Butan - 1-ol has highest Boiling point due to least no. of Branches and high molecular mass.

71. Which of the major product obtained by hydrolysis of compound formed by reaction between formaldehyde and ethyl magnesium bromide?

(A) 2 - Methyl - propan - 2 - ol

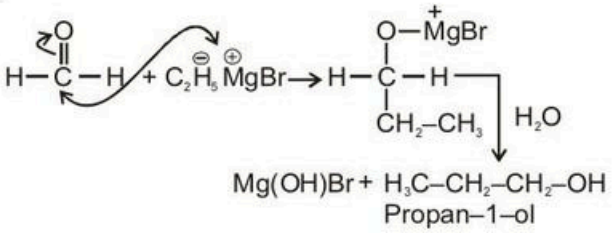
(B) Propan - 1 - ol

(C) Propan - 2 - ol

(D) Ethan - 1 - ol

Answer (B)

Sol.



72. Give the IUPAC name for methyl salicylate.

(A) Methyl - 3 - hydroxy benzoate

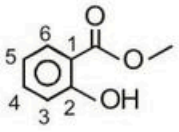
(B) Methyl - 2 - hydroxy benzoate

(C) 2' - hydroxy benzoic acid

(D) Methoxy benzoic acid

Answer (B)

Sol. Methyl salicylate:



IUPAC name : Methyl–2–hydroxy benzoate

73. Instantaneous rate of reaction for the reaction 3A + 2B $\rightarrow$ 5C is _____

(A) $+\frac{1}{3}\frac{d[A]}{dt} = -\frac{1}{2}\frac{d[B]}{dt} = -\frac{1}{5}\frac{d[C]}{dt}$

(B) $-\frac{1}{3}\frac{d[A]}{dt} = +\frac{1}{2}\frac{d[B]}{dt} = -\frac{1}{5}\frac{d[C]}{dt}$

(C) $-\frac{1}{3}\frac{d[A]}{dt} = -\frac{1}{2}\frac{d[B]}{dt} = +\frac{1}{5}\frac{d[C]}{dt}$

(D) $+\frac{1}{3}\frac{d[A]}{dt} = -\frac{1}{2}\frac{d[B]}{dt} = +\frac{1}{5}\frac{d[C]}{dt}$

Answer (C)

Sol. $3A+2B \rightarrow 5C$

$$= -\frac{1}{3}\frac{dA}{dt} = -\frac{1}{2}\frac{dB}{dt} = +\frac{1}{5}\frac{dc}{dt}$$

74. In a reaction A $\rightarrow$ B, if the concentration of reactant is increased by 9 times then rate of reaction increases 3 times. What is the order of reaction?

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$

(C) 3 (D) 2

Answer (B)

Sol. For A $\rightarrow$ B

Rate law = $K[A]^{1/2}$

If concentration is increase 9 times and Rate by 3 times so order of reaction must be 1/2

75. Which statement is incorrect for collision theory?

(A) The reactant experiencing fruitful collisions are converted to products

(B) There must be certain minimum energy for the reactant experiencing collision

(C) The collision of the reactant molecules should be from any direction

(D) The collission between in the reacting molecules is essential

Answer (C)

Sol. - Fact

76. The formation of association of colloidal particles by addition of electrolyte to form an insoluble precipitate is called___.

(A) Micelle (B) Coagulation

(C) Emulsification (D) Flocculation

Answer (B)

Sol. Coagulation

77. Which of the following reaction is used to prepare colloidal sol by double decomposition?

(A) $FeCl_3 + 3H_2O \rightarrow Fe(OH)_3 + {}_3HCl$

(B) $SO_2 + 2H_2S \rightarrow 3S + 2H_2O$

(C) $2AuCl_3 + 3HCHO + 3H_2O \rightarrow 2Au + 3HCOOH + 6HCl$

(D) $As_2O_3 + 3H_2S \rightarrow As_2S + 3H_2O$

Answer (D)

Sol. A) Hydrolysis reaction

B) By Oxidation of H_2S

C) By Reduction of $AuCl_3$

D) By Double decomposition

78. Which of the following pair has similar magnetic moment?

(A) Ni^{2+}, Co^{2+} (B) Fe^{2+},Mn^{2+}

(C) Fe^{3+},Mn^{2+} (D) Cr^{3+},Mn^{3+}

Answer (C)

Sol. The ion having same unpaired has similar magnetic moment

Fe^{3+} : $[Ar]3d^5$

5 unpaired electrons

Mn^{2+} : $[Ar]\ 3d^5$

5 unpaired electrons

79. Element A and B do not form an alloy because

(A) Both have similar electronic configuration in valence shell

(B) Both are the members of same group

(C) Radius of A is 115pm while radius of B is 187 pm

(D) Both elements have similar crystal structures

Answer (C)

Sol. Fact

80. What is the correct order for energy of d orbitals splitting in Tetra Chlorido Nickelate (II) complex ion?

(A) $d_{x^2-y^2} > d_{z^2} > d_{xy} \cong d_{yz} \cong d_{z^2}$

(B) $dxy \cong dyz \cong dzx > dx^2{-}y^2 \cong dz^2$

(C) $d_{xy} \cong d_{yz} \cong d_{xy} \cong d_{x^2-y^2} \cong d_{z^2}$

(D) $d_{xy} \cong d_{yz} \cong d_{xy} < d_{x^2-y^2} \cong d_{z^2}$

Answer (B)

Sol. In complex, $[NiCl_4]^{2-}$ it forms teltrahedral complex so energy of eg set < t_2g set of orbitals

$\therefore dxy \cong dyz \cong dzx > dx^2{-}y^2 \cong dz^2$

❑ ❑ ❑

Answers & Solutions

Time : 1 hrs. **M.M. : 40**

for

GUJCET-2019

(Mathematics)

Important Instructions :

1. The Mathematics test consists of 40 question. Each question carries 1 marks. For correct response, the candidate will get 1 marks. For each incorrect response 1/4 mark will be deducted. The maximum marks are 40.
2. This test is of 1 hours duration.
3. Use **Black Ball Point Pen only** for writing particulars on OMR Answer Sheet and marking answers by darkening the circle.
4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5. **On completion of the test, the candidate must handover the Answer Sheet to the Invigilator in the Room/Hall. The candidates are allowed to take away this Test Bookle with them.**
6. The Set No. for this Booklet is 00. Make sure that the Set No. Printed on the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7. The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet.
8. Do not write your Seat No. anywhere else, except in the specified space in the Test Booklet/Answer Sheet.
9. Use of White fluid for correction is not permissible on the Answer Sheet.
10. Each candidate must show on demand his/her Admission Card to the Invigilator.
11. No candidate, without special permission of the Superindent or Invigilator, should leave his/her seat.
12. Use of manual Calculator is permissible.
13. The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and must sign the Attendance Sheet (Patrak-01). Cases where a candidate has not signed the Attendance Sheet (Patrak-01) will be deemed not to have handed over the Answer Sheet and will be dealt with as an unfair means case.
14. The candidates are governed by all Rules and Regulations of the Board with regards to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
15. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16. The candidates will write the Correct Test Booklet Set No. as given in the Test Booklet/Answer Sheet in the Attendance Sheet. (Patrak-01)

PART–C : MATHEMATICS

1. If the rate of change of area of rhombus with respect to it's side is equal to the side of rhombus, then the angles of rhombus are.....

