

Date : 26/04/2019

Test Booklet Code



# Aakash

Medical | IIT-JEE | Foundations

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13

Time : 2 hrs.

M.M. : 80

## Answers & Solutions

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 Booklet 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 Superintendent 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.**  $\frac{b}{2} \sin \theta = \frac{\lambda}{2}$

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

2. The ratio of resolving power of telescope, when lights of wavelengths  $4400 \text{ \AA}$  and  $5500 \text{ \AA}$  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  $5000 \text{ \AA}$  superposes on the fifth bright fringe of an unknown wavelength. the unknown wavelength is .....  $\text{\AA}$ .
- (A) 8000  
(B) 5000  
(C) 6000  
(D) 4000

**Answer (D)**

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

$$\lambda' = \frac{4\lambda}{5} = 4000 \text{ \AA}$$

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 =  $1.6 \times 10^{-19} \text{ C}$ )
- (A)  $6.25 \times 10^{18}$   
(B)  $10^{16}$   
(C)  $1.25 \times 10^{16}$   
(D)  $10^{14}$

**Answer (B)**

**Sol.**  $i = ne$

$$\eta = \frac{1.6 \times 10^{-3}}{1.6 \times 10^{-19}}$$

$$= 10^{16}$$

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.**  $U = -2K$

$$= -2 \times \frac{e^2}{8\pi\epsilon_0 r}$$

6. The wavelength of the first line of Lyman series is  $\lambda$ . The wavelength of the first line in Paschen series is .....  $\lambda$ .
- (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,  $\tau = \dots\dots\dots \tau \frac{1}{2}$ .

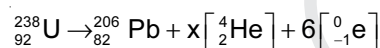
- (A) 1.44 (B) 144  
(C) 693 (D) 0.693

**Answer (A)**

**Sol.**  $\tau = \frac{1}{\ln 2} \cdot t_{\frac{1}{2}}$

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

8. For the following nuclear disintegration process



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  ${}_{30}^{64}\text{Zn}$  and  ${}_{13}^{27}\text{Al}$  nuclei are  $R_1$  and  $R_2$

respectively then  $\frac{R_1}{R_2} = \dots\dots\dots$

- (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  $1 \times 10^6 \text{ V/m}$  and the width of depletion region is  $5000 \text{ \AA}$ . The value of potential barrier = .....V.

- (A) 5 (B) 0.5  
(C) 0.005 (D) 0.05

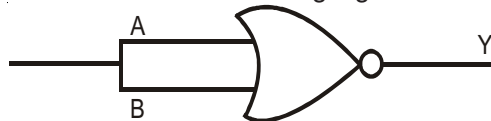
**Answer (B)**

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

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

$$= 0.5 \text{ V}$$

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.....  $\mu\text{m}$ .

- (A) 0.005 (B) 5  
(C) 6 (D) 0.5

**Answer (D)**

**Sol.**  $0.5 \mu\text{m}$

13. A modulating signal of frequency 5 kHz and peak voltage of 8 V is used to modulate a carrier 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.**  $M.I. = \frac{8}{10} = 0.8$

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

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

$$= 4 \text{ V}$$

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 spheres 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  $1 \mu\text{C}$  each is placed on the five corners of a regular hexagon of side  $1\text{m}$ . The electric field at its centre is .....N/C.

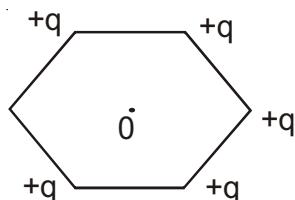
- (A)  $10^{-6}\text{K}$  (B)  $\frac{6}{5} \times 10^{-6}\text{K}$   
(C)  $5 \times 10^{-6}\text{K}$  (D)  $\frac{5}{6} \times 10^{-6}\text{K}$

