

CODE -

SAMPLE TEST PAPER

Time : 2 :30 hours.

(Class X)

Maximum Marks : 240

Name :

Roll No.:

INSTRUCTIONS

Please read the instructions carefully. You are allotted 5 minutes specifically for this purpose.
You are not allowed to leave the examination hall before the end of the test.

[A] General :

1. Attempt ALL the questions. Answer have to be marked on the **OMR** sheets
2. This question paper contains **60 questions**.
3. The question paper consists of **Four Parts Mathematics (Q.No. 1 to 20), Physics (Q.No. 21 to 35), Chemistry (Q.No. 36 to 50), & Mental Ability (Q.No. 51 to 60)**
4. Blank spaces are provided at the bottom of each page for rough work. No additional sheets will be provided for rough work.
5. Blank paper, clipboard, log tapes, silde rules, calculators, cellular phones, pagers and electronic gadgets in any form are **NOT** allowed.
6. Do not Tamper / mutilate the **OMR sheet** or this booklet.
7. Do not break the seals of the question-paper booklet before instructed to do so by the invigilator.
8. **SUBMIT** the OMR sheet to the invigilator after completing the test & take away the test paper with you.

[B] Filling of OMR Sheet :

9. In all the parts, each question will have 4 choices out of which **only one choice is correct**
10. Use only Black/Blue ball point pen for filling the OMR sheet.
11. On the OMR sheet, darken the appropriate bubble for each character of your name, Registration No., Phone No. etc.

[C] Marking Scheme :

12. For each right answer you will be **awarded 4 marks** if you darken the bubble corresponding to the correct answer and **zero marks** if no bubble is darkened. In case of bubbling of incorrect answer, **minus one (-1)** mark will be awarded.

Best of Luck

PART - I (MATHEMATICS)**(SINGLE CORRECT ANSWER TYPE)**

This section contains (1-20) multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Q.1 Let x, y be the solution to the following system of equations :

$$(a - b)x + (a + b)y = a^2 - 2ab - b^2$$

$$(a + b)(x + y) = a^2 + b^2$$

Then, the value of xy is equal to

- (A) $2ab$ (B) $-2ab$ (C) ab (D) $-ab$

Q.2 If degree of both $f(x)$ and $[f(x) + g(x)]$ is 18, then degree of $g(x)$ can be

- (A) 18 (B) 9 (C) 6 (D) any one of these

Q.3 If $\cot(\alpha + \beta) = 0$, then $\sin(\alpha + 2\beta)$ can be

- (A) $-\sin\alpha$ (B) $\sin\beta$ (C) $\cos\alpha$ (D) $\cos\beta$

Q.4 The outer radius and inner radius of a 30 cm long cylindrical gold pipe are 14 cm and 7 cm respectively. It is filled with bronze. The densities of gold and bronze are 20 gm/cm^3 and 30 gm/cm^3 respectively. Find the weight of the cylinder formed.(in gm).

- (A) 66150π (B) 99225π (C) 132300π (D) 198450π

Space for rough work

Q.5 The p^{th} term of an AP is a and its q^{th} term is b . The sum of the first $(p + q)$ terms of the AP is

- (A) $\left(\frac{p+q}{2}\right)\left(2(a+b) + \frac{a-b}{p-q}\right)$ (B) $\left(\frac{p+q}{2}\right)\left(a+b + \frac{a-b}{2(p-q)}\right)$
 (C) $\left(\frac{p+q}{2}\right)\left(\frac{a+b}{2} + \frac{2(a-b)}{p-q}\right)$ (D) $\left(\frac{p+q}{2}\right)\left(a+b + \frac{a-b}{p-q}\right)$

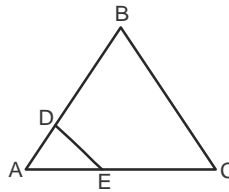
Q.6 Find the condition to be satisfied by the coefficients of the equation $px^2 + qx + r = 0$, so that the roots are in the ratio 3 : 4 .

