Test Booklet Code

**01**

Aakash
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# Answers & Solutions

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

*for*

# GUJCET-2018

## (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 01. 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

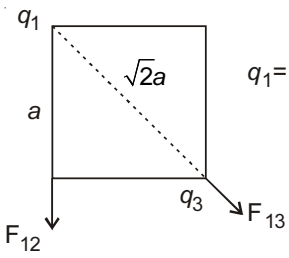
1. Three identical charges are placed on three vertices of a square. If the force acting between $q_1$ and $q_2$ is $F_{12}$ and between $q_1$ and $q_3$ is $F_{13}$ then $\frac{F_{13}}{F_{12}}$ =

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

(C) $\frac{1}{2}$ (D) $\sqrt{2}$

**Answer (C)**

**Sol.**




$q_1 = q_2 = q_3$ (=$q$, say)

$$F_{12} = \frac{kq_1q_2}{a^2} = \frac{kq^2}{a^2}$$

$$F_{13} = \frac{kq_1q_3}{(\sqrt{2}a)^2} = \frac{kq^2}{2a^2}$$

$$\frac{F_{13}}{F_{12}} = \frac{1}{2}$$

2. When a 10μC charge is enclosed by a closed surface, the flux passing through the surface is ϕ. Now another 10 μC charge is placed inside the closed surface, then the flux passing through the surface is ____

(A) 2ϕ (B) ϕ

(C) 4ϕ (D) Zero

**Answer (A)**

**Sol.** $\phi = \frac{q}{\varepsilon_0}$

$\Rightarrow \phi \propto q$

$\therefore \frac{\phi'}{\phi} = \frac{q'}{q} = \frac{20\mu C}{10\mu C}$

$= \phi' = 2\phi$

3. The electric force acting between two point charges kept at a certain distance in vacuum is 16N. If the same two charges are kept at the same distance in a medium of dielectric constant 8. The electric force acting between them is ____

(A) 16 (B) 128

(C) 1024 (D) 2

**Answer (D)**

**Sol.** In medium $F' = \frac{F}{K} = \frac{16}{2}$

= 8N

4. The unit of polarizabity of the molecule is ___

(A) $C^{-2}m^1N^{-1}$ (B) $C^{-2}m^1N^1$

(C) $C^2m^1N^{-1}$ (D) $C^2m^{-1}N^{-1}$

**Answer (C)**

5. On the axis and on the equator of an electric dipole for all points ____

(A) On the axis V = 0 and on equator V ≠ 0

(B) On both of them V = 0

(C) On both of them V ≠ 0

(D) On the axis V ≠ 0 and on equator V = 0

**Answer (D)**

**Sol.** Potential due to dipole

$$V = \frac{kp\cos\theta}{r^2}$$

on axis,

$\theta = 0$

$\therefore V = \frac{kp}{r^2} \neq 0$ on equator

$\theta = 90°$ V = 0

6. When the temperature of a conductor increases the ratio of conductivity and resistivity ___

(A) decrease (B) increase

(C) remain constant (D) increase or decrease

**Answer (A)**

**Sol.** $\frac{\sigma}{\rho} = \frac{1}{\rho^2}$

ρ increases when temperature is increased. Thus, the given ratio decreases.

7. You are given 10 resistors each of resistance 2Ω. First they are connected to obtain possible minimum resistance. Then they are connected to obtain possible maximum resistance. The ratio of maximum and minimum resistance is ___

(A) 2.5 (B) 10

(C) 100 (D) 25

**Answer (C)**

**Sol.** Minimum possible resistance is obtained when all resistors are connected in parallel

$$R_{min} = \frac{2}{10} = 0.2\Omega$$

Maximum possible resistance is obtained when all resistors are connected in series.

$R_{max} = 2 \times 10 = 20\Omega$

8. The dimensional formula of mobility is ___

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

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

**Answer (D)**

**Sol.** $\mu = \frac{V_d}{E}$

$$[\mu] = \frac{[V_d]}{[E]} = \frac{[V_d][q]}{[F]}$$

$$= \frac{[LT^{-1}][AT]}{[MLT^{-2}]}$$

$= [M^{-1}L^0T^2A]$

9. An electron having mass $9.1 \times 10^{-31}$ kg, charge $1.6 \times 10^{-19}$ C and moving with the velocity of $10^6$ m/s enters a region where magnetic field exists. If it describes a circle of radius 0.2 m then intensity of magnetic field must be ____ $\times 10^{-5}$ T.

