GUJCET-PCE-2023

Test Booklet No. 0900809 **Test Booklet Set No.** 09

This booklet contains 32 pages.

DO NOT open this Test Booklet until you are asked to do so.

Important Instructions :

1) The Physics and Chemistry test consists of 80 questions. Each question carries 1 mark. For each correct response, the candidate will get 1 mark. For each incorrect response ¼ 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 09. 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 Simple (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 regard 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)

PHYSICS

1) Two slits are made 10 millimeter apart and the screen is placed 1.5 metre away. What is the fringe separation when a wavelength of 7000 Å is used?

(A) 105 μm
(B) 1.05 μm
(C) 10.5 μm
(D) 0.105 μm

2) What is the de Broglie wavelength associated with an electron accelerated through a potential difference of 64 volts?

(A) 1.43 Å
(B) 1.23 Å
(C) 1.53 Å
(D) 1.33 Å

3) An electron, an α-particle and a proton have the same kinetic energy. Which of these have longest de Broglie wavelength?

(A) α-particle
(B) proton
(C) electron
(D) both α-particle and proton

(Space for Rough Work)

$x = \frac{\lambda D}{d} = \frac{7008 \times 10^{-10} \times 1.5}{16 \times 10^{-3}}$

$= 7 \times 1.5 \times 10^{-5}$

$= 105 \times 10^{-5}$

$= 105 \times 10^{-6}$ m

e → m
p → m
→ 4m

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

$\lambda_\alpha = \frac{h}{2\sqrt{2mK}}$

$\lambda = \frac{1.227}{\sqrt{64}}$

$= 1.23$

$= 0.153 \times 10^{-9}$ m

$= 1.53 \times 10^{-10}$

4) The number of photons emitted per second by a bulb of 66 W power emitting waves of wavelength 600 nm is _____. ($h = 6.6 \times 10^{-34}$ J.s)

(A) 2×10^{22} (B) 2×10^{19}

(C) 2×10^{21} (D) 2×10^{20}

5) The longest wavelength present in the Balmer series of spectral line is _____.

(A) 5438 Å (B) 6563 Å

(C) 7369 Å (D) 3646 Å

6) In hydrogen atom an electron makes a transition from 5^{th} orbit to 3^{rd} orbit. The change in the angular momentum for this electron is _____.

(A) $\frac{h}{\pi}$ (B) $\frac{h}{2\pi}$

(C) $\frac{3h}{\pi}$ (D) $\frac{5h}{\pi}$

7) A radioactive isotope has a halflife of 2.5 years. How long will it take the activity to reduce to 1.5625%?

(A) 10 years (B) 5 years

(C) 15 years (D) 20 years

(Space for Rough Work)

$\frac{5h}{2\pi} - \frac{3h}{2\pi}$ $\frac{2h}{2\pi}$

$Ba \rightarrow 2$

Pa

$\frac{1}{\lambda} = R\left[\frac{1}{2^2} - \frac{1}{3^2}\right]$

$\lambda = \frac{4 \times 9}{5R} = \frac{36}{5 \times 9}$

$U = \frac{Kq_1q_2}{\lambda}$

$= \frac{1}{4\pi\varepsilon_0} \frac{e^2 Z}{\frac{e^2 Z^2 h^2 \pi}{e^2 Z^2 \pi m}}$ $\quad \frac{mv^2}{r} = \frac{K(e^2)Z}{r^2}$

$r = \frac{Ke^2 Z}{mv^2} = \frac{Ke^2 Z}{m\left(\frac{nh}{2\pi mr}\right)^2}$ $\quad r = \frac{Ke^2 Z}{mv}$

$mvr = \frac{nh}{2\pi}$

$v = \frac{nh}{2\pi mr}$

$U = \frac{1}{\frac{e^2 Z}{4\pi\varepsilon_0\left(\frac{n^2h^2}{4\pi^2m^2r^2}\right)}}$ $\quad r = \frac{e^2 Z^2 \pi m r^2}{\varepsilon_0 n^2 h^2}$

$r = \frac{\varepsilon_0 n^2 h^2}{e^2 Z^2 \pi m}$

$\text{momentum} = nh$

$\lambda = \frac{nh}{2\pi}$

8) In proton-proton cycle in Sun the energy released when an electron & its antiparticle combines is _____.

