



MOCK TEST

SUBJECT : PHYSICS (THEORY)

CLASS - XII CBSE

M.M. : 70

TIME : 3 HRS

| | | |
|---------------|-------------------------------|---------------------|
| NOTE : | Q.No. 1 to 5 contain | 1 Marks each |
| | Q.No. 6 to 12 contain | 2 Marks each |
| | Q.No. 13 to 24 contain | 3 Marks each |
| | Q.No. 25 to 27 contain | 5 Marks each |

-
- Q.1** How does the force between two points charges change if dielectric constant of medium in which they are kept increases.
- Q.2** A carbon resistor is marked in green, red and orange bands. What is the approximate resistance of the resistor ?
- Q.3** What is angle of dip at a place, where horizontal and vertical components of earth's magnetic field are equal ?
- Q.4** Why does the acceleration of a magnet falling through a long solenoid increase ?
- Q.5** Why are microwaves used in radar ?
- Q.6** If current sensitivity of a moving coil galvanometer is increased by 20%, its resistance also increases by 1.5 times. How will voltage sensitivity of galvanometer be affected ?
- Q.7** Briefly explain how Lenz's law supports law of conservation of energy.
- Q.8** What is meant by amplitude modulation ? What is the depth of modulation ?
- OR**
- Violet light is incident on a converging lens of focal length f . State with reason how focal length of lens will change if violet light is replaced by red light.
- Q.9** What is polarising angle of a medium of refractive index $\sqrt{3}$?
- Q.10** Draw a ray diagram to illustrate the image formation by a Newton's type reflecting telescope.
- Q.11** What change in interference pattern in Young's double slit experiment will be observed when
- Distance between the slit is reduced.
 - If the apparatus is immersed in water ?

Q.12 An infinite plane sheet of charge density 10^{-8} C/m^2 is held in air. In this situation how far apart are two equipotential surfaces where potential difference is 5 V ?

Q.13 With the help of a circuit diagram, explain the working of a full wave rectifier.

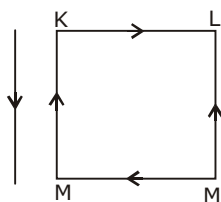
Q.14 Derive an expression for the maximum range upto which signals from a T.V. tower can reach.

Q.15 A radioactive nucleus A decays as follows



If the mass number and atomic number of A_2 are 176 and 71 respectively, what are the mass numbers and atomic numbers of A_1 and A ? Which of these three elements are isobars ?

Q.16 Explain with reason, in which direction does the current loop K L M N move when kept near an infinitely long straight wire carrying current as shown in the figure.



Q.17 A 60W lamp is rated at 0.8 W/candela. Calculate

- Luminous intensity of the lamp.
- Luminous flux of the lamp and
- Luminance at a distance of 2m from the lamp.

Q.18 Two identical cells each of e.m.f. 2V and unknown internal resistance are connected in parallel. This combination is connected to a 5 ohm resistor. If the terminal voltage across the cells is 1.5V, what is the internal resistance of each cell ?

Q.19 Using Biot Savart law, derive an expression for magnetic field at the centre of a circular coil of radius r having N number of turns. Indicate the direction of magnetic field.

Q.20 Two metals X and Y have work functions 2eV and 5eV respectively. Which metal will emit electrons when irradiated with light of wavelength 400 nm and why ?

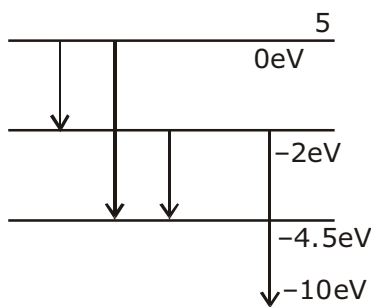
Q.21 The output of a two input NAND gate is fed to a NOT gate. Write down the truth table for the final output of the combination.

OR

The input resistance of a common emitter amplifier is 2k ohm and a.c. current gain is 20. If the load resistor used is 5k ohm, calculate (i) voltage gain of the amplifier and (ii) the transconductance of transistor used.

Q.22 What is the difference between analogue and digital communications ?

- Q.23** Define resistivity of a conductor. Explain the variation of resistance with temperature in (i) metallic conductors, and (ii) semiconductors.
- Q.24** Two tangent galvanometers A and B have number of turns in the ratio of 1 : 3 and diameters in the ratio of 1 : 2. Explain with reason (i) which galvanometer has greater reduction factor ? (ii) Which galvanometer shows greater deflection when both are connected in series to a d.c. source ?
- Q.25** (i) Prove that the radius of nth Bohr orbit of an atom is directly proportional to n^2 , where n is the principal quantum number.
 (ii) The energy levels of an atom are shown in figure. Which one of transition will result in emission of a photon of wavelength 275 nm ?