- (A) $12q^2 = 49pr$ (B) $12q^2 = -49pr$ (C) $49q^2 = 12pr$ (D) $49q^2 = -12pr$

Q.7 The roots of the equation $4x^2 - 2\sqrt{5}x + 1 = 0$ are

- (A) $\sin 36^\circ, \sin 18^\circ$ (B) $\sin 18^\circ, \cos 36^\circ$
 (C) $\sin 36^\circ, \cos 18^\circ$ (D) $\cos 18^\circ, \cos 36^\circ$

Q.8 If each side of triangle ABC is length 4 and if AD is 1 cm and $ED \perp AB$. What is area of region BCDE



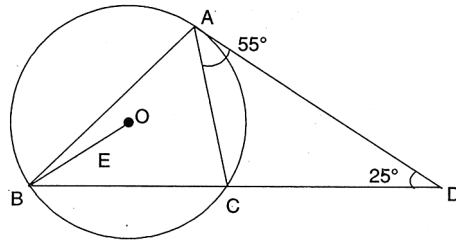
- (A) $8\sqrt{3} \text{ cm}^2$ (B) $4\sqrt{3} \text{ cm}^2$ (C) $4.5\sqrt{3} \text{ cm}^2$ (D) $3.5\sqrt{3} \text{ cm}^2$

Space for rough work

- Q.9 Find the sum of $\frac{0.3}{0.5} + \frac{0.33}{0.55} + \frac{0.333}{0.555} + \dots$ to 15 terms.
- (A) 10 (B) 9 (C) 3 (D) 5
- Q.10 Consider the equation $ax^2 + bx + c = 0$. If a and c are of opposite signs, what can you say about the nature of the roots of the equation ?
- (A) Real and unequal
(B) Real and equal
(C) Non-real
(D) Nothing can be said -the information is insufficient
- Q.11 The arithmetic mean of the series 1, 3, 3^2 , 3^{n-1} is _____ .
- (A) $\frac{3^n}{2n}$ (B) $\frac{3^n - 1}{2n}$ (C) $\frac{3^{n-1}}{n + 1}$ (D) None of these
- Q.12 Which of the following are the roots of $|y|^2 - |y| - 12 = 0$?
- (a) 4 (b) -4 (c) 3 (D) -2
- (A) Both (a) and (b) (B) Both (c) and (b)
(C) (a), (b), (c) and (d) (D) None of the above

Space for rough work

- Q.13 In the shown figure, O is the centre of the circle and AD is a tangent to the circle at A. If $\angle CAD = 55^\circ$ and $\angle ADC = 25^\circ$, then $\angle ABO =$



- (A) 10° (B) 15° (C) 20° (D) 25°
- Q.14 Given $ax^2 + bx + c$ is a quadratic polynomial in x and leaves remainders 6, 11 and 18 respectively when divided by $(x+1)$, $(x+2)$ and $(x+3)$. Find the value of $a + b + c$.
- (A) 1 (B) 2 (C) 3 (D) 4
- Q.15 Let α, β be the roots of $ax^2 + 2bx + c = 0$ and γ, δ be the roots of $px^2 + 2qx + r = 0$. If $\alpha, \beta, \gamma, \delta$ are in geometric progression, which of the following is true?

(A) $\frac{a+c}{b^2} = \frac{p+r}{q^2}$

(B) $\frac{ac}{b} = \frac{pr}{q}$

(C) $acb^2 = prq^2$

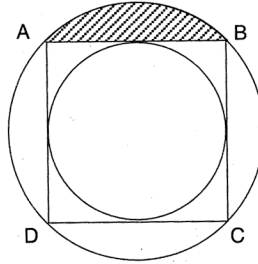
(D) $\frac{ac}{b^2} = \frac{pr}{q^2}$

Space for rough work

Q.16 A circle touches side BC of $\triangle ABC$ at P, and sides AB and AC produced at Q and R respectively. If l is the perimeter of $\triangle ABC$, the

- (A) $l = AQ$ (B) $l = \frac{3}{2}AQ$ (C) $l = 2AQ$ (D) $l = \frac{4}{3}AQ$

Q.17 In the following figure, a circle is inscribed in square ABCD and the square is circumscribed by a circle. If the radius of the smaller circle is r cm, then find the area of the shaded region (in cm^2).