(1) $\frac{\pi}{3}$ and $\frac{2\pi}{3}$ (2) $\frac{\pi}{6}$ and $\frac{5\pi}{6}$

(3) $\frac{\pi}{4}$ and $\frac{3\pi}{4}$ (4) $\frac{5\pi}{12}$ and $\frac{7\pi}{12}$

Answer (2)

Sol. Area = $a^2\sin\theta = A$

$= \frac{dA}{Da} = 2a\sin\theta \quad a$

$= \sin\theta = \frac{1}{2}$

$\therefore$ Angles are

$\frac{\pi}{6}$ and $\frac{5\pi}{6}$

2. The approximate value of 5^{201} is ....., where, $(\log_e 5 = 1.6095)$.

(1) 25.4125 (2) 25.5025

(3) 25.2525 (4) 25.4024

Answer (4)

Sol. $f(x) = 5^x,\ x = 2,\ \Delta x = .01$

Now $f(x+\Delta x) = f(x) + f'(x)\Delta x$

$f(5^{2.01}) = 25 + \left((5^2\log^5)x.01\right)$

$= 25.40237 \approx 25.4024$

3. $f(x) = \frac{x}{\log x^e}$ is increasing on the interval .....; where $x \in R^+ - \{1\}$

(1) $(-e, \infty)$ (2) $(0, \infty) - \{1\}$

(3) $\left(\frac{1}{e}, 1\right) \cup (1, \infty)$ (4) $\left(\frac{1}{e}, \infty\right)$

Answer (3)

Sol. $f(x) = \frac{x}{\log x^e} = x\log_e x (x \neq 1)$

$f'(x) > 0 \Rightarrow \log x + 1 > 0$

$\Rightarrow \log_e x > -1$

$\Rightarrow x > \frac{1}{e}; (x \neq 1)$

$\Rightarrow \left(\frac{1}{e}, 1\right) \cup (1, \infty)$

4. $\int (2+\log x)(ex)^x\,dx = \ldots\ldots + C; x > 1.$

(1) $(ex)^x$ (2) $(ex)^{-x}$

(3) x^x (4) e^{x^x}

Answer (1)

Sol. $\int (2+\log x)(ex)^x\,dx$

Now, $(ex)^x = t$

$\Rightarrow x\log(ex) = \log t$

$\Rightarrow x(1+\log x) = \log t$

$\Rightarrow (1+(\log x+1))dx = \frac{1}{t}dt$

$\Rightarrow (2+\log x)(ex)^x\,dx = dt$

$\therefore \int dt = t + c = (ex)^x + c$

5. $\int e^{\sqrt{x}}\,dx = \ldots\ldots\ldots\ldots\ldots + C;\ x > 0$

(1) $2\left(\sqrt{x}-1\right)e^{\sqrt{x}}$ (2) $2\left(1-\sqrt{x}\right)e^{\sqrt{x}}$

(3) $\left(1-\sqrt{x}\right)e^{\sqrt{x}}$ (4) $\left(\sqrt{x}-1\right)e^{\sqrt{x}}$

Answer (1)

Sol. $\int e^{\sqrt{x}}\,dx \quad \sqrt{x} = t\ ; \quad dx = 2tdt$

$\Rightarrow 2\int e^t t\,dt$

$\Rightarrow 2\left[e^t t - e^t\right]$

$\Rightarrow 2e\sqrt{x}\left[\sqrt{x}-1\right] + c$

6. If $\int \frac{\sin x}{\sin(x-\alpha)}dx = px - q\log|\sin(x-\alpha)| + C$, then pq = ...

(1) $-\frac{1}{2}\sin 2\alpha$ (2) $\frac{1}{2}\sin 2\alpha$

(3) $\sin 2\alpha$ (4) $-\sin 2\alpha$

Answer (1)

Sol. $\int \frac{\sin x}{\sin(x-\alpha)}dx$

$\Rightarrow \int \frac{\sin(x-\alpha+\alpha)}{\sin(x-\alpha)}dx$

$\Rightarrow \int(\cos\alpha + \sin\alpha\cot(x-\alpha))dx$

$\Rightarrow x(\cos\alpha) + \sin\alpha.\log(|\sin(x-\alpha)|) + c$

$p = \cos\alpha$

$q = -\sin\alpha$

$\therefore pq = \frac{-1}{2}\sin 2\alpha$

7. $\int_1^3 \left(\frac{x^2+1}{4x}\right)^{-1} dx$ = ...

(1) log 5 (2) log 25

(3) $\frac{1}{2}\log 5$ (4) log 100

Answer (2)

Sol. $\int_1^3 \left(\frac{x^2+1}{4x}\right)^{-1}$

$\Rightarrow \int_1^3 \left(\frac{4x}{x^2+1}\right)dx$

$\Rightarrow x^2+1=t \Rightarrow 2xdx = dt$

$\int_2^{10} \frac{2dt}{t} \Rightarrow 2(\log 10 - \log 2)$

$\Rightarrow \log 25$

8. If $\int_1^K (2x-3) = 12$, then K = ...

(1) –2 and 5 (2) 2

(3) 5 (4) –5

Answer (1)

Sol. $\int_1^K (2x-3) = 12$

$\Rightarrow \left[x^2 - 3x\right]_1^K = 12$

$\Rightarrow (K^2 - 3K) - (1-3) = 12$

$\Rightarrow K^2 - 3K + 2 - 12 = 0$

$\Rightarrow K^2 - 3K - 10 = 0$

$\Rightarrow K = 5, -2$

("dx" is not mention in question)

9. $\int_{-\pi/2}^{\pi/2} \frac{\cos^2 2x}{1+25^x}dx$ = ...

(1) $\frac{\pi}{4}$ (2) $\frac{\pi}{2}$

(3) $-\frac{\pi}{2}$ (4) $-\frac{\pi}{4}$

Answer (1)

Sol. $I = \int_{-\pi/2}^{\pi/2} \frac{\cos^2 2x}{1+25^x}dx$

$I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\cos^2(2x)}{1+25^{-x}}dx$

$\left[\int_a^b f(x)dx = \int_a^b f(a+b-x)dx\right]$

add,

$2I = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos^2(2x)dx$

$2I = 2\int_0^{\frac{\pi}{2}} \cos^2(2x)dx$

$I = \int_0^{\frac{\pi}{2}} \left(\frac{1+\cos 4x}{2}\right)dx = \frac{\pi}{4}$

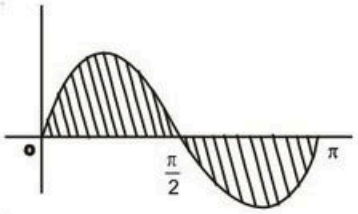
10. The area bounded by curve $y=\sin 2x$ $x=0$ to $x=\pi$ and X−axis is .....