(A) 1.021×10^{-13} J (B) 0.672×10^{-13} J

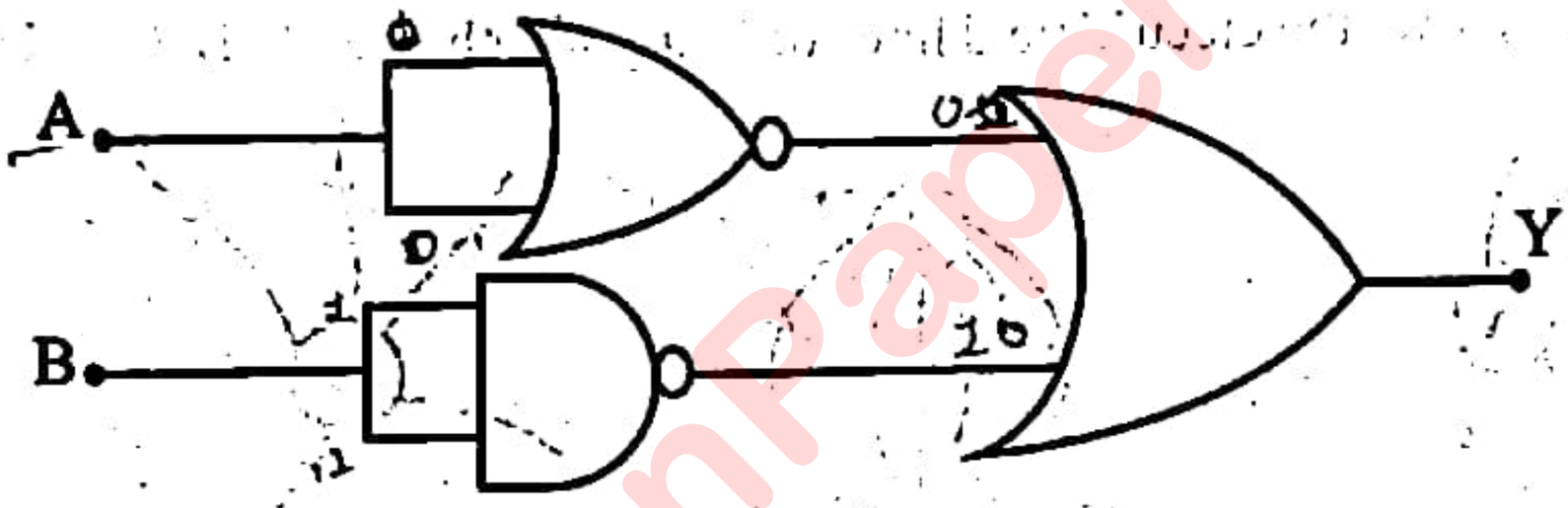
(C) 1.126×10^{-13} J (D) 1.632×10^{-13} J

9) The ratio of halflife and average life for a radioactive sample is _____.

(A) 2.303 (B) log (2)

(C) ln(2) (D) e^2

10) The given logic circuit behaves as _____ gate.



(A) NAND (B) NOR

(C) NOT (D) OR

11) In p-n junction solar cell, the ratio of thickness of p-Si wafer and n-Si layer is approximately _____.

(A) 300 (B) 1000

(C) 30 (D) 0.3

(Space for Rough Work)

$g - \frac{8b}{5xR} = \frac{65.63}{5x6563} = \frac{36}{5x6563}$

$e^{-1} = e^{-\lambda t}$

$1 = \lambda\tau$

$R \quad \tau = \frac{1}{\lambda} = \frac{T_{1/2}}{0.693}$

$0.000977 \times 10^{-10} \quad 0.693 = \frac{T_{1/2}}{\tau}$

9.77×10^{6}

$\lambda = \frac{0.693}{\lambda 25}$

$\ln \frac{R_0}{R_b} =$

$2.303 \log \frac{1.5625}{100} = -\lambda t$

A	B	Y	Y
1	1	0	1
0	1	1	0
1	0	1	0
0	0	1	0

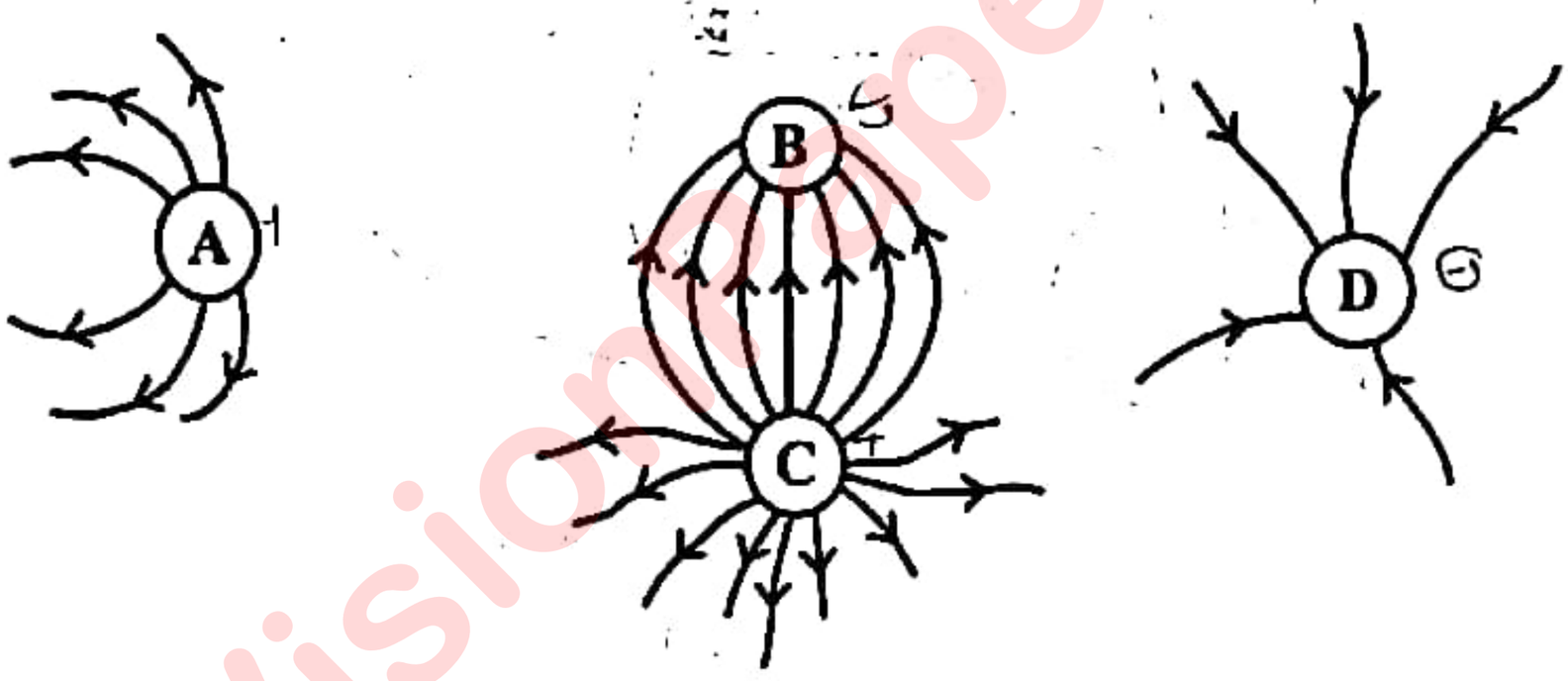
12) The minimum band gap (E_g) of semiconductors used for fabrication of visible LED is _____ eV.