(A) 2.84 (B) 5.65

(C) 14.4 (D) 1.32

**Answer (A)**

**Sol.** $r = \frac{mv}{qB}$

$$= B = \frac{mv}{qr} = \frac{9.1\times10^{-31}\times10^6}{1.6\times10^{-19}\times0.2}$$

$= 2.84 \times 10^{-5}$ T

10. A galvanometer of resistance 50Ω giving full scale deflection for a current of 10 milliampere is to be changed into a voltmeter of range 100V.

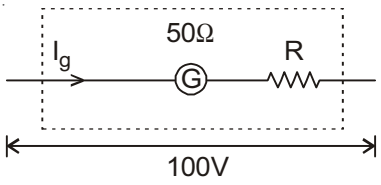
A resistance of ____ Ω has to be connected in series with the galvanometer.

(A) 10000 (B) 10025

(C) 9950 (D) 9975

**Answer (C)**

**Sol.**




Using Ohm's law

$100 = I_g(50 + R)$

$100 = 10 \times 10^{-3}$ (R + 50)

$= R + 50 = 10000$

$= R = 9950\Omega$

11. Two parallel very long straight wires carrying current of 5A each are kept at a separation of 1m. If the currents are in the same direction, the force per unit length between them is ___ N/m. ($\mu_0 = 4\pi \times 10^{-7}$ SI)

(A) $5 \times 10^{-5}$, repulsive (B) $5 \times 10^{-6}$, attractive

(C) $5 \times 10^{-5}$, attractive (D) $5 \times 10^{-6}$, repulsive

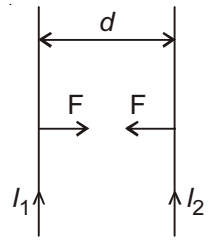
**Answer (B)**

**Sol.** Force per unit length is given by

$$F = \frac{\mu_o I_1 I_2}{2\pi d}$$

$$= \frac{4\pi\times10^{-7}\times5\times5}{2\pi\times1}$$

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




12. A very long straight wire of radius *r* carries current I. Intensity of magnetic field B at a point, lying at a perpendicular distance '*a*' from the axis is ∝ ___ .

(where *a* < *r*)

(A) $1/a$ (B) $1/a^2$

(C) $a^2$ (D) *a*

**Answer (D)**

**Sol.** Magnetic field inside a wire is given by

$$B = \frac{\mu_0 ia}{2\pi r^2}$$

$\Rightarrow$ B ∝ a

13. A substance is placed in a non uniform magnetic field. It experience weak force towards the strong field. The substance is ____ type.

(A) Ferromagnetic (B) Diamagnetic

(C) Paramagnetic (D) None of these

**Answer (C)**

**Sol.** Paramagnetic material is weakly attracted towards strong magnetic field.

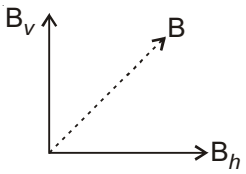
14. The relation between $B_v$, $B_h$ and B is ____

(A) $B = \frac{B_v}{B_h}$ (B) $B = B_h \cdot B_v$

(C) $B = \sqrt{B_h^2 + B_v^2}$ (D) $B = \frac{B_h}{B_v}$

**Answer (C)**

**Sol.** From the diagram




$B = \sqrt{B_h^2 + B_v^2}$

15. Two thin lenses of focal length $f_1$ and $f_2$ are in contact and coaxial. The power of the combination is ____

(A) $\frac{f_1 f_2}{f_1 + f_2}$ (B) $\frac{f_1 + f_2}{2}$

(C) $\frac{1}{\sqrt{f_1 f_2}}$ (D) $\frac{f_1 + f_2}{f_1 f_2}$

**Answer (D)**

**Sol.** Power of combination of lenses is given by

$$P = P_1 + P_2 = \frac{1}{f_1} + \frac{1}{f_2}$$

$$= P = \frac{f_1 + f_2}{f_1 f_2}$$

16. On decreasing the wavelength of incident light from 8000 Å to 4000 Å. the intensity of the scattered light in Rayleih scattering will become ____ times the initial scattered intensity.