- Q.26** Define dipole moment of an electric dipole. Show mathematically that the electric field intensity due to a short dipole at a distance d along the axis is twice the intensity the same distance along equatorial line.

OR

Explain the principle, construction and working of van de Graff generator.

- Q.27** Distinguish between reactance and impedance. When a series combination of inductance and resistance are connected with 10W, 50Hz a.c. source, a current of 1A flows in the circuit. The voltage leads the current by a phase angle of $\pi/3$ radian. Calculate the value of resistance and inductance.



MOCK TEST

SUBJECT : CHEMISTRY (THEORY)

CLASS - XII CBSE

M.M. : 70

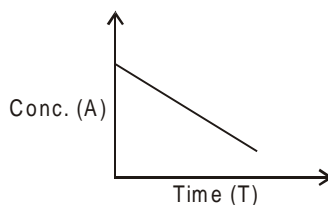
TIME : 3 HRS

| | | |
|---------------|-------------------------------|---------------------|
| NOTE : | Q.No. 1 to 8 contain | 1 Marks each |
| | Q.No. 9 to 18 contain | 2 Marks each |
| | Q.No. 19 to 27 contain | 3 Marks each |
| | Q.No. 28 to 30 contain | 5 Marks each |

Use log tables only if necessary and calculators are not allowed :

- Q.1** Calculate the number of atoms in a cubic based unit cell having one atom at each corner and two atoms on each body diagonal.
- Q.2** Calculate the mole fraction of C_2H_5OH and H_2O in a sample of rectified spirit which contains 95% of C_2H_5OH by weight.
- Q.3** If specific conductivity of N/50 KCl sol. at 298 K is $0.002765 \text{ ohm}^{-1}$ and resistance of cell containing the sol is 100 ohm, calculate the cell constant.
- Q.4** Given the IUPAC name of the following
- $$(CH_3)_2C = CH - \underset{\begin{array}{c} || \\ O \end{array}}{C} - CH_3$$
- Q.5** How do you account for the solubility of glucose and fructose in water.
- Q.6** Direct nitration of aniline is not carried out. Explain why.
- Q.7** Sulphur dioxide is more powerful reducing agent in alkaline medium than in acidic medium.
- Q.8** Predict the shape of ClF_3 on the basis of VSEPR theory.
- Q.9** Write the chemical equations for all the steps involved in the rusting of iron. Give any one method to prevent the rusting of iron.
- Q.10** How will you distinguish between the following :
- Methyl alcohol and ethyl alcohol.
 - Allyl alcohol and vinyl alcohol.
- Q.11** Define the following terms :
- Amylose
 - Amylopectine

Q.12 Consider the reaction $A \xrightarrow{K} P$. The change in concentration of A with time is shown in the following plot.



- Predict the order of the reaction.
- Derive the expression for the time required for the completion of the reaction.

Q.13 Give reasons for the following :

- Aniline does not undergo Friedal Craft alkylation.
- Although $-NH_2$ group is ortho and para directing group, nitration of aniline gives alongwith o- and p- derivatives m-derivative also.

Q.14 An element (X) with atomic mass of 60g/mol has density of 6.23 g/cm. If the edge length of its cubic unit cell is 400 pm, identify the type of cubic unit cell. Calculate the radius of an atom of this element.

Q.15 Explain the following :

- Transition metal acts as a catalyst.
- Transition metal forms coloured compound.

Q.16 Account for the following :

- Among the halogens F_2 is the strongest oxidising agent ?
- Acidity of oxo acid of chlorine is



Q.17 Give explanations for the following :

- Presence of a base is needed in the ammonolysis of alkyl halides.
- Aromatic 1° amines cannot be prepared by Gabriel phthallimide reaction.

Q.18 Write down the products when lactose is hydrolysed and draw haworth projections for them.

Q.19 Give the mechanism of Reimer - Timann reaction.

Q.20 Write down the equations for hydrolysis of XeF_4 and XeF_6 . Which of these two reactions is a redox reaction.

- Which will have a higher b.p. ? 1-chloroethane or 2-methyl-2-chlorobutane.
- Glucose do not give 2, 4 DNP test. What does it indicates.
- Allyl chloride is more reactive than vinyl chloride.

Q.22 The activation energy of a reaction is 94.14 kJ/mol and value of rate constant at 313 K is $1.8 \times 10^{-5} \text{ sec}^{-1}$. Calculate the frequency factor A.