(A) 1.8
(B) 1.4
(C) 2.3
(D) 3.0

13) Consider a uniform electric field $\vec{E} = 3\times10^3 \hat{k}$ N/C. The electric flux of this field through a square of 20 cm on a side whose plane is parallel to yz plane is _____ Nm^2/C.

(A) 90
(B) 120
(C) 60
(D) Zero

14) Figure shows the electric field lines of four point charges A, B, C and D.



Which charge has the maximum magnitude?

(A) C charge
(B) B charge
(C) A charge
(D) D charge

(Space for Rough Work)

$A = 20\ L^2 = 20\times20\times10^{-4} = 4\times10^{-2}$

$\phi = EA\cos0^\circ$

$= 3\times10^3 \times 4\times10^{-2}$

$= 120$

15) A polythene piece rubbed with wool is found to have a negative charge of 3.52×10^{-7} C. What is the number of electrons transferred?

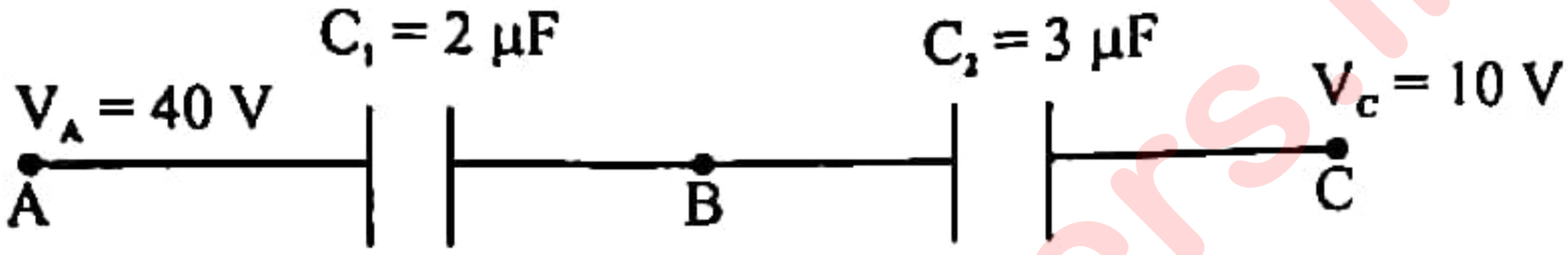
(A) 1.1×10^{12}

(B) 2.2×10^{12}

(C) 4.4×10^{12}

(D) 5.5×10^{12}

16) The potential at the point B in the given figure is _____ V.



(A) 30

(B) 50

(C) 22

(D) 25

17) A charge Q is placed at the centre of circle of radius 10 cm. Find the work done in moving a charge q between any two points lying on the arc of this circle.

(A) KQq J

(B) 0.1 KQq J

(C) 0.5 KQq J

(D) 0 J

18) The dielectric strength of air is _____.

(A) 3×10^9 V/cm

(B) 3×10^9 V/mm

(C) 3×10^9 V/μm

(D) 3×10^9 V/m

(Space for Rough Work)

$Q = ne$

$\frac{3.52\times10^{-7}}{1.6\times10^{-19}} = n$

$\times10^{12}$

$2\pi r =$

$V_A =$ 2×Q μF +

!!

$W = \frac{KQq_1}{r}$

$= \frac{K(Q)(q)}{10\times10^{-2}}$

$= \frac{KQq}{10^{-1}}$

19) Unit of mobility in terms of fundamental units is _____.

(A) $kg^{-1}s^{-2}A$ (B) kgs^2A

(C) $kg^{-1}s^2A$ (D) $kg^{-1}s^2A^{-1}$

20) A metal rod of length 10 cm and a rectangular cross-section of $1cm \times \frac{1}{2}cm$ is connected to a battery across opposite faces. The resistance will be _____.