(A) 16 (B) 4

(C) 2 (D) 8

**Answer (A)**

**Sol.** Intensity in raylength scattering depends on wavelength as

$$I \propto \frac{1}{\lambda^4}$$

$$\frac{I'}{I} = \left(\frac{\lambda}{\lambda'}\right)^4$$

$$= \left(\frac{8000\,\text{Å}}{4000\,\text{Å}}\right)^4 = 16$$

17. A small angled prism of refractive index 1.6 gives a deviation of 3.6°. The angle of prism is ___

(A) 5° (B) 6°

(C) 7° (D) 8°

**Answer (B)**

**Sol.** $\delta = (\mu - 1)A$

$\Rightarrow 3.6 = (1.6 - 1)A$

$\Rightarrow A = 6°$

18. A plano convex lens is made of material having refractive index 1.5. The radius of curvature of curved surface is 60 cm. The focal length of the lens is ____ cm

(A) 60 (B) 120

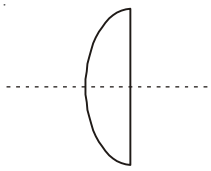
(C) –60 (D) –120

**Answer (B)**

**Sol.** $\frac{1}{f} = (\mu - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

$= \frac{1}{f} = (1.5 - 1)\left(\frac{1}{60} - \frac{1}{\infty}\right)$

$= f = 120$ cm



19. If the uncertainty in the position of an electron is $10^{-10}$ m, then the value of uncertainty in its momentum will be ___ kgms$^{-1}$. ($h = 6.62 \times 10^{-34}$ J$^{-s}$)

(A) $1.06 \times 10^{-24}$ (B) $1.03 \times 10^{-24}$

(C) $1.05 \times 10^{-24}$ (D) $1.08 \times 10^{-24}$

**Answer (C)**

**Sol.** As per principle of uncertainty

$$\Delta p \cdot \Delta x \simeq \frac{h}{2\pi}$$

$$\Rightarrow \Delta p = \frac{h}{2\pi\Delta x} = \frac{6.626 \times 10^{-34}}{2 \times 3.14 \times 10^{-10}}$$

$= 1.05 \times 10^{-24}$ kg-m/s

20. If the energy of photons corresponding to wavelength of 6000 Å is $3.2 \times 10^{-19}$ J. The photon energy for wavelength of 4000 Å will be ___

(A) $1.11 \times 10^{-19}$ J (B) $2.22 \times 10^{-19}$ J

(C) $4.44 \times 10^{-19}$ J (D) $4.80 \times 10^{-19}$ J

**Answer (D)**

**Sol.** $E = \frac{hC}{\lambda}$

$E \propto \frac{1}{\lambda}$

$\therefore \frac{E_2}{E_1} = \frac{\lambda_1}{\lambda_2}$

$= \frac{E_2}{3.2\times10^{-19}} = \frac{6000Å}{4000Å}$

$= E_2 = \frac{3}{2}\times3.2\times10^{-19}$

$= 4.8 \times 10^{-19}$ J

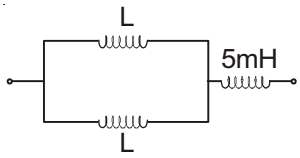
21. Two inductors each of inductance L are connected in parallel. One more inductor of value 5 mH is connected in series of this configuration then the effective inductance is 15 mH. The value of L is ___ mH.

(A) 2.5 (B) 5.0

(C) 10 (D) 20

**Answer (D)**

**Sol.**




Equivalent inductance is given by

$L_{eq} = \left(\frac{L\times L}{L+L}\right) + 5 = 15$ (in mH)

$= \frac{L}{2} = 10$

$= L = 20$ mH

22. A lamp consumes only 50% of maximum power in an A.C. circuit. What is the phase difference between the applied voltage and the circuit current?

(A) $\frac{\pi}{6}$ (B) $\frac{\pi}{3}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