Q.23 A solution containing 6g of a solute dissolved in 250 cm³ of water gave an osmotic pressure of 4.5 atmosphere at 27°C. Calculate the boiling point of the solution. The molal elevation constant for water is 0.52°C per 1000 gm.

Q.24 A zinc rod is dipped in 0.1M solution of ZnSO₄. The salt is 95% dissociated at this dilution at 298 K. Calculate the electrode potential ($E_{\text{Zn}^{++}/\text{Zn}}^{\circ} = -0.76 \text{ V}$)

Q.25 Give reasons for the following :

- (i) CN⁻ is known but CP⁻ ion is not known.
- (ii) NO₂ dimerizes to form N₂O₄.
- (iii) ICl is more reactive than I₂.

Q.26 Explain the following :

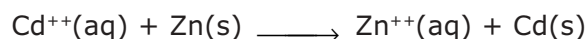
- (i) Chlorine water is both oxidizing and bleaching properties.
- (ii) H₃PO₂, H₃PO₃ acts as good reducing agents while H₃PO₄ does not.
- (iii) When ozone reacts with KI solution, violet vapours are produced.

Q.27 Complete the following reactions A, B and C.

(i) $\text{A} + \text{H}_2(\text{g}) \xrightarrow{\text{Pd/BaSO}_4} (\text{CH}_3)_2\text{CH} - \text{CHO}$.

(ii) $\text{CH}_3 - \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}} - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3 + \text{NaOH} \longrightarrow \text{B} + \text{C}$.

Q.28 (a) Calculate the equilibrium constant for the reaction.



$$\text{if } E_{\text{Cd}^{++}/\text{Cd}}^{\circ} = -0.403 \text{ V}$$

$$E_{\text{Zn}^{++}/\text{Zn}}^{\circ} = -0.763 \text{ V}$$

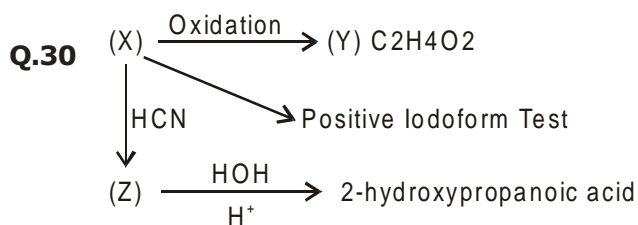
(b) When a current of 0.75 A is passed through a CuSO₄ sol. for 25 min., 0.369 g of copper is deposited at cathod. Calculate the atomic mass of copper.

(c) Fournished silver contains Ag₂S. Can this tarnish be removed by silver ware in an aluminium pan containing an inert electrolytic solution such as NaCl. The standard electrode potential for half reaction.



Q.29 An unknown aldehyde 'A' on reacting with alkali gives a β -hydroxy aldehyde, which loses water to form an unsaturated aldehyde 2-butenal. Another aldehyde 'B' undergoes disproportionate reaction in the presence of conc. alkali to form products (C) and (D). CH an aryl alcohol with $C_7H_8O_1$.

- Identify A and B
- Write the sequence of reactions.
- Name the product when (B) reacts with Zn-Hg/HCl.



- Write down structure for (X), (Y), (Z).
- Name the product when 'X' reacts with dil. NaOH.
- Write down the reactions involved.



MOCK TEST

SUBJECT : MATHS

CLASS - XII

M.M. : 100

TIME : 3 HRS

| | | |
|---------------|-------------------------------|---------------------|
| NOTE : | Q.No. 1 to 10 contain | 1 Marks each |
| | Q.No. 11 to 22 contain | 4 Marks each |
| | Q.No. 23 to 29 contain | 6 Marks each |

SECTION A

Q.1 If $A = \begin{bmatrix} \cos 2\theta & \sin 2\theta \\ -\sin 2\theta & \cos 2\theta \end{bmatrix}$, find A^2 .

Q.2 If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, show that $A^2 - 5A + 7I_2 = O$.

Q.3 Show that $\begin{vmatrix} b-c & c-a & a-b \\ c-a & a-b & b-c \\ a-b & b-c & c-a \end{vmatrix} = 0$.

Q.4 Show that the function $f(x) = 2x - |x|$ is continuous at $x = 0$.

Q.5 Find a , for which $f(x) = a(x + \sin x) + a$ is increasing.

Q.6 Evaluate $\int_0^{\pi/4} \sqrt{1 - \sin 2x} \, dx$.

Q.7 The slope of the curve at any point is the reciprocal of twice the ordinate at that point. The curve also passes through the point $(4, 3)$. Find the equation of the curve.