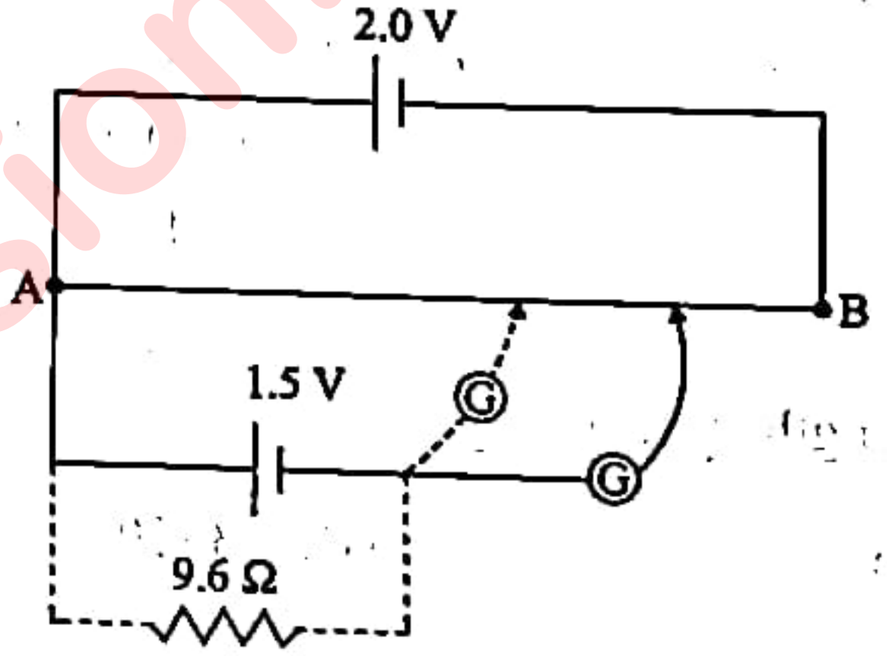
(A) Maximum when the battery is connected across 10 cm × 1 cm

(B) Maximum when battery is connected across $1cm \times \frac{1}{2}cm$ faces

(C) Maximum when the battery is connected across $10cm \times \frac{1}{2}cm$

(D) Same irrespective of three faces

21) Figure shows 2.0 V potentiometer used for the determination of internal resistance of 1.5 V cell. The balance point of cell in open circuit is 77.4 cm. When a resistor of 9.6 Ω is used in the external circuit of the cell, the balanced point shifts to 64.5 cm length of the potentiometer wire. The internal resistance of the cell is _____Ω.



(A) 1.92 (B) 1.5

(C) 1.62 (D) 0.96

(Space for Rough Work)

$$\frac{Vd}{E} = \frac{m}{s^2}\cdot\frac{C}{N} = \frac{m}{s^2}\cdot\frac{s^2}{Kgm}\cdot A$$

$$\therefore \quad V = Ed \qquad F = qE$$

$$q \qquad ms^2 \cdot A$$

$$Kg^{-1}$$

22) An electron is projected with uniform velocity along the axis of current carrying long solenoid. Which of the following is true?

(A) The electron path will be circular about the axis

(B) The electron will be accelerated along the axis

(C) The electron will experience a force at 45° to the axis and hence execute a helical path

(D) The electron will continue to move with uniform velocity along the axis of the solenoid

23) An electron is moving at a speed of 3.2×10^7 m/s in a magnetic field of 12×10^{-4} T perpendicular to the direction of motion of electron. The radius of the path of the electron is _____ cm. ($e = 1.6 \times 10^{-19}$ C and $m_e = 9 \times 10^{-31}$ kg)

(A) 30 (B) 13

(C) 15 (D) 26

24) A solenoid of length 0.5 m has a radius of 1 cm and is made up of 250 turns. It carries a current of 5 A. What is the magnitude of the magnetic field inside the solenoid?

(A) 3.14×10^{-3} T (B) 6.28×10^{-3} T

(C) 62.8×10^{-3} T (D) Zero

(Space for Rough Work)

$B = n\mu_0 I$

$= \mu_0 \frac{N}{l} I$

$= 4\pi \times 10^{-7} \times \frac{250}{0.5} \times 5$

$= \frac{4 \times 3.14 \times 10^{-7} \times 250 \times 10}{5}$

$= 3140 \times 10^{-6}$

$= 3.14 \times 10^{-3}$

$R = \frac{mv}{qB}$

$= \frac{1.5 \times 10^{-1}}{15 \times 10^{-2}}$

$\lambda = \frac{mv}{qB}$

$= \frac{9 \times 10^{-31}}{1.6 \times 10^{-19}} \times \frac{3.2 \times 10^{7}}{12 \times 10^{-4}}$

25) The galvanometer has a resistance of 18 Ω. Calculate the value of shunt to increase the range of galvanometer by 10 times.

(A) 4 Ω
(B) 1 Ω
(C) 3 Ω
(D) 2 Ω

26) A bar magnet having pole strength q_m and magnetic moment m is divided into two equal parts along its length. The new pole strength is _____ and the magnetic moment is _____ respectively.

(A) $q_m, \frac{m}{2}$
(B) $\frac{q_m}{2}, m$
(C) $\frac{q_m}{2}, \frac{m}{2}$
(D) q_m, m

27) A solenoid has a core of a material with relative permeability 400. The windings of solenoid are insulated from the core and carry a current of 2 A. If the number of turns is 1000 per metre, the magnetic field B inside the solenoid is _____T.

(A) 1.5
(B) 1.0
(C) 1.8
(D) 2.0

28) The dimensional formula of self inductance is _____.