(1) 4 (2) 1

(3) 2 (4) $\frac{3}{2}$

Answer (3)

Sol. $y=\sin 2x \quad (x=0 \text{ to } x)$



$$\Rightarrow \text{Area} = 2\int_0^{\frac{\pi}{2}} \sin(2x)\,dx$$

$$= 2\left[-\frac{\cos 2x}{2}\right]_0^{\frac{\pi}{2}}$$

$$= -[-1-1]$$

$$= 2$$

11. Area bounded by the ellipse $2x^2+3y^2=1$ is .....

(1) $\frac{\pi}{6}$ (2) 6π

(3) $\frac{\pi}{\sqrt{6}}$ (4) $\sqrt{6}\pi$

Answer (3)

Sol. Area of ellipse is π ab

$$\Rightarrow \frac{x^2}{\left(\frac{1}{\sqrt{2}}\right)^2}+\frac{y^2}{\left(\frac{1}{\sqrt{3}}\right)^2}=1$$

$$\Rightarrow \text{Area} = \pi\left(\frac{1}{\sqrt{2}}\right)\left(\frac{1}{\sqrt{3}}\right)=\frac{\pi}{\sqrt{6}}$$

12. The integrating factor (I.F.) of differential equation $\frac{dy}{dx}(1+x)-xy=1-x$ is .....

(1) $(1+x)e^x$ (2) $(1+x)e^{-x}$

(3) $(x-1)e^{-x}$ (4) $(1-x)e^{-x}$

Answer (2)

Sol. $\frac{dy}{dx}(1+x)-xy=1-x$

$$\Rightarrow \frac{dy}{dx}-\frac{x}{1+x}y=(1-x)$$

I.F. = $e^{-\int\frac{x}{1+x}dx}$

= $(1+x)e^{-x}$

13. If the general solution of some differential equation is $y=a_1(a_2+a_3).\cos(x+a_4)-a_5.e^{x+a_6}$ then order of differential equation is .....

(1) 6 (2) 4

(3) 5 (4) 3

Answer (4)

Sol. $y=a_1(a_2+a_3).\cos(x+a_4)-a_5e^{x+a_6}$

$$\Rightarrow y=A_1\cos(x+a_4)-A_2e^x$$

Order is 3

14. If the length of the subnormal at any point of the curve is constant, then the eccentricity of this curve is .....

(1) $e=\sqrt{2}$ (2) $0<e<1$

(3) $e>1$ (4) $e=1$

Answer (4)

Sol. For parabola, length of subnormal is constant $\quad \therefore e=1$

15. If $|\bar{x}|=|\bar{y}|=\|\bar{x}+\bar{y}\|=1$, then $|\bar{x}-\bar{y}|$=.....

(1) $\sqrt{2}$ (2) 1

(3) $\sqrt{3}$ (4) 3

Answer (3)

Sol. $\left|\vec{x}+\vec{y}\right|^2+\left|\vec{x}-\vec{y}\right|^2=2\left(\left|\vec{x}\right|^2+\left|\vec{y}\right|^2\right)$

$$\therefore \left|\vec{x}-\vec{y}\right|=\sqrt{3}$$

16. If $\bar{x}$ is a vector in the direction of $(2,-2,1)$ of magnitude 6 and $\bar{y}$ is a vector in the direction of $(1,1,-1)$ of magnitude $\sqrt{3}$, then $|\bar{x}+2\bar{y}|$=.....

(1) 40 (2) $\sqrt{17}$

(3) $\sqrt{35}$ (4) $2\sqrt{10}$

Answer (4)

Sol. Now $\vec{x}=(4,-4,2)$

$\vec{y}=(1,1,-1)$

$\Rightarrow 36+4(3)+4(4-4-2)=\left|\vec{x}+2\vec{y}\right|^2$

$\Rightarrow \left|\vec{x}+2\vec{y}\right|=2\sqrt{10}$

17. The angle between two adjacent sides $\bar{a}$ and $\bar{b}$ of parallelogram is $\frac{\pi}{6}$. If $\bar{a}=(2,-2,1)$ and $\bar{b}=2|\bar{a}|$, then area of this parallelogram is .....

(1) 9 (2) $\frac{9}{2}$

(3) 18 (4) $\frac{3}{4}$

Answer (1)

Sol. Area of parallelogram $=|a\times b|$

$=|a|\,|b|\,|\sin\theta|$

$=3\times(2\times3)\times\frac{1}{2}$

$=9$

18. The perpendicular distance from the point of intersection of line $\frac{x+1}{2}=\frac{y+2}{3}=\frac{z}{-1}$ and plane $2x-y+z=0$ to the Z-axis is.....

(1) 1 (2) 2

(3) $\sqrt{5}$ (4) 5

Answer (?)

Sol. Question is incorrect, as line is lying on plane

$\therefore$ perpendicular distance can be multiple values

19. The measure of the angle between the line $\bar{r}=(2,-3,1)+k(2,2,1);k\in R$ and the plane $2x-2y+z+7=0$ is .....

(1) $\cos^{-1}\frac{1}{9}$ (2) $\sin^{-1}\frac{1}{3}$

(3) $\tan^{-1}\frac{1}{4\sqrt{5}}$ (4) $\frac{\pi}{2}$

Answer (3)

Sol. $\sin\theta=\frac{4-4+1}{3\times3}=\frac{1}{9}$

$=\tan\theta=\frac{1}{\sqrt{80}}=\frac{1}{4\sqrt{5}}$

$\theta=\tan^{-1}\frac{1}{4\sqrt{5}}$

20. The image of the point A(1, 2, 3) relative to the plane π is $B(3,6,-1)$, the equation of plane π is .....

(1) $x+2y+3z-1=0$ (2) $x-2y+2z-8=0$

(3) $x+2y-2z+8=0$ (4) $x+2y-2z-8=0$

Answer (4)

Sol. Midpoint will lie on plane

$=(2,4,1)$

And D. R. of Normal to the plane is $(1,2,-2)$

Now equation of pane is given by

$a(x-x_1)+b(y-y_1)+c(z-z_1)=0$

$=1(x-2)+2(y-4)-2(z-1)=0$

$=x-2+2y-8-2z+2=0$

$=x+2y-2z-8=0$

21. $f:R\to R, f(x)=x^2+3x+4$ is .....