- (A) $\left(\frac{\pi-2}{4}\right)r^2$ (B) $\left(\frac{3\pi-4}{2}\right)r^2$ (C) $\left(\frac{\pi+2}{4}\right)r^2$ (D) $\left(\frac{\pi-2}{2}\right)r^2$

Q.18 What is the volume of a hemispherical shell of outer radius r cm and thickness 1 cm ?

- (A) $\frac{2}{3}\pi(3r^2 - 2r + 1)\text{cm}^3$ (B) $\frac{2}{3}\pi(3r^2 - 3r + 1)\text{cm}^3$
 (C) $\frac{2}{3}\pi(4r^2 - 3r + 1)\text{cm}^3$ (D) $\frac{2}{3}\pi(4r^2 - 3r + 2)\text{cm}^3$

Space for rough work

- Q.19 Given that $\log(2) = 0.3010 \dots\dots$, the number of digits in the number 2000^{2000} is
- (A) 6601 (B) 6602
(C) 6603 (D) 6604
- Q.20 The cost of 2 puffs, 14 cups of coffee and 5 pizzas is Rs 356. The cost of 20 puffs, 7 cups of coffee and 15 pizzas is Rs 830. Find the cost of 38 puffs and 25 pizzas. (in Rs)
- (A) 1296 (B) 1104
(C) 1304 (D) Cannot be determined

Space for rough work

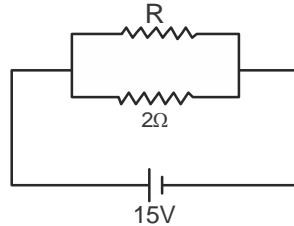
PART - II (PHYSICS)**(SINGLE CORRECT ANSWER TYPE)**

This section contains (21-35) multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Q.21 A Force of 4 N acts on a body of mass 40 kg for distance of 2m. The kinetic energy acquired by the body is :

- (A) 16 J (B) 32×10^8 erg (C) 8 J (D) 32 erg

Q.22 If in the circuit, power dissipation is 150 W, then R is



- (A) 2 Ω (B) 6 Ω (C) 5 Ω (D) 4 Ω

Q.23 A current flows in a conductor from east to west. The direction of the magnetic field at a point above the conductor is

- (A) towards north (B) towards south (C) towards east (D) towards west

Q.24 Common moderator used in nuclear reactor is

- (A) boron (B) uranium (C) graphite (D) cadmium

Space for rough work

- Q.25 Which of the following is not a unit of force?
(A) Dyne (B) Kg m s^{-2} (C) g cm s^{-2} (D) $\text{Kg m}^2 \text{s}^{-2}$
- Q.26 Echo is produced due to :
(A) reflection of sound (B) resonance
(C) refraction of sound (D) None of these
- Q.27 The S.I. unit of magnetic field intensity is -
(A) Weber (B) Tesla (C) Oersted (D) Gauss
- Q.28 What force is needed to speed up a frictionless 60 kg cart from 4 m/s to 6.5 m/s in 3.0 second ?
(A) 50 N (B) 100 N (C) 5 N (D) 20 N
- Q.29 An object 20 cm from a spherical mirror gives rise to a virtual image 15 cm behind the mirror. The type of the mirror and its focal length is
(A) concave, 8.5 cm (B) convex, 30 cm
(C) concave, 60 cm (D) convex, 60 cm
- Q.30 The area under the velocity-time graph and time axis gives the value of :
(A) velocity (B) acceleration (C) distance (D) displacement
- Q.31 Two resistances 1Ω and 2Ω are connected in series and then in parallel. The ratio of the effective resistance of series and parallel combination of resistances is
(A) 2 : 9 (B) 9 : 2 (C) 3 : 1 (D) 1 : 2