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

(Space for Rough Work)

$\mu = \mu_0\mu_r$

$B = \mu_0\mu_r \times 1000 \times 2$

$= 4\pi \times 10^{-7} \times 400 \times 1000 \times 2$

$= \frac{\mu_0 N I'}{100}$ 10^{-2}

$\frac{\varepsilon \times t}{\phi}$

$\frac{V \times S}{B \cdot A}$

$\frac{V \times S}{\bar{V} \times S}$

$\varepsilon = -L\frac{d\phi}{dt}$

$\frac{W}{q} \times \frac{t}{}$

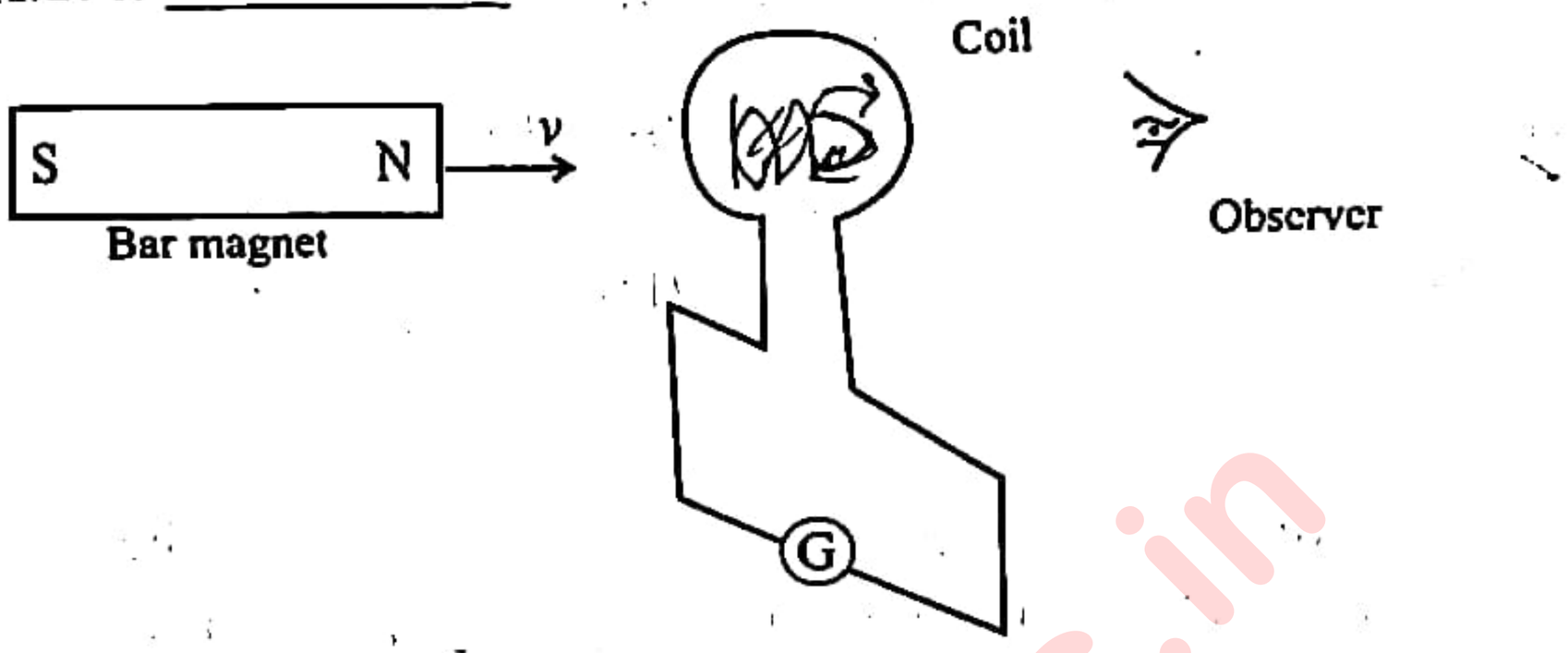
$m = q_m \cdot l$

$q_m = \frac{m}{2} \cdot l$

$R = \frac{I_G R_G}{I - I_G}$

$= \frac{I_G \times 18}{9 I_G} = \frac{18}{9}$

29) As shown in the figure a bar magnet is moving towards a stationary coil with constant speed v. The direction of induced current in the coil observed by the observer on R.H.S. is _____.



(A) Anticlockwise

(B) Clockwise

(C) Current changes its direction randomly

(D) Induced current will not be produced

30) A circular coil of area 2 cm^2 is placed in a magnetic field of 3T perpendicularly. The coil has 10 turns and 5 Ω resistance. Now the coil is removed from magnetic field in 0.2 s. The value of induced charge flowing through the coil is _____.

(A) 1.1 mC

(B) 1.9 mC

(C) 1.2 mC

(D) Zero

(Space for Rough Work)

$10-21$
$M^1L^0T^{-2}A^{-1}$
$2=\pi r$
$\frac{2}{\pi}=r^2$
$\frac{2\times10^{-4}}{3.14}$
$0.64\times10^{-4}=0.2$
$0.8\times10^{-2}=r$

$A=2cm^2$
$B=3T$
$N=10$ turns
$R=5\Omega$

$B=\frac{\mu_0 NI}{2\pi r}$
$\frac{B\cdot 2\pi r\, t}{\mu_0 N}=1$
$\frac{3\times7\times3.14\times0.4\times10^{-2}}{4\pi\times10^{-7}\times10}$
$3\times0.4\times10^{4}$
$1.2\times10^{4}\times0.2$

$\varepsilon=BVl$
$\frac{3\times2\times0.8\times10^{-2}\times0.2}{4\times3.14\times10^{-7}\times10}$
0

31) A pure inductor of 25.48 mH and a pure resistor of 8Ω are connected in series with an A.C. source of frequency 50 Hz. The phase difference between current (I) and voltage (V) in this circuit is _____.