(1) one-one and onto

(2) many-one and not onto

(3) one-one and not onto

(4) not one-one and onto

Answer (2)

Sol. $f'(x)=2x+3$, As this depends on x $\Rightarrow$ many-one

Here Range $=\left[\frac{7}{4},\infty\right)\neq$ co-domain $\Rightarrow$ Not onto

Alternative method

A parabola is many-one and not onto from $R\to R$

22. If $a*b=\frac{ab}{10};a,b\in Q^+$, then $(5*8)^{-1}=$.....

(1) 4 (2) 10

(3) $\frac{1}{25}$ (4) 25

Answer (4)

Sol. $a * b = \frac{ab}{10}$

Identity element = 10

Now Inverse $= \frac{100}{a}$

$5 * 8 = \frac{5 \times 8}{10} = 4 = a$

$\therefore$ inverse $= \frac{100}{4} = 25$

23. If $f : N \to N$, $f(x) = x + 3$, then $f^{-1}(x) =$.....

(1) $x + 3$ (2) $x - 3$

(3) does not exists (4) $3 - x$

Answer (3)

Sol. Function is not bijective

$\Rightarrow$ Inverse does not exists

24. $\sin^2\left(\sin^{-1}\frac{1}{2}\right) + \tan^2\left(\sec^{-1}2\right) + \cot^2\left(\text{cosec}^{-1}4\right) =$.....

(1) $\frac{73}{4}$ (2) $\frac{89}{4}$

(3) $\frac{37}{2}$ (4) 19

Answer (1)

Sol. $\sin^2\left(\sin^{-1}\left(\frac{1}{2}\right)\right) + \tan^2\left(\sec^{-1}2\right) + \cot^2\left(\text{cosec}^{-1}4\right)$

$= \frac{1}{4} + 3 + 15$

$= \frac{73}{4}$

25. $\tan\left(\cos^{-1}\frac{4}{5} + \tan^{-1}\frac{2}{3}\right) =$.....

(1) $\frac{3}{17}$ (2) $\frac{17}{4}$

(3) $\frac{17}{6}$ (4) $\frac{6}{17}$

Answer (3)

Sol. $\tan\left(\tan^{-1}\left(\frac{3}{4}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right)$

$= \tan\left(\tan^{-1}\left(\frac{\frac{3}{4} + \frac{2}{3}}{1 - \frac{1}{2}}\right)\right)$

$= \tan\left(\tan^{-1}\left(\frac{17}{6}\right)\right) = \frac{17}{6}$

26. $\cos\left(\cot^{-1}\left(\text{cosec}\left(\cos^{-1}a\right)\right)\right) =$..... (Where, $0 < a < 1$)

(1) $\frac{1}{\sqrt{2 - a^2}}$ (2) $\sqrt{2 - a^2}$

(3) $\sqrt{3 - a^2}$ (4) $\frac{1}{\sqrt{2 + a^2}}$

Answer (1)

Sol. $\cos\left(\cot^{-1}\left(\text{cosec}\left(\cos^{-1}a\right)\right)\right)$

$= \cos\left(\cot^{-1}\left(\frac{1}{\sqrt{1 - a^2}}\right)\right)$

$= \cos\cos^{-1}\left(\frac{1}{\sqrt{2 - a^2}}\right)$

$= \frac{1}{\sqrt{2 - a^2}}$

27. $\begin{vmatrix} \sin^2\theta & \cos^2\theta \\ -\cos^2\theta & \sin^2\theta \end{vmatrix} =$ .....

(1) $\cos 2\theta$ (2) $\frac{1}{2}(1 - \sin^2 2\theta)$

(3) $\frac{1}{2}(1 + \cos^2 2\theta)$ (4) $\frac{1}{2}\sin^2 2\theta$

Answer (3)

Sol. $\begin{vmatrix} \sin^2\theta & \cos^2\theta \\ -\cos^2\theta & \sin^2\theta \end{vmatrix}$

$= \sin^4\theta + \cos^4\theta$

$= 1 - 2\sin^2\theta\cos^2\theta$

$= 1 - \frac{\sin^2 2\theta}{2}$

$= 1 - \left(\frac{1 - \cos^2 2\theta}{2}\right)$

$= \frac{1}{2}(1 + \cos^2 2\theta)$

28. If $\begin{vmatrix} 1! & 2! & 3! \\ 2! & 3! & 4! \\ 3! & 4! & 5! \end{vmatrix} = 2016K$, then K = ...

(1) 24 (2) $\frac{1}{24}$

(3) 84 (4) $\frac{1}{84}$

Answer (4)

Sol. $\begin{vmatrix} 1! & 2! & 3! \\ 2! & 3! & 4! \\ 3! & 4! & 5! \end{vmatrix} = 12\begin{vmatrix} 1 & 2 & 6 \\ 1 & 3 & 12 \\ 1 & 4 & 20 \end{vmatrix}$

$= 24 = 2016\ k$

$k = \frac{1}{84}$

29. If $\begin{vmatrix} 1+x & 1 & 1 \\ 1+y & 1+2y & 1 \\ 1+x & 1+z & 1+3z \end{vmatrix} = 10K\,xyz\left(3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$

then K=..... $\left(\text{Where } xyz \neq 0; 3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z} \neq 0\right)$.

(1) $\frac{1}{5}$ (2) 5

(3) 2 (4) 1

Answer (1)

Sol. $\begin{vmatrix} 1+x & 1 & 1 \\ 1+y & 1+2y & 1 \\ 1+z & 1+z & 1+3z \end{vmatrix}$

$= (10k)xyz\left(3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)$

$xyz\begin{vmatrix} \frac{1}{x}+1 & \frac{1}{x} & \frac{1}{x} \\ \frac{1}{y}+1 & \frac{1}{y}+2 & \frac{1}{y} \\ \frac{1}{z}+1 & \frac{1}{z}+1 & \frac{1}{z}+3 \end{vmatrix}$

$= xyz\left(3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)\begin{vmatrix} 1 & 1 & 1 \\ \frac{1}{y}+1 & \frac{1}{y}+2 & \frac{1}{y} \\ \frac{1}{z}+1 & \frac{1}{z}+1 & \frac{1}{z}+3 \end{vmatrix}\ (R_1 \to R_1+R_2+R_3)$

$= 2xyz\left(3+\frac{1}{x}+\frac{1}{y}+\frac{1}{z}\right)(C_2 \to C_2-C_1 \text{ and } C_3 \to C_3-C_1)$

$\Rightarrow k = \frac{1}{5}$

30. If the inverse of the matrix = $A=\begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ is

$\frac{1}{5}\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & \alpha \\ 2 & 2 & -3 \end{bmatrix}$ then, a = ...