**Answer (A)**

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

$$q = 1\mu\text{C}$$

$$r = 1\text{m}$$



$$= 10^{-6}\text{K}$$

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

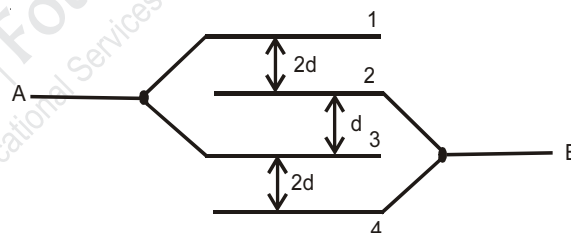
**Answer (B) & (C)**

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

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

**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)  $\frac{4A\epsilon_0}{d}$  (B)  $\frac{2A\epsilon_0}{d}$   
(C)  $\frac{3A\epsilon_0}{d}$  (D)  $\frac{A\epsilon_0}{d}$

**Answer (B)**

**Sol.**  $C = \frac{\epsilon_0 A}{2d} + \frac{\epsilon_0 A}{d} + \frac{\epsilon_0 A}{2d}$   
 $= \frac{2\epsilon_0 A}{d}$

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.**  $P = I^2 R$

$$P \propto I^2$$

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

(A)  $7 \times 10^5 \Omega$  —————  $13 \times 10^5 \Omega$   
 (B)  $9 \times 10^5 \Omega$  —————  $11 \times 10^5 \Omega$   
 (C)  $8 \times 10^5 \Omega$  —————  $12 \times 10^5 \Omega$   
 (D) None of these

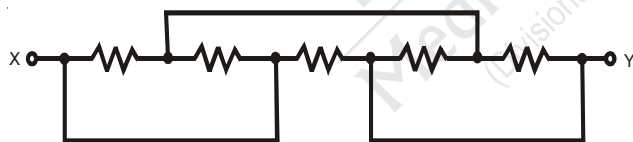
**Answer (C)**

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

$$= 1 \times 10^6 \pm 20\%$$

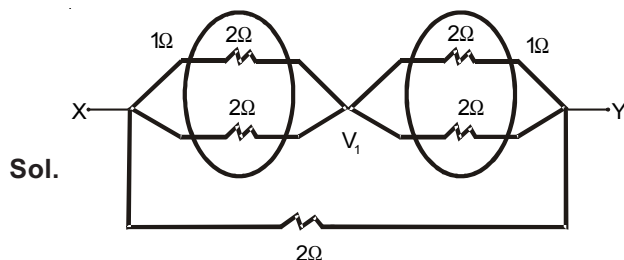
Range is  $8 \times 10^5 \Omega$  —————  $12 \times 10^5 \Omega$

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



(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)**

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

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

(A)  $M^0 L^0 T^0$  (B)  $M^1 L^2 T^{-2}$   
 (C)  $M^1 L^2 T^{-2} A^{-2}$  (D)  $M^1 L^2 T^{-3}$

**Answer (B)**

**Sol.** Torque =  $c\theta$ ,  $\theta$  is dimensionless

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

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)  $4\pi \times 10^{-3}$  (B)  $2\pi \times 10^{-3}$   
 (C)  $6\pi \times 10^{-3}$  (D)  $5\pi \times 10^{-3}$

**Answer (D)**

**Sol.**  $B = \mu_0 n i$

$$= 4\pi \times 10^{-7} \times (50 \times 100) \times 2.5$$

$$= 4\pi \times 5 \times 2.5 \times 10^{-4}$$

$$= 5\pi \times 10^{-3} \text{ (T)}$$

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

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

**Answer (B)**

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

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)**

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

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

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

$$f = 60 \text{ cm}$$

30. Time taken by the sunlight to pass through a slab of 4 cm and refractive index 1.5 is ..... sec.
- (A)  $2 \times 10^{11}$  (B)  $2 \times 10^{-10}$   
(C)  $2 \times 10^{-11}$  (D)  $2 \times 10^{-8}$