(A) 45°
(B) 30°
(C) 60°
(D) 90°

32) The charge of the capacitor in L-C oscillatory circuit, when the energy associated with inductor and capacitor are equal, is _____. [Q_0 is the initial charge on the capacitor].

(A) $\frac{Q_0}{2}$
(B) Q_0
(C) $\frac{Q_0}{\sqrt{3}}$
(D) $\frac{Q_0}{\sqrt{2}}$

33) The output of a stepdown transformer is measured to be 24V when connected to a 12 watt light bulb. The value of peak current (I_m) is _____ A.

(A) 1.41
(B) 0.71
(C) 2
(D) 2.83

(Space for Rough Work)

test $\left(\frac{X_L}{R}\right) = \frac{\omega L}{R} = \left(\frac{2\pi r \times 25.48 \times 10^{-3}}{8}\right)$

$= \frac{2 \times 3.14 \times 50 \times 25.48 \times 10^{-3}}{8}$

$= 1500 \times 10^{-3}$

$P = I_{rms}^2 R$

$P = I_{rms}^2 \frac{V}{I}$

$= IV.$

$\frac{P}{V} = \frac{12}{24\Omega} = I_{rms} = 1.5$

$\frac{\sqrt{2}}{2} \cdot 2 = I_m$ $\frac{15}{10} = \frac{3}{2}$

34) If $\vec{E}$ and $\vec{B}$ represent electric and magnetic field vectors of electromagnetic wave, the direction of propagation of electromagnetic wave is along

(A) $\vec{B}$

(B) $\vec{E}$

(C) $\vec{B} \times \vec{E}$

(D) $\vec{E} \times \vec{B}$

35) Frequency range of visible light is _____.

(A) 400 THz to 700 THz

(B) 400 GHz to 700 GHz

(C) 400 MHz to 700 MHz

(D) 400 kHz to 700 kHz

36) The refractive index of air with respect to vacuum is _____.

(A) 1.0029

(B) 1

(C) 1.00029

(D) 1.029

37) A lens of power – 4.0 Diopter. It means _____.

(A) Concave lens of focal length –25.0 cm

(B) Concave lens of focal length – 0.25 cm

(C) Convex lens of focal length +0.25 cm

(D) Convex lens of focal length +25.0 cm

(Space for Rough Work)

$n = \frac{c}{v}$

38) The earth takes 24 h to rotate once about its axis. How much time does the Sun takes to shift by 1 minute viewed from the earth.

(A) 4 minutes

(B) 40 s

(C) 4 s

(D) 40 minutes

39) For what distance a ray optics a good approximation when the aperture is 6 mm wide and the wavelength is 6000 Å ?

(A) 50 m

(B) 60 m

(C) 40 m

(D) 10 m

40) Monochromatic light of wavelength 480 nm is incident from air to glass surface. Refractive index of glass is 1.5. The ratio of the frequency of the incident and refracted light is _____.

(A) 2 : 1

(B) 1 : 2

(C) 4 : 1

(D) 1 : 1

(Space for Rough Work)

$z = \frac{a^2}{\lambda}$

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

$= 36 \times 10$

$= 6 \times 0$

$= 60\ m$

$24 \times 3600 \rightarrow 360$

$1 \leftarrow 1$

$\frac{24 \times 3600}{360}$

240 s

$\frac{240}{60}$

$\frac{c}{\lambda}$

$\frac{n\nu}{\lambda}$

$\frac{n\nu}{\frac{n\nu}{\lambda}}$

$\frac{10}{10} : \frac{15}{10}$

2 : 3

CHEMISTRY

41) Which one is the common name of the compound $CH_2 = CH - CHO$?

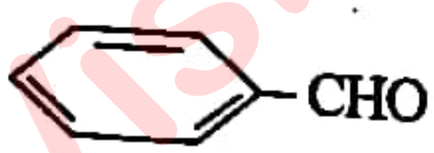
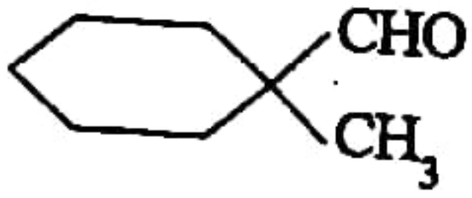
(A) Mesityl Oxide
(B) Prop-2-Enal
(C) Acrolein
(D) Propanal-1-ene

42) What is the correct order of acidity of compound (I), (II) and (III)?

I) 4-Nitrobenzoic acid
II) 4-Methoxy Benzoic acid
III) Benzoic acid

(A) I > III > II
(B) I > II > III
(C) I < II < III
(D) I < III < II

43) Which of the following compound does not give cannizzaro reaction?

(A) 
(B) 
(C) HCHO
(D) CH_3CHO

(Space for Rough Work)

44) Which compound will give Hoffmann bromamide degradation reaction?

(A) $Ar-CONH_2$ (B) $Ar-NH_2$

(C) $Ar-NO_2$ (D) $Ar-CH_2NH_2$

45) Benzene diazonium chloride reacts with phenol in basic medium to give product. How many σ (sigma) and π (pi) bonds are present in that product?