Q.8 Let $\vec{a} = \hat{i} - \hat{j}$, $\vec{b} = 3\hat{j} - \hat{k}$ and $\vec{c} = 7\hat{i} - \hat{k}$. Find a vector \vec{d} which is perpendicular to both \vec{a} and \vec{b} , and $\vec{c} \cdot \vec{d} = 1$.

Q.9 A speaks truth in 60% of the cases and B in 90% of the cases. In what percentage of cases are they likely to contradict each other in stating the same fact.

Q.10 A machine operates if all of its three components function. The probability that the first component fails during the year is 0.14, the probability that the second component fails is 0.10 and the probability that the third component fails is 0.05. What is the probability that the machine will fail during the year?

SECTION B

Q.11 If $f(x) = \sqrt{x}$ ($x \geq 0$) and $g(x) = x^2 - 1$ are two real functions, find fog and gof. Is fog = gof ?

Q.12 Solve
$$\begin{vmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{vmatrix} = 0.$$

Q.13 If the function $f(x)$ given by $f(x) = \begin{cases} 3ax + b & , \text{ if } x > 1 \\ 11 & , \text{ if } x = 1 \\ 5ax - 2b & , \text{ if } x < 1 \end{cases}$ is continuous at $x = 1$, find the values of a and b .

Q.14 Show that the function $f(x)$ given by $f(x) = \begin{cases} x \sin \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$ is continuous at $x = 0$.

Q.15 An airforce plane is ascending vertically at the rate of 100 km/h. If the radius of the earth is r km, how fast is the area of the earth, visible from the plane, increasing at 3 minutes after it started ascending?

Given that the visible area A at height h is given by $A = 2\pi r^2 \frac{h}{r+h}$.

Q.16 Evaluate : $\int \frac{\sin 2x}{(1 + \sin x)(2 + \sin x)} dx$.

Q.17 Evaluate : $\int \frac{2x}{(1+x^2)(3+x^2)} dx$.

Q.18 Evaluate $\int_0^{\pi/2} \frac{\cos x}{1 + \cos x + \sin x} dx$

Q.19 Solve the following differential equation : $(1 + x^2) \frac{dy}{dx} - 2xy = (x^2 + 2)(x^2 + 1)$.

Q.20 Find a vector whose magnitude is 3 units and which is perpendicular to the vectors \vec{a} and \vec{b} , where $\vec{a} = 3\hat{i} + \hat{j} - 4\hat{k}$ and $\vec{b} = 6\hat{i} + 5\hat{j} - 2\hat{k}$.

- Q.21** A bag contains 4 white and 2 black balls. Another bag contains 3 white and 5 black balls. If one ball is drawn from each bag, find the probability that
- Both are white ;
 - Both are black;
 - One is white and one is black;
- Q.22** Three urns A, B and C contain 4 red and 6 white; 3 red and 5 white; and 2 red and 4 white balls respectively. An urn is chosen at random and a ball is drawn from it. If the ball drawn is found to be red, find the probability that the ball was drawn from urn A.

SECTION C

- Q.23** Show that $f : [-1, 1] \rightarrow \mathbb{R}$, given by $f(x) = \frac{x}{x+2}$ is one-one. Find the inverse of the function $f : [-1, 1] \rightarrow \text{Range}(f)$.
- Q.24** If $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$, prove that $(aI + bA)^n = a^n I + na^{n-1} bA$.
Where I is a unit matrix of order 2 and n is a positive integer.
- Q.25** Water is dripping out from a conical funnel of semi-vertical angle $\frac{\pi}{4}$ at the uniform rate of $2 \text{ cm}^2/\text{sec}$ in its surface area through a tiny hole at the vertex in the bottom. When the slant height of the water is 4 cm, find the rate of decrease of the slant height of the water.
- Q.26** Find the area of the region included between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$, where $a > 0$.
- Q.27** If the direction cosines of a variable line in two adjacent positions be ℓ, m, n and $\ell + \delta\ell, m + \delta m, n + \delta n$, show that the small angle $\delta\theta$ between the two positions is given by $\delta\theta^2 = \delta\ell^2 + \delta m^2 + \delta n^2$.
- Q.28** Find the length and the foot of the perpendicular from the point $(1, 1, 2)$ to the plane $\vec{r} \cdot (2\hat{i} - 2\hat{j} + 4\hat{k}) + 5 = 0$.
- Q.29** Solve the following linear programming problem graphically :
Maximize $z = 8x + 7y$ subject to the constraints
 $3x + y \leq 66$
 $x + y \leq 45$
 $x \leq 20$
 $y \leq 40$
 $x, y \geq 0$.