**Answer (B)**

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

$$= \frac{1.5 \times 4 \times 10^{-2}}{3 \times 10^8}$$

31. If the tube length of astronomical telescope is 96 cm and magnifying 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)**

$$\text{Sol. } \frac{f_o}{f_e} = 15$$

$$= f_o + f_e = 96$$

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

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

$$f_o = 90 \text{ cm}$$

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)**

$$\text{Sol. } KE_1 = 2 - 0.5 = 1.5 \text{ eV}$$

$$KE_2 = 2.5 - 0.5 = 2.0 \text{ eV}$$

$$\frac{V_1}{V_2} = \sqrt{\frac{KE_1}{KE_2}} = \sqrt{\frac{1.5}{2.0}} = \frac{\sqrt{3}}{2}$$

33. To increase de Broglie wavelength of an electron from  $0.5 \times 10^{-10} \text{ m}$  to  $10^{-10} \text{ m}$ , its energy should be.....
- (A) Decreased to fourth part  
(B) Doubled  
(C) Halved  
(D) Increased to 4 times

**Answer (A)**

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

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

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

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

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)**

$$\text{Sol. } \text{Emf} = \frac{B\omega r^2}{2}$$

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

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

35. A coil of surface area  $200 \text{ cm}^2$  having 25 turns is held perpendicular to the magnetic field of intensity  $0.02 \frac{\text{Wb}}{\text{m}^2}$ . The resistance of the coil is  $1\Omega$ . 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.**  $\Delta Q = \frac{|\Delta \phi|}{R} = \frac{NBA - 0}{R}$

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

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

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

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

**Answer (B)**

**Sol.** JWL, WL = Reactance

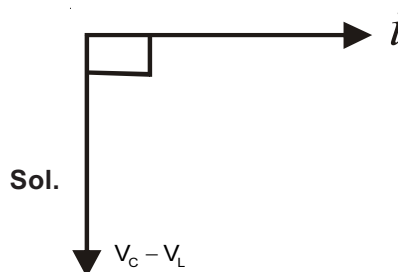
$$= [WL] = [R] = \left[ \frac{ML^2 T^{-2}}{[Q][Q]} \right] [T]$$

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

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

- (A) Lags behind the current by  $\pi$  in phase  
(B) Leads the current by  $\frac{\pi}{2}$  in phase  
(C) Leads the current by  $\pi$  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,  $L = 9H$ ,  $R = 10\Omega$  &  $C = 100\mu F$ . Hence Q-factor of the circuit is

- .....  
(A) 30 (B) 35  
(C) 45 (D) 25

**Answer (A)**

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

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

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

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

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

**Answer (B)**

**Sol.**  $\sqrt{\mu_r \epsilon_r}$  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 comparatively 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)  $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$  (B)  $[\text{CoF}_6]^{3-}$   
(D)  $[\text{CoCl}_6]^{3-}$  (C)  $[\text{Co}(\text{NH}_3)_6]^{3+}$

**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  $\text{K}[\text{Co}(\text{OX})_2(\text{NH}_3)_2]$  complex respectively is \_\_\_\_

- (A) 3, 6, 1 (B) 3, 6, 2  
(C) 4, 4, 2 (D) 3, 4, 2

**Answer (B)**

**Sol.** In complex,  $\text{K}[\text{Co}(\text{OX})_2(\text{NH}_3)_2]$ :

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

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

43. Which of the following complex possess meridional isomer?

- (A)  $[\text{Co}(\text{NH}_3)_5\text{Cl}]$  (B)  $[\text{Co}(\text{NH}_3)_2\text{Cl}_4]$   
(C)  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]$  (D)  $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$

**Answer (D)**

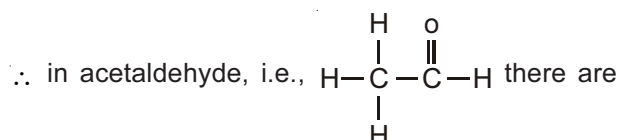
**Sol.**  $\text{Ma}_3\text{b}_3$  shows facial and meridional isomers so  $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$

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  $\alpha$  - H-atoms for aldol condensation.