(A) 16 - σ and 7 - π (B) 16 - σ and 6 - π

(C) 26 - σ and 7 - π (D) 26 - σ and 6 - π

46) Methylamine reacts with HNO_2 to form?

(A) $CH_3-O-N=O$ (B) CH_3-OH

(C) CH_3-O-CH_3 (D) CH_3-CHO

47) Which statement is not correct for Glucose?

(A) When heated with HI it gives n-Hexane

(B) It is aldohexose

(C) It react with Hydroxyl amine

(D) It contain furanose structure

(Space for Rough Work)

48) Which base is not present in the DNA structure?

(A) Uracil
(B) Adenine
(C) Guanine
(D) Cytosine

49) What are two monomers of Glyptal polymer?

(A) Ethylene Glycol and Isophthalic acid
(B) Ethane - 1, 2-Diol and Phthalic acid
(C) Ethylene Glycol and Terephthalic acid
(D) Formaldehyde and Ethylene Glycol

50) Which polymer is used in making non-stick surface coated Utensils?

(A) PHBV
(B) Nylon 6,6
(C) Teflon
(D) Buna - N

51) Which artificial sweetening agent is limited in for cold food and soft drinks?

(A) Sucralose
(B) Alitame
(C) Saccharin
(D) Aspartame

(Space for Rough Work)

52) Polyethylene-glycol is used in the preparation of which types of detergent?

(A) Anionic detergent

(B) Non Ionic detergent

(C) Cationic detergent

(D) Soap

53) The correct order of the packing efficiency in different types of unit cell is _____.

(A) fcc > bcc > simple cubic

(B) fcc < bcc < simple cubic

(C) fcc < bcc > simple cubic

(D) fcc = bcc > simple cubic

54) Which of the following defect obtained by heating of zinc-oxide?

(A) Impurity defect

(B) Metal deficiency defect

(C) Stoichiometric defect

(D) Metal excess defect

(Space for Rough Work)

55) Which of the following aqueous solution has highest boiling point?

(A) 0.1 M KNO_3

(B) 0.1 M urea

(C) 0.1 M $K_4[Fe(CN)_6]$

(D) 0.1 M NH_4NO_3

56) We have three aqueous solutions of CH_3COONa labelled as A, B and C with concentration 0.1 M; 0.01 M and 0.001 M respectively. The value of Van't Hoff factor (i) for these solutions will be in order _____.

(A) $i_A > i_B > i_C$

(B) $i_A < i_B < i_C$

(C) $i_A = i_B = i_C$

(D) $i_A < i_B > i_C$

57) What is the osmotic pressure (π) of 0.02 M solution of NaCl?

(A) 0.01 RT

(B) 0.02 RT

(C) 0.04 RT

(D) 0.002 RT

58) Resistance of a conductivity cell filled with 0.1 M KCl solution is 100 Ω and conductivity of solution is 1.29 s/m. Then what will be the value of conductivity cell constant.

(A) 1.29 cm^{-1}

(B) 1.29 m^{-1}

(C) 1.24 cm^{-1}

(D) 0.248 m^{-1}

(Space for Rough Work)

$K = G^* \cdot C$

$K = G^* \cdot \frac{l}{R}$

1.29×100

$129\ m^{-1}$

$1\ cm$

$1 \rightarrow 100$

$129 \rightarrow ?$

$0.1 \longrightarrow 0$

$\alpha \quad 0.1-\alpha \qquad \alpha \quad \alpha$

59) Which of the following is correct Nearst equation for the given electrochemical cell?

$$Mg_{(s)}\left|Mg^{2+}_{(aq)}\,(0.1M)\right\|Cl^{-}_{(aq)}\,(0.1M)\left|Cl_{2(g)}\,(1\,bar)\right|Pt_{(s)}$$

(A) $E_{cell}=E^{o}_{cell}-\frac{0.059}{2}\log\frac{\left[Cl^{-}\right]^{2}}{\left[Mg^{2+}\right]}$

(B) $E_{cell}=E^{o}_{cell}-\frac{0.059}{2}\log\frac{\left[Mg^{2+}\right]}{\left[Cl^{-}\right]^{2}}$

(C) $E_{cell}=E^{o}_{cell}-\frac{0.059}{2}\log\frac{1}{\left[Mg^{2+}\right]\left[Cl^{-}\right]^{2}}$

(D) $E_{cell}=E^{o}_{cell}-\frac{0.059}{2}\log\left[Mg^{2+}\right]\left[Cl^{-}\right]^{2}$

(Space for Rough Work)

$Mg \longrightarrow Mg^{2+} + 2e^{-}$

$2Cl_2 + 2e^{-} \longrightarrow 2Cl^{-}$

60) Which of the following chemical reaction occur at anode during electrolysis of higher concentrated H_2SO_4 solution?

(A) $2SO_{4(aq)}^{2-} \rightarrow S_2O_{8(aq)}^{2-} + 2e^-$

(B) $2H_2O_{(l)} \rightarrow O_{2(g)} + 4H_{(aq)}^+ + 4e^-$

(C) $H_2O_{(l)} + e^- \rightarrow \frac{1}{2}H_{2(g)} + 2OH_{(aq)}^-$

(D) $S_2O_{8(aq)}^{2-} + 2e^- \rightarrow 2SO_{4(aq)}^{2-}$

61) For which of the following graph of first order reaction the value of slope will be $K/2.303$?