**Answer (B)**

**Sol.** $P = VI\cos\phi$

$P_{max} = VI$

Given

$P = \frac{P_{max}}{2}$

$\Rightarrow VI\cos\phi = \frac{VI}{2}$

$\Rightarrow \cos\phi = \frac{1}{2}$

$\Rightarrow \phi = \frac{\pi}{3}$

23. A capacitor 'C' is connected across a D.C. source, the reactance of capacitor will be ___

(A) LOW (B) HIGH

(C) ZERO (D) INFINITE

**Answer (D)**

**Sol.** For D.C. source

$\omega = 0$,

Capacitive reactance

$X_C = \frac{1}{\omega C} = \infty$

24. The dimensional formula of $\mu_0\in_0$ is ___

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

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

**Answer (C)**

**Sol.** Speed of light

$c = \frac{1}{\sqrt{\mu_0\varepsilon_0}}$

$c^2 = \frac{1}{\mu_0\varepsilon_0}$

$= \mu_0\varepsilon_0 = \frac{1}{c^2}$

$\therefore [\mu_0\varepsilon_0] = \frac{1}{[c]^2} = \frac{1}{[LT^{-1}]^2}$

$= [L^{-2}T^2] = [M^0L^{-2}T^2]$

25. Match Column I and Column II

| Column I | Column II |
|---|---|
| (i) Interference | (P) Coherent sources |
| (ii) Brewster's Law | (Q) $\mu = \frac{1}{\sin C}$ |
| (iii) Malus Law | (R) $\mu = \tan\theta_p$ |
| (iv) Total Internal reflection | (S) $I = I_0\cos^2\theta$ |

(A) i→Q, ii→S, iii→R, iv→P

(B) i→P, ii→R, iii→S, iv→Q

(C) i→P, ii→S, iii→R, iv→Q

(D) i→R, ii→Q, iii→S, iv→P

**Answer (B)**

**Sol.** (i) Interference patterns can be observed only when coherent sources are used.

(ii) Brewster's Law gives angle of polarization $\tan\theta_p = \mu$

(iii) Malus law gives intensity of light after passing through polarizer

$I = I_0 \cos^2\theta$

(iv) Critical angle for total internal reflection is given by relation

$$\sin C = \frac{1}{\mu}$$

26. Frequencies of various radiations are given as

$f_v \rightarrow$ Visible light

$f_r \rightarrow$ Radio waves

$f_{UV} \rightarrow$ Ultra Violet waves

Then which of following is true?

(A) $f_v < f_r < f_{UV}$ (B) $f_r < f_v < f_{UV}$

(C) $f_{UV} < f_v < f_r$ (D) $f_{UV} < f_r < f_v$

**Answer (B)**

**Sol.** -

27. Wavelength of characteristic X-ray depends on which property of target?

(A) A (B) Z

(C) Melting point (D) All of these

**Answer (B)**

**Sol.** $E = \frac{hC}{\lambda}$

$E \propto Z^2$

$\therefore \frac{1}{\lambda} \propto Z^2$

$= \lambda \propto \frac{1}{\sqrt{Z}}$

28. The energy of the fast neutrons emitted in a nuclear fission reactor is approximately ___

(A) 10 MeV (B) 2 KeV

(C) 2 MeV (D) 20 MeV

**Answer (C)**

29. In radioactive reaction

$${}^{A}_{Z}X \rightarrow {}^{A}_{Z+1}X_1 \rightarrow {}^{A}_{Z+2}X_2 \rightarrow {}^{A-4}_{Z}X_3 \rightarrow {}^{A-4}_{Z+1}X_4$$

(A) $\beta^-,\beta^-,\alpha,\alpha$ (B) $\beta^-,\beta^-,\beta^+,\alpha$

(C) $\beta^-,\beta^-,\beta^-,\alpha$ (D) $\beta^-,\beta^-,\alpha,\beta^-$

**Answer (D)**

**Sol.** In $\alpha$-decay $({}^{4}_{2}He)$ mass number decreases by 4 and atomic no. decreases by 2.

In $\beta^-$ - decay ($n \rightarrow p^+ + e^-$) mass number remains same while atomic no. increases by 1.

$${}^{A}_{Z}X \xrightarrow{\beta^- \text{decay}} {}^{A}_{Z+1}X \xrightarrow{\beta^- \text{decay}}$$

$${}^{A}_{Z+2}X_2 \xrightarrow{\alpha-\text{decay}} {}^{A-4}_{Z}X_3 \xrightarrow{\beta^- -\text{decay}} {}^{A-4}_{Z+1}X_4$$

30. In CE transistor amplifier, the collector junction has ____ bias and emitter junction has ____ bias.

(A) reverse, forward (B) forward, forward

(C) reverse, reverse (D) forward, reverse

**Answer (A)**

**Sol.** -

31. When carrier wave of 2.5 MHz frequency is amplitude modulated, the resulting AM wave has maximum amplitude of 15 V and minimum amplitude of 10 V. The modulation index is ____ .