Space for rough work

- Q.32 A current of 2 A passing through conductor produces 80 J of heat in 10 seconds. The resistance of the conductor is
- (A) 0.5Ω (B) 2Ω (C) 4Ω (D) 20Ω
- Q.33 The atmosphere is held to the earth due to :
- (A) Winds (B) Clouds (C) Gravity (D) Rotation of earth
- Q.34 If 10^{10} electrons are removed from a neutral body, the charge acquired by the body is
- (A) $+1.6 \times 10^{-29} \text{ C}$ (B) $+1.6 \times 10^{-9} \text{ C}$
(C) $-1.6 \times 10^{-9} \text{ C}$ (D) $+10^{10} \text{ C}$
- Q.35 A car is moving with a constant speed of 20 m/s against a resistance of 100 N. The power exerted by the car is
- (A) 2 kW (B) 5 W (C) 200 W (D) 1 kW

Space for rough work

PART - III (CHEMISTRY)**(SINGLE CORRECT ANSWER TYPE)**

This section contains (36-50) multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

Q.36 Which one of the following sets of quantum numbers represents an impossible arrangement ?

	n	l	m	s		n	l	m	s
(A)	3	2	-2	1/2	(B)	4	0	0	1/2
(C)	3	2	-3	1/2	(D)	5	3	0	-1/2

Q.37 The postulates of Bohr's atomic model are given below. Arrange them in the correct sequence.

- As long as the electron revolves in a particular orbit, the electron does not lose its energy. Therefore, the orbits are called stationary orbits and the electrons are said to be in stationary energy states.
- Electron revolve round the nucleus in specified circular path called orbits or shells.
- The energy associated with a certain energy level increase with the increase of distance from the nucleus.
- An electron jumps from a lower energy level to a higher energy level by absorbing energy. But when it jumps from a higher to lower energy level, energy is emitted in the form of electromagnetic radiation.
- each orbit or shell is associated with definite amount of energy. Hence these are also called energy levels and are designated as K, L, M, N respectively.

(A) a c d e b (B) b c e a d (C) b e c a d (D) b a d c e

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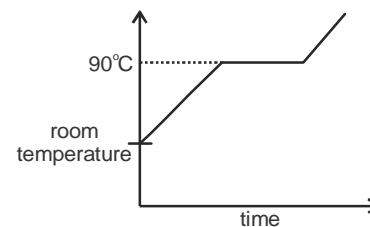
Q.38 How many total protons are found in one molecule of retional ($C_{20}H_{30}O$) ?

- (A) 51 (B) 151 (C) 600 (D) 158

Q.39 The graph shows the temprature change of solid 'A' ;

Which of the following set of statements is correct for solid 'A' at $90^{\circ}C$?

- (A) The solid 'A' is undergoing a change of state.
 (B) Solid 'A' is an impure substance.
 (C) Solid 'A' is a pure substance.
 (D) Solid 'A' is has a fixed melting point.



- (A) A only (B) A & D (C) A, B & D (D) A, C & D

Q.40 In Rutherford's experiment a small fraction of α -particles are scattered at small angle, because

- (A) α -particles are attracted by a negatively charged particle
 (B) α -particles are pushed away by heavy nuclear region
 (C) α -particles are repelled by positively charged region
 (D) α -particles are attracted by positively charged region

Q.41 Ionic bond forms between

- (A) two highly electronegative elements
 (B) two highly electropositive elements
 (C) element having high electronegativity and element having high electron affinity
 (D) element having high electronegativity and element having low ionization energy

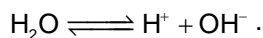
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Comprehensionv (For Q. No. 42 to Q.No 44)