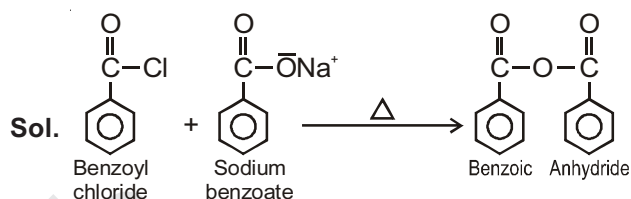


3- $\alpha$ -H-atoms

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

- (A) Benzoic anhydride (B) Benzyl benzoate  
(C) Benzyl alcohol (D) Benzaldehyde

**Answer (A)**

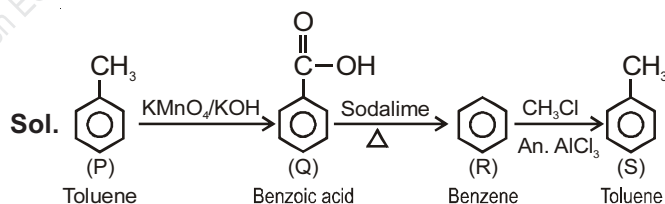


46.  $\text{P} \xrightarrow{\text{KMnO}_4} \text{Q} \xrightarrow[\Delta]{\text{Soda lime}} \text{R} \xrightarrow[\text{An. AlCl}_3]{\text{CH}_3\text{Cl}} \text{S}$

If P and S are toluene, Q & R are \_\_\_\_ and \_\_\_\_ respectively

- (A) Benzene, Benzoic acid  
(B) Benzoic acid, Benzene  
(C) Benzaldehyde, Sodium benzoate  
(D) Benzaldehyde, benzoic acid

**Answer (B)**

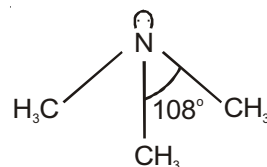


47. Type of Hybridisation of N and C - N - C bond angle in  $(\text{CH}_3)_3\text{N}$  are \_\_\_\_ and \_\_\_\_ respectively.

- (A)  $\text{sp}^2$ ,  $117.5^\circ$  (B)  $\text{sp}^3$ ,  $109^\circ 28'$   
(C)  $\text{sp}^2$ ,  $120^\circ$  (D)  $\text{sp}^3$ ,  $108^\circ$

**Answer (D)**

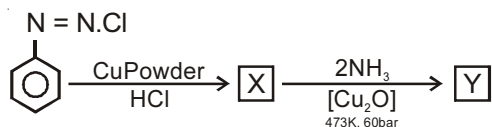
**Sol.** In trimethyl amine,  $((\text{CH}_3)_3\text{N})$











Hybridisation =  $\text{SP}^3$

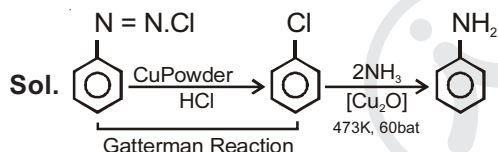
Bond angle :  $108^\circ$

48. Identify X and Y in following reaction.



- (1) ,  (2) , 
- (3) ,  (4) , 

**Answer (D)**

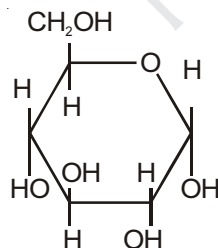


49. Why glucose is called gluco-pyranose?

- (A) Glucose is a cyclic compound containing 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  $\alpha$  - 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.


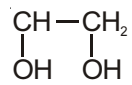
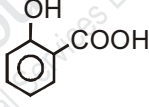
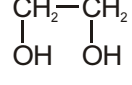
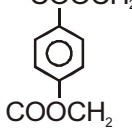
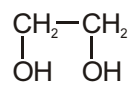
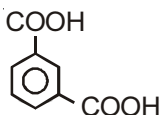
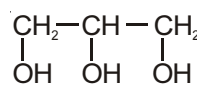
- (i) Cytosine base is the derivative of pyrimidine  
 (ii)  $\beta$ -D Ribose sugar is present in DNA.  
 (iii) The message for the synthesis of a specific protein is present in RNA.  
 (iv) DNA is responsible for maintaining the identity of different species of organisms for one century
- (A) FFTF (B) FTFF  
 (C) FFFT (D) TFFT