(A) 10% (B) 20%

(C) 30% (D) 40%

**Answer (B)**

**Sol.** $A_{max} = 15$ V

$= A_c + A_m = 15$ V .... (A)

$A_{min} = 10$ V

$= A_c - A_m = 10$ V .... (B)

from (A) - (B)

$2A_m = 5$

from (A) + (B)

$2A_c = 25$

modulation index,

$$\mu = \frac{A_m}{A_c} = \frac{5}{25} = \frac{1}{5}$$

$$= \frac{1}{5} \times 100\% = 20\%$$

32. Which of the following is wrong for interference fringes?

(A) Distance between two consecutive fringes is constant

(B) All bright fringes are equally bright

(C) Fringes are due to limited portion of wave front

(D) Fringes are due to the use of coherent sources

**Answer (C)**

**Sol.** -

33. A ray of light travelling in impure water is incident on a glass plate immersed in it. When the angle of incidence is 51°, the reflected ray is totally plane polarized. Given that refractive index of impure water is 1.4. The refractive index of glass should be ____ (tan51° = 1.235)

(A) 1.53 (B) 1.34

(C) 1.64 (D) 1.73

**Answer (D)**

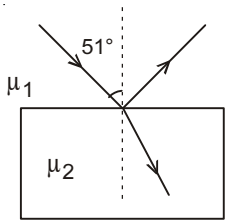
**Sol.** Using Brewster's law

$\tan\theta_p = \mu_{21} = \frac{\mu_2}{\mu_1}$

$= \tan 51° = \frac{\mu_2}{1.4}$

$= \mu_2 = 1.4 \times 1.235$

$= 1.73$




34. A coil having 200 turns has a surface area of 0.15 $m^2$. A magnetic field of strength 0.2 T applied perpendicular to this changes to 0.6 T in 0.4 s, then the induced emf in the coil is ___ V.

(A) 15 (B) 30

(C) 45 (D) 60

**Answer (B)**

**Sol.** $E = \frac{\Delta\phi}{\Delta t} = \frac{N(\Delta B)A}{\Delta t}$

$= \frac{200 \times (0.6 - 0.2) \times 0.15}{0.4} = 30V$

35. A sinusoidal A.C. current flows through a resistor of resistance 10Ω. If the peak current is 2A flowing through the resistor then the power dissipated in ____ W.

(A) 10 (B) 20

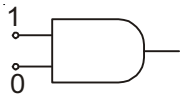
(C) 30 (D) 40

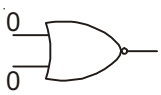
**Answer (B)**

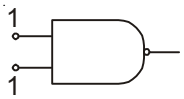
**Sol.** $P = i^2_{rms}R = \left(\frac{i_{max}}{\sqrt{2}}\right)^2 R = \left(\frac{2}{\sqrt{2}}\right)^2 \times 10$

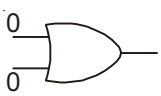
$= 20$ W

36. Which of following gates produces output of 1?

(A) 


(B) 


(C) 


(D) 


**Answer (B)**

**Sol.** (A) Output of AND gate is 0

(B) Output of NOR gate is 1

(C) Output of NAND gate is 0

(D) Output of OR gate is 0

37. The value of β of a transistor is 19. The value of α will be ___

(A) 0.99 (B) 0.98

(C) 0.93 (D) 0.95

**Answer (D)**

**Sol.** $\frac{1}{\alpha} = 1 + \frac{1}{\beta} = 1 + \frac{1}{19}$

$= \alpha = 0.95$

38. If the half-life of a radioactive element is 10 hr, its average life = ____ hr.

(A) 14.4 (B) 6.93

(C) 1.44 (D) 0.693

**Answer (A)**

**Sol.** Average life

$\tau = \frac{t_{1/2}}{\ln 2} = \frac{10}{0.693}$

$\simeq 14.4$ hrs.

39. ____ is the wavelength of photon of energy 35 KeV.

$h = 6.625 \times 10^{-34}$ $J^{-2}$, $c = 3 \times 10^8$ m/s,

1 eV = 1.6 x $10^{-19}$ J.