(A) $\log [R]_0/[R] \rightarrow t(\text{Time})$

(B) $\log [R]/[R]_0 \rightarrow t(\text{Time})$

(C) $\ln [R]_0/[R] \rightarrow t(\text{Time})$

(D) $\ln [R]/[R]_0 \rightarrow t(\text{Time})$

(Space for Rough Work)

$\ln[R] = Kt + C$

$\ln[R] = Kt + \ln[R_0]$

$\ln \frac{[R]}{[R_0]} = Kt$

2.

62) Which will be the unit of rate constant for the reaction having Rate = $K[A]^{1/2}.[B]^{3/2}$?

(A) $Second^{-1}$

(B) $Mol/lit.Sec^{-1}$

(C) $Mol^{-1}.lit.Sec^{-1}$

(D) $(Mol/lit)^2.Sec^{-1}$

63) A reaction is first order in terms of A and second order in terms of B. What will be the rate of reaction, if concentration of B is increased two times?

(A) 4-Times

(B) 2-Times

(C) 8-Times

(D) 16-Times

64) Which of the following statement is incorrect for physisorption?

(A) It arises because of Van der Waal's Force

(B) It is reversible in nature

(C) It is not specific in nature

(D) High temperature is favourable for adsorption. It increases with increase in temperature

65) Which is correct order of flocculating power in the coagulation of As_2S_3 Sol?

(A) $PO_4^{3-} > SO_4^{2-} > Cl^-$

(B) $Al^{3+} > Ba^{2+} > Na^+$

(C) $Al^{3+} < Ba^{2+} < Na^+$

(D) $PO_4^{3-} < SO_4^{2-} < Cl^-$

(Space for Rough Work)

66) Mention percentage of Ag (Silver) in German silver alloy.

(A) 20-30%
(B) 10%
(C) 0.0%
(D) 40-50%

67) Which of the following ore is not in oxide form?

(A) Malachite
(B) Haematite
(C) Magnetite
(D) Zincite

68) By thermal decomposition of which of the following compound very pure dinitrogen gas can be obtained?

(A) Ammonium dichromate
(B) Ammonium Chloride
(C) Sodium Azide
(D) Barium Nitrate

69) Which of the following oxide show acidic property?

(A) MnO_2
(B) MnO
(C) Mn_2O_7
(D) Mn_2O_3

70) Which of the following are peroxo acids of Sulphur?

(A) H_2SO_5 and $H_2S_2O_7$
(B) H_2SO_5 and $H_2S_2O_8$
(C) $H_2S_2O_7$ and $H_2S_2O_8$
(D) $H_2S_2O_6$ and $H_2S_2O_7$

(Space for Rough Work)

71) When alkaline $KMnO_4$ is treated with KI, Iodide ion is oxidised to _____.

(A) IO^-

(B) I_2

(C) IO_3^-

(D) IO_4^-

72) In the electronic configuration of which of the following element-electron is arranged in 5d orbital?

(A) $_{64}Gd$

(B) $_{63}Eu$

(C) $_{65}Tb$

(D) $_{66}Dy$

73) What kind of isomerism exists between $[Cr(H_2O)_6]Cl_3$ and $[Cr(H_2O)_5Cl]Cl_2 \cdot H_2O$?

(A) Ionisation

(B) Solvate

(C) Coordination

(D) Linkage

74) How $t_{2g}^4 e_g^0$ configuration is possible for d^4 ion during crystal Field splitting in Octahedral complex?

(A) $\Delta_o = P$

(B) $\Delta_o \leq P$

(C) $\Delta_o < P$

(D) $\Delta_o > P$

(Space for Rough Work)

75) Which of the following species is not expected to be a ligand?

(A) NH_4^+ (B) NO

(C) $H_2N-CH_2-CH_2-NH_2$ (D) CO

76) The following results are as under for the reaction S + Nu → Product by which reaction mechanism this reaction occurs?

Experiment	[S]	[Nu]	Rate $\left(\frac{\text{Concentration}}{\text{Time}}\right)$
1	0.1	0.1	2.2×10^{-3}
2	0.2	0.1	4.4×10^{-3}
3	0.1	0.2	4.4×10^{-3}

(A) Electrophilic addition (B) S_N1

(C) S_N2 (D) Electrophilic substitution

77) Which one is a reaction to prepare CCl_2F_2 (Freon-12) from CCl_4?

(A) Wurtz Reaction (B) Finkelstein

(C) Elimination Reaction (D) Swartz Reaction

(Space for Rough Work)

78) How much gram of ethanol is required to obtain 280 ml dihydrogen at S.T.P. by reaction of C_2H_5OH with Na-Metal? (Mol. wt. of ethanol = 46 g/mol).

(A) 2.3

(B) 4.6

(C) 1.15

(D) 0.575

79) Which product is obtained between reaction of CH_3ONa and $(CH_3)_3CBr$?

(A) Only Ether

(B) Only Alkene

(C) Both alkene and ether

(D) Alcohol

80) Which of the following alcohol undergo dehydration reaction with Cu (Copper) metal at 573 K temperature?

(A) Secondary and Tertiary

(B) Primary & Secondary

(C) Primary and Tertiary

(D) Only Tertiary

(Space for Rough Work)

$n = \frac{w}{M}$

$\frac{V}{22.4L} \times 46 = w$

$\frac{280}{22 \times 1000} \times 46 \times 10$