**Answer (D)**

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

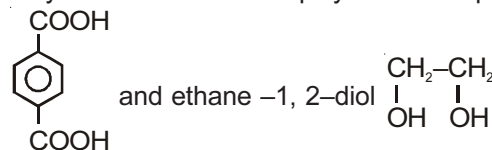
(ii), (iii) are false statements

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

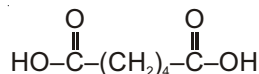


53. Which of the following acid has property of flexibility?

- (A)  $\text{HOOC} - (\text{CH}_2)_2 - \text{COOH}$   
 (B)  $\text{CH} - \text{CH} - \text{CH}_2 - \text{COOH}$   
           |  
          $\text{CH}_3$   
 (C)  $\text{HOOC} - (\text{CH}_2)_4 - \text{COOH}$   
 (D)  $\text{HO} - \text{CH} - \text{CH}_2 - \text{COOH}$   
           |  
          $\text{CH}_2 - \text{CH}_3$

**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 arrangement 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  $\text{K}_3[\text{Fe}(\text{CN})_6]$  having a degree of dissociation ( $\alpha$ ) equal to 0.778.

- (A) 2.334 (B) 0.222  
(C) 3.334 (D) 4.334

**Answer (C)**

**Sol.**  $\text{K}_3[\text{Fe}(\text{CN})_6] \rightarrow 3\text{K}^+_{(\text{aq})} + [\text{Fe}(\text{CN})_6]^{3-}_{(\text{aq})}$

$$t = 0 \quad 1$$

$$t = t \quad 1-\alpha \quad 3\alpha \quad \alpha$$

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

$$i = 1 + 3\alpha$$

$$i = 1 + 3(0.778)$$

$$i = 3.334$$

58. If molality of a solution is 0.05 and elevation in boiling point is 0.16 K then, what is the molal elevation constant of the solvent?

- (A) 2.3 (B) 2.2  
(C) 1.6 (D) 3.2

**Answer (D)**

**Sol.**  $\Delta T_b = K_b m$

$$\Delta T_b = 0.16 \text{ K}, m = 0.05$$

$$\therefore 0.16 = K_b (0.05)$$

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

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.  $\text{Zn}_{(\text{s})} / \text{Zn}^{2+}_{(\text{aq})} (1\text{M}) / \text{Ni}^{2+}_{(\text{aq})} (1\text{M}) / \text{Ni}_{(\text{s})}$

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  $\text{Cu}^{2+}_{(\text{aq})}$  ions



61. If one mole electrons is passed through the solutions of  $\text{AlCl}_3$ ,  $\text{AgNO}_3$  and  $\text{MgSO}_4$ , 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 :

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

$$= 2 : 6 : 3$$

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.** Iron pyrites :  $\text{FeS}_2$

Magnetite :  $\text{Fe}_3\text{O}_4$

Siderite :  $\text{FeCO}_3$

Haematite :  $\text{Fe}_2\text{O}_3$

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

- (A)  $\text{AsH}_3$  (B)  $\text{NH}_3$   
 (C)  $\text{SbH}_3$  (D)  $\text{PH}_3$

**Answer (B)**

**Sol.** Stability of Hydrides decreases down the group

$\therefore \text{NH}_3$  is most stable.

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

- (A)  $\text{H}_4\text{P}_2\text{O}_7$  and  $\text{H}_3\text{PO}_3$  (B)  $\text{H}_4\text{P}_2\text{O}_7$  and  $\text{H}_5\text{P}_3\text{O}_{10}$   
 (C)  $\text{H}_3\text{PO}_4$  and  $\text{H}_5\text{P}_3\text{O}_{10}$  (D)  $\text{H}_3\text{PO}_4$  and  $\text{H}_4\text{P}_2\text{O}_7$