(1) 3 (2) 2

(3) 4 (4) –2

Answer (2)

Sol. $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$

$A^{-1} = \frac{1}{5}\begin{bmatrix} -3 & 2 & 2 \\ 2 & -3 & \alpha \\ 2 & 2 & -3 \end{bmatrix}$

$\Rightarrow \alpha = 2$

31. Matrix $A_r = \begin{bmatrix} r & r-1 \\ r-1 & r \end{bmatrix}$;

$r = 1, 2, 3, \ldots\ldots$ If $\sum_{r=1}^{100} |A_r| = \left(\sqrt{10}\right)^K$, then K= .....;

$\left(|A_r| = \det(A_r)\right)$.

(1) 2 (2) 4

(3) 6 (4) 8

Answer (4)

Sol. $|A_r| = (2r-1)$

$= \sum_{r=1}^{100}(2r-1)$

$= 10000 = 10^4 = \left(\sqrt{10}\right)^8 = \left(\sqrt{10}\right)^k$

$= k = 8$

32. $\frac{d}{dx}\left(3\cos\left(\pi/6 + x^0\right) - 4\cos^3\left(\pi/6 + x^0\right)\right) =$ .....

(1) $\cos(3x^0)$ (2) $\frac{\pi}{60}\cos(3x^0)$

(3) $\frac{\pi}{60}\sin(3x^0)$ (4) $\frac{-\pi}{60}\sin(3x^0)$

Answer (2)

Sol. $\frac{d}{dx}\left(-\cos\left(\frac{\pi}{2}+3x^0\right)\right)$

$\frac{d}{dx}\left(\sin\left(3x^0\right)\right)$

$= \frac{\pi}{60}\cos\left(3x^0\right)$

33. If $f(x)=1+x+x^2+....+x^{1000}$, then $f'(-1)=$.....

(1) –50 (2) –100

(3) –500 (4) 500500

Answer (3)

Sol. $f'(x)=1+2x+3x^2+.....1000x^{999}$

$= f'(-1)=1-2+3-4+5.....-1000$

$= -500$

34. Applying mean value theorem on $f(x)=\log x; x\in[1,e]$ the value of e =.....

(1) $\log(e-1)$ (2) $1-e$

(3) $e-1$ (4) 2

Answer (3)

Sol. $f'(c)=\frac{f(b)-f(a)}{b-a}$ a = 1

b = e

$= \frac{1}{x}=\frac{1-0}{e-1}$

$= x = e-1$

35. If $\int \sin^{13}x\cos^3 x\,dx = A\sin^{14}x+B\sin^{16}x+C$, then A + B =.....

(1) $\frac{1}{110}$ (2) $\frac{15}{112}$

(3) $\frac{17}{112}$ (4) $\frac{1}{112}$

Answer (4)

Sol. $I=\int \sin^{13}x\cos^3 x dx$

$= \int \sin^{13}x\left(1-\sin^2 x\right)\cos x\,dx$

$= \int\left(\sin^{13}x-\sin^{15}x\right)\cos x\,dx$

let sin x = t

$\Rightarrow \cos x\,dx = dt$

$\Rightarrow I=\int\left(t^{13}-t^{15}\right)dt$

$= \frac{t^{14}}{14}-\frac{t^{16}}{16}+C$

$= \frac{\sin^{14}x}{14}-\frac{\sin^{16}x}{16}+C$

$\therefore A=\frac{1}{14}\ B=\frac{-1}{16}$

$\therefore A+B=\frac{1}{112}$

36. If $\int\frac{1+\cos x}{\cos x-\cos^2 x}dx=\log|\sec x+\tan x|-2f'(x)+C$, then $f(x)=$.....

(1) $2\cot\left(\frac{x}{2}\right)$ (2) $-2\cot\left(\frac{x}{2}\right)$

(3) $2\log\left|\sin\frac{x}{2}\right|$ (4) $-2\log\left|\sin\frac{x}{2}\right|$

Answer (3)

Sol. $\int\frac{1+\cos x}{\cos x(1-\cos x)}.....dx$

$= \int\left(\frac{1}{\cos x}+\frac{2}{1-\cos x}\right)dx$

$\int\left((\sec x)+2\left(\text{cosec}^2 x+\cot x\cdot\text{cosec}x\right)\right)dx$

$= \log(|\sec x+\tan x|)-2\cot x-2\,\text{cosec}x+c$

$\therefore f'(x)=\cot x+\text{cosec}\,x$

$f'(x)=\cot\left(\frac{x}{2}\right)$

$\therefore f(x)=2\log\left(|\sin\left(\frac{x}{2}\right)|\right)$

37. The probability that an event A occurs in a single trial of an experiment is 0.6. In the first three independent trials of the experiment, the probability that A occurs atleast once is .....

(1) 0.930 (2) 0.925

(3) 0.936 (4) 0.927

Answer (3)

Sol. $1-(.4)^3$

$= 0.936$

38. If $6P(A)=8P(B)=14P(A\cap B)=1$, then $P\left(\frac{A'}{B}\right)=....$

(1) $\frac{3}{7}$ (2) $\frac{3}{5}$

(3) $\frac{4}{7}$ (4) $\frac{2}{5}$

Answer (1)

Sol. $P\left(\frac{A'}{B}\right)=\frac{P(A'\cap B)}{P(B)}$

$=\frac{P(B)-P(A\cap B)}{P(B)}$

$==1-\frac{P(A\cap B)}{P(B)}$

Now $P(A)=\frac{1}{6}$

$P(B)=\frac{1}{8}$

$P(A\cap B)=\frac{1}{14}$

$\therefore 1-\frac{\frac{1}{14}}{\frac{1}{8}}$

$=\frac{3}{7}$

39. The mean and variance of a random variable X having a binomial distribution are 6 and 3 respectively. The probability of variable X less than 2 is .....

(1) $\frac{13}{2048}$ (2) $\frac{15}{4096}$

(3) $\frac{13}{4096}$ (4) $\frac{25}{2048}$

Answer (3)

Sol. mean $=np=6$; variance $=npq=3$

$\therefore q=\frac{1}{2}$

$\therefore p=\frac{1}{2}$

$\therefore n=12$

$\sum_{r=0}^{1}{}^{12}C_r\left(\frac{1}{2}\right)^r\left(\frac{1}{2}\right)^{12-r}$

$=\left(\frac{1}{2}\right)^{12}+12\times\frac{1}{2}\times\left(\frac{1}{2}\right)^{11}$

$=\left(\frac{1}{2}\right)^{12}[1+12]$

$=\frac{13}{4096}$

40. The coordinates of the corner points of the bounded feasible region are $(10,0),(2,4),(1,5)$ and $(0,8)$. The maximum of objective function $z=60x+10y$ is .....