(A) 3.5 mm (B) 35 Å

(C) $35 \times 10^{-12}$ mm (D) 3.5 Å

**Answer (C)**

**Sol.** $E = \frac{hc}{\lambda}$

$\Rightarrow \lambda = \frac{hc}{E} = \frac{1242 \text{ eV} - \text{nm}}{35 \times 10^3 \text{ eV}}$

$\simeq 35 \times 10^{-3}$ nm

$= 35 \times 10^{-12}$ m

40. The band gaps of an insulator, conductor and semi conductor are respectively $E_{g1}$, $E_{g2}$ and $E_{g3}$. The relationship between them is given as ___

(A) $E_{g1} < E_{g2} > E_{g3}$ (B) $E_{g1} > E_{g2} > E_{g3}$

(C) $E_{g1} > E_{g2} < E_{g3}$ (D) $E_{g1} < E_{g2} < E_{g3}$

**Answer (C)**

**Sol.** Band gap is largest in insulators while it is smallest in conductors.

# PART–B : CHEMISTRY

41. If the edge length of a body centred unit cell is 400pm, what will be the approximate radius of the atom present in it? (in pm)

(A) 173 (B) 141

(C) 200 (D) 924

**Answer (A)**

**Sol.** a = 400pm

For Body centered unit cell ;

$\sqrt{3}a = 4r$

$\therefore \frac{\sqrt{3}(400)}{4} = r \qquad r = 173.2 \text{ pm}$

42. Which of the following is Ferromagnetic?

(A) MnO (B) $CrO_2$

(C) $O_2$ (D) $Fe_3O_4$

**Answer (B)**

**Sol.** Fe, Co, Ni and $CrO_2$ are ferromagnetic in nature

43. What is the normality of aqueous solution of $H_2SO_4$ having pH = 1.

(A) 0.1 N (B) 0.05 N

(C) 1 N (D) 0.5 N

**Answer (A)**

**Sol.** $H_2SO_4 \rightarrow 2H^+_{(aq)} + SO^{2-}_{4(aq)}$

For $[H^+]$ = 0.1M; the $p^H$ = 1

Molarity of $H_2SO_4$ = 0.05 M

$\therefore$ Normality of $H_2SO_4$ = $M_{H_2SO_4} \times n_f$

= 0.05 x 2

= 0.1 N

44. Which of the following mixture is non-ideal solution?

(A) Chlorobenzene and bromobenzene

(B) Benzene and toluene

(C) Chloroform and acetone

(D) Bromoethane and chloroethane

**Answer (C)**

**Sol.** $(CHCl_3 + H_3C - \overset{O}{\overset{\|}{C}} - CH_3)$ forms a non-ideal solution showing negative deviation

45. Which solution is isotonic with 6% w/v aqueous solution of urea? [Mole mass of Urea = 60 gm. $mol^{-1}$]

(A) 0.1 M NaCl (B) 0.5 M NaCl

(C) 0.25 M NaCl (D) 1 M NaCl

**Answer (B)**

**Sol.** Isotonic solution means $(\pi_1 = \pi_2)$

Isotonic presure for 6% w/v aqueous soltuion of area $(\pi_1)$ = icRT

6 gms of area is present in 100ml solution

$\therefore C = \frac{6}{60} \times \frac{1000}{100} = 1$

$\therefore \pi_1$ = (1) (1) RT ($\because$ i of area = 1)

$\pi_1$ = RT

$\therefore$ For 0.5 M NaCl solution, i = 2

so $\pi_2$ = (2) (0.5 RT)

$\boxed{\pi_2 = RT}$

46. In which metal container, the aqueous solution of $CuSO_4$ can be stored?

$E^0_{Cu^{3+}/Cu} = 0.34V$

$E^0_{Fe/Fe^{2+}} = 0.44V, E^0_{Al/Al^{3+}} = 1.66V$

$E^0_{Ni/Ni^{2+}} = 0.25V, E^0_{Ag^+/Ag} = 0.80V$

(A) Fe (B) Ni

(C) Ag (D) Al

**Answer (C)**

**Sol.** Since the SRP value of $Ag^+/Ag$ = 0.80 V

$\therefore$ aq solution of $CuSO_4$ can be stored in Ag as

$E^0_{Cu^{2+}/Cu} = 0.34V$

47. For how much time, 10 ampere electric current should be passed through a dilute aqueous $NiSO_4$ solution during electrolysis using inert electrode, in order to get 5.85 gm Nickel? [At. mass of Ni = 58.5gm]

(A) 1930 sec. (B) 3860 sec.

(C) 965 sec. (D) 9650 sec.

**Answer (A)**

**Sol.** By Faraday's Ist law of electrolysis m = zit

$5.85 = \frac{E}{F}(i)(t)$

($\because$ E = Equivalent mass of Ni)

$E = \frac{58.5}{2} \qquad 5.85 = \frac{58.5}{2}\frac{(10)}{(96500)}(t)$

$\therefore$ t = 1930 sec.