**Answer (A)**

**Sol.** P has oxidation state of +5 in  $\text{H}_4\text{P}_2\text{O}_7$

P has oxidation state of +3 in  $\text{H}_3\text{PO}_3$

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

- (A)  $\text{HClO}_4 > \text{HClO}_3 > \text{HClO}_2 > \text{HClO}$   
 (B)  $\text{HClO}_2 > \text{HClO} > \text{HClO}_4 > \text{HClO}$   
 (C)  $\text{HClO}_4 > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}$   
 (D)  $\text{HClO} > \text{HClO}_2 > \text{HClO}_3 > \text{HClO}_4$

**Answer (A)**

**Sol.** Correct order of acidic strength :

$\text{HClO}_4 > \text{HClO}_3 > \text{HClO}_2 > \text{HClO}$

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

- (A) Allylic halide (B) Alkylidene halide  
 (C) Vicinal halide (D) Geminal halide

**Answer (C)**

**Sol.**  $\begin{array}{c} \text{H}_2\text{C}-\text{CH}_2 \\ | \quad | \\ \text{Cl} \quad \text{Cl} \end{array}$  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)  $\text{CCl}_4$ ,  $\text{CHI}_3$ ,  $\text{CHCl}_3$ , DDT  
 (B)  $\text{CCl}_4$ ,  $\text{CHI}_3$ , DDT,  $\text{CHCl}_3$   
 (C) DDT,  $\text{CHCl}_3$ ,  $\text{CCl}_4$ ,  $\text{CHI}_3$   
 (D)  $\text{CHCl}_3$ ,  $\text{CHI}_3$ , DDT,  $\text{CCl}_4$

**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

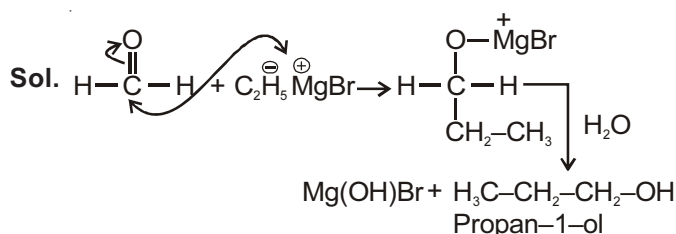
**Answer (A)**

**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

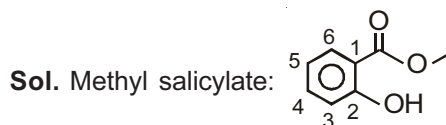
**Answer (B)**



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)**



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  $A \rightarrow B$

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

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 collision 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)  $\text{FeCl}_3 + 3\text{H}_2\text{O} \rightarrow \text{Fe}(\text{OH})_3 + 3\text{HCl}$   
 (B)  $\text{SO}_2 + 2\text{H}_2\text{S} \rightarrow 3\text{S} + 2\text{H}_2\text{O}$   
 (C)  $2\text{AuCl}_3 + 3\text{HCHO} + 3\text{H}_2\text{O} \rightarrow 2\text{Au} + 3\text{HCOOH} + 6\text{HCl}$   
 (D)  $\text{As}_2\text{O}_3 + 3\text{H}_2\text{S} \rightarrow \text{As}_2\text{S}_3 + 3\text{H}_2\text{O}$

**Answer (D)**

**Sol.** A) Hydrolysis reaction

- B) By Oxidation of  $\text{H}_2\text{S}$   
 C) By Reduction of  $\text{AuCl}_3$   
 D) By Double decomposition

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

- (A)  $\text{Ni}^{2+}, \text{Co}^{2+}$  (B)  $\text{Fe}^{2+}, \text{Mn}^{2+}$   
 (C)  $\text{Fe}^{3+}, \text{Mn}^{2+}$  (D)  $\text{Cr}^{3+}, \text{Mn}^{3+}$

**Answer (C)**

**Sol.** The ion having same unpaired has similar magnetic moment



5 unpaired electrons



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

**Answer (B)**

**Sol.** In complex,  $[\text{NiCl}_4]^{2-}$  it forms tetrahedral complex so energy of eg set  $< t_{2g}$  set of orbitals

$$\therefore d_{xy} \cong d_{yz} \cong d_{zx} > d_{x^2-y^2} \cong d_{z^2}$$