(1) 700 (2) 600

(3) 800 (4) 110

Answer (2)

Sol. Maximum of objective functions

z= 60 x + 10 y is obtained at (10, 0)

$\therefore (z)_{maximum}$

= 600

❑ ❑ ❑

Answers & Solutions

Time : 1 hrs. M.M. : 40

for

GUJCET-2019

(Biology)

Important Instructions :

1. The Biology test consists of 40 question. Each question carries 1 marks. For correct response, the candidate will get 1 marks. For each incorrect response 1/4 mark will be deducted. The maximum marks are 40.
2. This test is of 1 hours duration.
3. Use **Black Ball Point Pen only** for writing particulars on OMR Answer Sheet and marking answers by darkening the circle.
4. Rough work is to be done on the space provided for this purpose in the Test Booklet only.
5. **On completion of the test, the candidate must handover the Answer Sheet to the Invigilator in the Room/Hall. The candidates are allowed to take away this Test Bookle with them.**
6. **The Set No. for this Booklet is 15**. Make sure that the Set No. Printed on the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
7. The candidate should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet.
8. Do not write your Seat No. anywhere else, except in the specified space in the Test Booklet/Answer Sheet.
9. Use of White fluid for correction is not permissible on the Answer Sheet.
10. Each candidate must show on demand his/her Admission Card to the Invigilator.
11. No candidate, without special permission of the Superindent or Invigilator, should leave his/her seat.
12. Use of manual Calculator is permissible.
13. The candidate should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and must sign the Attendance Sheet (Patrak-01). Cases where a candidate has not signed the Attendance Sheet (Patrak-01) will be deemed not to have handed over the Answer Sheet and will be dealt with as an unfair means case.
14. The candidates are governed by all Rules and Regulations of the Board with regards to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of the Board.
15. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
16. The candidates will write the Correct Test Booklet Set No. as given in the Test Booklet/Answer Sheet in the Attendance Sheet. (Patrak-01)

PART–C : BIOLOGY

1. Which option is correct for the ATP molecules produced through oxidative phosphorylation of NADH, produced through breakdown of 12 molecules of pyruvic acid in Kreb cycle?

(1) 36 (2) 48

(3) 144 (4) 12

Answer (3)

2. Which is the correct option for the following statements A and R?

Statement-A: With the help of DNA fingerprint it is easy & quick to trace the criminal

Statement-B: The process of DNA finger printing starts from isolation of DNA from blood sample or cell sample.

(1) Statement A and R are correct and R is explanation of Statement A

(2) Statement A is correct. Statenent R is wrong.

(3) Statement A and R are correct and R is not explanation of Statement A

(4) Statement A and R both are wrong.

Answer (3)

3. Choose the right option showing the correct reason, responsible for forming plaques at the injured regions of an artery.

(1) High blood pressure

(2) Smoking

(3) Consumption of high fat food

(4) All of the given

Answer (4)

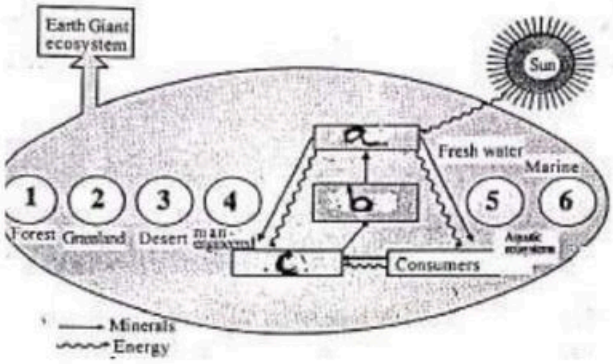
4. Select the number of amino-acids contained in human insulin.

(1) 21 (2) 51

(3) 31 (4) 41

Answer (2)

5. Choose the correct option for the label 'a', 'b' and 'c' in the diagram, with reference to types of ecosystem.



(1) a = nutrients, b = producer, c = second order consumer

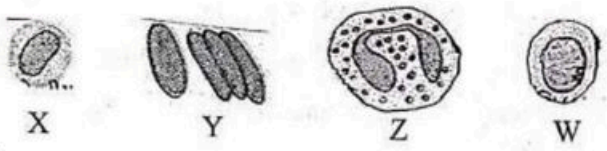
(2) a = decomposers, b = non-living components, c = nutrients

(3) a = producer, b = nutrients, c = decomposers

(4) a = nutrients, b = producer, c = consumer

Answer (3)

6. Which of the figure indicates 'acidophils' from the following options:



(1) Y (2) X

(3) Z (4) W

Answer (3)

7. In mRNA strand having specific number of genetic codes, if the 23rd genetic code UUA is replaced by UAA, what will be the change found in synthesized polypeptide chain?

(1) Amino acid on 23rd place will be change in polypeptide chain

(2) Protein synthesis will stop after 22nd amino acid

(3) There will be no change in polypeptide chain

(4) None amongst these

Answer (2)

8. In reference to the self pollination which of the followig option is correct?

(1) In sunflower the pollen is released after the stigma becomes receptive

(2) In malva genetic mechanism prevents self pollens from fertilizing the ovule

(3) In palms stigma becomes receptive after the release of pollens

(4) In castor flowers are bisexual and they show self pollination.

Answer (2)

9. In context to their mode of reproduction, which option is different than rest of the examples?

(1) Asparagus (2) Sweer potato

(3) Dahlia (4) Ginger

Answer (4)

10. Which option is correct for the statements 'X', 'Y' and 'Z' givben below:

Statement-X: A forest in a tropical region like Equadar has upto 10 times as many species of vascular plants as a forest of equal area in temperate region

Statement-Y: Temperate regions subjected to freuqent glaciations in the past, tropical latitudes have remainded relatively undisturbed for millions of years.

Statement-Z: In tropical area, productivity is high.

(1) Statement 'X' is right and statement 'Y' and 'Z' are wrong.

(2) Statement 'X', 'Y' and 'Z' are all right.

(3) Statement 'Y' and 'Z' are right and statement 'X' is wrong.

(4) Statement 'X', 'Y' and 'Z' are all wrong.

Answer (2)

11. When the value of water potential decreases related to water potential pressure?

(1) When the vlaue of Ψ P is positive

(2) When the vlaue of Ψ P is 0

(3) When the vlaue of Ψ P is negative

(4) When the vlaue of Ψ P is constant

Answer (3)

12. With reference to Biotechnology and its applications, choose the incorrect statement from the options:

(1) Genetically modified plants can produce toxix or allergic metabolities

(2) Change in genetic constitution under natural environmental pressure

(3) To stop the exploitation and to recompensate the damages, it is necessary to form strict rules to curb biopiracy

(4) Biotechnology may pose unforeseen risks to the environment, including risk to biodiversity.

Answer (2)

13. Choose the right option by matching columns I, II and III correctly:

Column I (Gland's name)	Column II (Secretion)	Column III (Function
(a) Delta cells of Pancreas	(i) TCT	(e) Activates the breakdown of glycogen
(b) Thyroid	(ii) Relaxin	(f) Inhibits GH
(c) Ovary	(iii) Epinephrine	(g) Balances the calcium level in blood
(d) Adrenal Medulla	(iv) Somatostatin	(h) Relax the cerix of the uterus

(1) (a-iv-g) (b-i-h) (c-ii-e) (d-iii-f)

(2) (a-iii-e) (b-iv-g) (c-i-f) (d-ii-h)

(3) (a-iv-f) (b-i-g) (c-ii-h) (d-iii-e)

(4) (a-ii-f) (b-iv-e) (c-iii-h) (d-i-g)

Answer (3)

14. Choose the option which have correct sentence (statement).

(1) Propliopithecus lived about 40 milion years ago and was having long arms

(2) Ramapithecus lived 12 to 14 milion years ago and their dentition was more identical to dentition of man.

(3) Aegyptopithecus similar to propliopithecus and it is more identical to man than Ape.

(4) Dryopithecus lived about 20 milion years ago and their hindlimbs was shorter than forelimbs

Answer (2)

15. What is correct for chylomicron?

(1) It is Glycerol converted into finely fat globule

(2) It is unit formed by the union of Fructose with carrier molecules

(3) It is fatty acid converted into very small fat globules

(4) Small fat globules in the form of cholesterol

Answer (3)

16. When sugar level in blood reduces and stored sugar is not available then in which form protein and lipid will enter respiration process respectively?

(1) Pyruvic acid; Acetyl CoA

(2) Glycerol; Fatty acid

(3) Amino acid; Fatty acid and Glycerol

(4) Fatty acid; Glycerol, Amino acid

Answer (3)

17. Which of the following option shows correctly matched pairs?

(1) The pre-motor area of frontal lobe > controls involuntary movement and autonomous nervous system

(2) Lateral temporal lobe > voluntary movement

(3) Middle parietal lobe > centres for hearing and sight

(4) Posterior occipital lobe > with cold, temperature and pain

Answer (1)

18. A normal son of Haemophilic father marries a daughter of haemophilic father. State the possibility of first born daughter child.

(1) 100% (2) 25%

(3) 0% (4) 50%

Answer (3)

19. Formual for human vertabral column is ____

(1) $C_7T_{12}L_5S_5C_4$ (2) $C_7T_{10}L_5S_7C_4$

(3) $C_4T_{12}L_5S_5C_7$ (4) $C_7T_{10}L_7S_5C_4$

Answer (1)

20. Which option is correct for the induced movement in plants?

(1) Cilary movement - Chlamydomonas

(2) Circumnutation - Spiral growth of the shoot in climbers

(3) Negative geotrophism - Stem

(4) Amoeboic movement - Plasmodia of Slime molds

Answer (3)

21. Which of the following options shows correctly matched pairs for the given column-A and column-B?

Column-A	Column-B
(a) ethmoid	(i) bone of pelvic girdle
(b) lacrymal	(ii) bone of skull
(c) clavicle	(iii) bone of face
(d) ischium	(iv) collar bone

(1) (a-i) (b-ii) (c-iv) (d-iii) (2) (a-iii) (b-iv) (c-i) (d-ii)

(3) (a-ii) (b-iii) (c-iv) (d-i) (4) (a-iv) (b-i) (c-iii) (d-ii)

Answer (3)

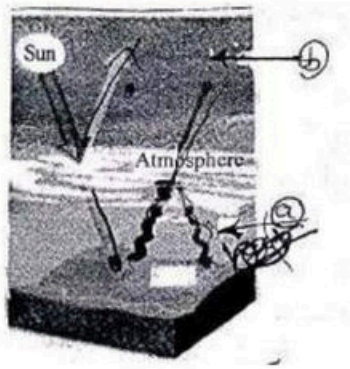
22. Which hormones is not associated with menstrual cycle?

(1) Melatonin (2) Progesterone

(3) Estrogen (4) Relaxin

Answer (4)

23. Choose the correct option for the label 'a' and 'b' in the diagram given below:



(1) a = CO_2, b = heat

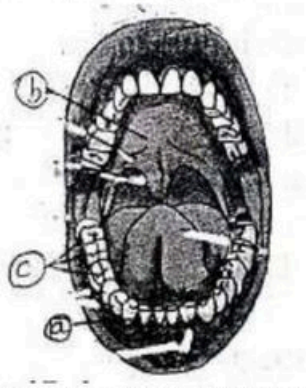
(2) a = heat, b = CO_2

(3) a = heat, b = green house gases

(4) a = earth, b = CO_2

Answer (1)

24. Which option is correct for the region labelled as 'a', 'b' and 'c' in the given diagram?



(1) a = Incisors; b = Hard Palate; c = Premolar

(2) a = Incisors; b = Soft Plaate; c = Premolar

(3) a = Canine; b = Hard Palate; c = Molar

(4) a = Canine; b = Soft Palate; c = Molars

Answer (3)

25. Sequence of genes on a specific DNA segment is ABCDEFGHI. If the middle three genes get inverted and first three genes get tendemised duplication, then in newly formed DNA segment gene sequence will be ____

(1) ABCCCBAGHIDEF (2) ABCABCFEDGHI

(3) ABCABCDEFGHI (4) ABCCBAFEDGHI

Answer (2)

26. How many types and in what ratio tghe gametes are produced by a dihybrid heterozygous parents in Mendel's experiment"

(1) 4 types, 9:3:3:1 ratio (2) 3 types, 1:2:1 ratio

(3) 2 types, 3:1 ratio (4) 4 types, 1:1:1:1 ratio

Answer (4)

27. Match the following

Column-I	Column-II
(i) B.thuringiensis	(a) treatment for diabetes
(ii) P.brazzeana	(b) cancer
(iii) C-peptide	(c) cry protein
(iv) Gene-therapy	(d) human insulin

Choose the right option showing correct matching

(1) (i-b) (ii-c) (iii-a) (iv-d)

(2) (i-b) (ii-d) (iii-a) (iv-c)

(3) (i-c) (ii-a) (iii-d) (iv-b)

(4) (i-a) (ii-c) (iii-b) (iv-d)

Answer (3)

28. Following are the stpes, following in Recombinant DNA Technology:

(i) Amplification

(ii) Downstream processing

(iii) Isolation

(iv) Obtaining the foreign gene product

(v) Insertion

Choose the correct option showing the correct sequence of steps involved in Recombinant DNA Technology

(1) (ii) → (iv) → (vi) → (i) → (v) → (iii)

(2) (iii) → (v) → (i) → (ii) → (iv) → (vi)

(3) (iv) → (ii) → (i) → (vi) → (iii) → (v)

(4) (iii) → (v) → (i) → (vi) → (iv) → (ii)

Answer (4)

29. Which option is correct for the given statement X, Y and Z.

Statement-X: The descending limb of Henle's loop is permeable for water but mearly impermeable to salts

Statement-Y: The ascending limb of Henle's loop is impermeable to water but permeable to electrolytes and transports them actively or passively.

Statement-Z: In descending limb of Henle's loop the filtrate is hypertonic to blood plasma.

(1) Statements X, Y and Z are correct and statement X is not correct explanation of statement Z

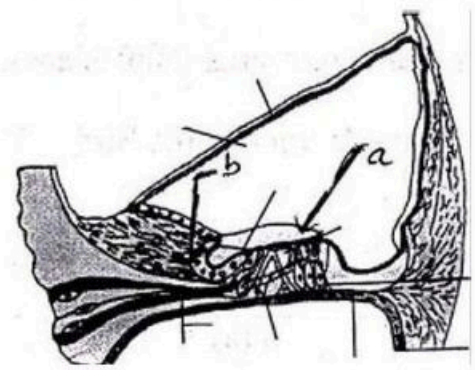
(2) Statement X and Y are correct and Statement Z is wrong

(3) Statement X, Y and Z are correct and Statement Z is correct explanation of Statement X

(4) Statement X and Y are wrong and Statement Z is correct

Answer (3)

30. What does 'a' and 'b' indicates in the given diagram?



(1) a = Basilar membrane; b = Hair cells

(2) a = Basilar membrane; b = Border cell

(3) a = Reissner's membrane; b = Outer hair cells

(4) a = Tectorial membrane; b = Border cell

Answer (4)

31. Cytokinin was first discovered as kinetin from 'a', which a modified form of 'b'.

(1) a = eggs of herring fish; b = guanin

(2) a = sperms of herring fish; b = adenine

(3) a = coconut milk; b = adenine

(4) a = maize seed; b = thymine

Answer (2)

32. Choose the correct option for the given statement X and Y.

Statement-X: Out of total CO_2 produced only 10% of CO_2 is transported in form of H_2CO_3 by blood plasma.

Statement-Y: pH of blood plasma is higher than its normal level due to formation of H_2CO_3 during transport of CO_3.

(1) Statement X and statement Y are true

(2) Statement X and Statement Y are wrong

(3) Statement X is correct and Statement Y is wrong

(4) Statement X is wrong and Y is correct

Answer (2)

33. Where does the process of Oogenesis get completed in human?

(1) In Oviduct (2) In ovarian follicle

(3) In uterus (4) In the cervix of uterus

Answer (1)

34. Choose the right option showing correct matching:

(1) Tadpole - ammonotelic, Mammals - Ureotelic, Birds - Uricotelic

(2) Aquatic insect - ammonotelic, Mammal - Uricotelic - Land snail - Uretelic

(3) Land snail - ammonotelic, Terrestrial Amphibians - Ureotelic - Mammal - Uricotelic

(4) Terrestrial Amphibian - Ammonotelic, Birds - Uricotelic, Mammal - Ureotelic

Answer (1)

35. Select the right option matching column I and column II correctly.

	Column-I		Column-II
(i)	Hormonal pills	(a)	Fusion of gametes is prevented
(ii)	Spermicides	(b)	vasectomy
(iii)	Condoms	(c)	natural method and almost nil side effects
(iv)	Sterilization	(d)	inhibit O2 uptake and kill sperms
(v)	Interruption-coitus interruptus	(e)	prevents the release of ovum from the ovary

(1) (i-d) (ii-e) (iii-c) (iv-b) (v-a)

(2) (i-c) (ii-b) (iii-a) (iv-d) (v-e)

(3) (i-e) (ii-d) (iii-a) (iv-b) (v-c)

(4) (i-a) (ii-d) (iii-b) (iv-c) (v-e)

Answer (3)

36. From the following options choose the chemical reaction which does not occur in chloride shift.

(1) $KHCO_3 \rightarrow K^+ + HCO_3^-$

(2) $K^+ + Cl^- \rightarrow KCl$

(3) $Na^+ + HCO_3^- \rightarrow NaHCO_3$

(4) $CO_2 + Hb \cdot NH_2 \rightarrow Hb \cdot NHCOOH$

Answer (4)

37. Which option indicate correct chronology of the reactions during photosynthesis, taking place in mesophyll cells of C_4 plant?

(1) $CO_2 +$ OAA (oxalo acetic acid) > Malic acid

(2) CO_2 + P.A. > RuBP > PGA

(3) CO_2 + PEP > OAA (oxalo acetic acid) > Malic acid

(4) $CO_2 + H_2O > H_2CO_3$

Answer (3)

38. Which option is correct for the correctly matched pairs of the following mineral ions and their importance?

	Mineral ions		Importance
(i)	Chlorine	(a)	For germination of pollen grain
(ii)	Boron	(b)	For synthesis of nucleic acid
(iii)	Zinc	(c)	For cell-division
(iv)	Magnesium	(d)	For the synthesis of Auzin

(1) (i-c) (ii-a) (iii-d) (iv-b) (2) (i-c) (ii-b) (iii-d) (iv-a)

(3) (i-b) (ii-d) (iii-c) (iv-a) (4) (i-d) (ii-c) (iii-b) (iv-a)

Answer (1)

39. Sequential order of nucleotides on template strand forminig m-RNA synthesizing specific protein is given below. Based on it select the sequential t-RNA anticodon entering in the process of protein synthesis.

Template - TAC, GAC, AAC, CAC, TTA, ATT.

(1) AUG, CUG, UUG, GUG, AAU, UAA

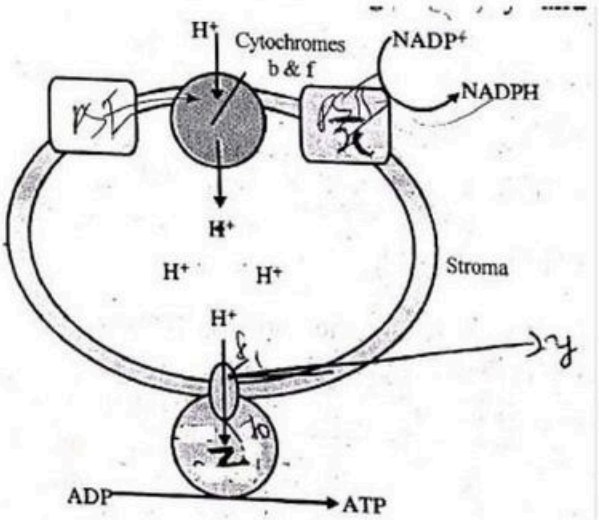
(2) UAC, GAC, AAC, CAC, UUA, AUU

(3) TAC, GAC, AAC, CAC, TTA, ATT

(4) None

Answer (2)

40. Which option is correct for the labelled region 'x', 'y' and 'z' in the given diagram?



(1) x = PS I, y = Cytochrome, z = F_0

(2) x = PS I, y = F_0, z = F_1

(3) x = PS II, y = F_1, z = F_0

(4) x = PS II, y = Stroma, z = F_1

Answer (2)

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