A new way of expressing the concentration of H^+ ions in solution is pH. pH is defined as the negative logarithm to base 10 of H^+ ion concentration.

$$pH = -\log_{10}[H^+], \text{ where } [H^+] \text{ represent the concentration of } H^+ \text{ ions in moles per litre.}$$

Pure water is considered neutral as it dissociates to give equal concentration of H^+ and OH^- ions as follows



$$[H^+] = [OH^-] = 10^{-7} \text{ moles per litre at } 25^\circ C .$$

As per the formula, $pH = -\log_{10}(10^{-7}) = 7$, hence pH of water is 7.

K_w is the ionic product of water which is equal to product of H^+ and OH^- concentration at a particular temperature.

$$\text{At } 25^\circ C, K_w = [H^+] \cdot [OH^-] = 10^{-14} \text{ mol}^2 / L^2 .$$

Hence, $pH + pOH = 14$ (only at $25^\circ C$).

For an acidic solution $[H^+] > [OH^-]$ which is numerically greater than 10^{-7} mol ion /litre (at $25^\circ C$).

Lower the pH value, greater will be the acidic strength of the solution.

For a basic solution $[H^+] < [OH^-]$ which is numerically less than 10^{-7} mol ion/litre. Thus, pH of a base is always greater than 7 at $25^\circ C$.

Greater the pH value greater will be the basic strength of the solution.

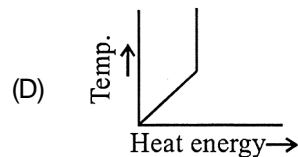
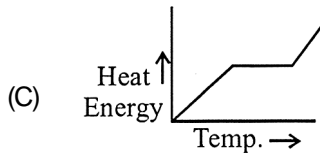
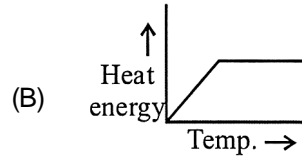
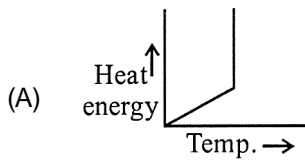
$$(\log 10 = 1; \log 0.1 = -1; \log 100 = 2)$$

Space for rough work

- Q.42 You are provided with four solutions P, Q, R, S with $[H^+]$ values (in mol/litre) as 1.076×10^{-13} , 1.89×10^{-12} , 3.2×10^{-10} and 2.7×10^{-11} respectively. Which solution will be most acidic ?
- (A) P (B) Q (C) R (D) S
- Q.43 At $60^\circ C$, if water has $[H^+] = 16^{-5}$ mole/litre, then the solution will be
- (A) Acidic (B) Basic (C) Amphoteric (D) Neutral
- Q.44 Now if 3.65 gm of HCl is added to 1 litre of water (as mentioned in Q. NO. 16) What will be the pH of resultant solution at $60^\circ C$ (atomic weight of Cl = 35.5, H = 1) ?
- (A) 0.01 (B) 0.1 (C) 1 (D) 10
- Q.45 An element has the configuration $1s^2, 2s^2, 2p^6, 3s^2, 3p^2$. To which block of the Periodic Table, does this belong?
- (A) s-block (B) p-block (C) d-block (D) f-block
- Q.46 The electrons, identified by quantum numbers n and l
- I. $n = 4, l = 1$
II. $n = 4, l = 0$
III. $n = 3, l = 2$ and
IV. $n = 3, l = 1$
- The correct order of increasing energy for electrons is
- (A) $IV < II < III < I$ (B) $II < IV < I < III$ (C) $I < III < II < IV$ (D) $III < I < IV < II$

Space for rough work

- Q.47 "Chemical bonding is the phenomenon of redistribution of electron." Which of the following is incorrect regarding this ?
- (A) Redistribution of electrons tend to attain nearest noble element electronic configuration for all the concerned atoms
- (B) Chemical bonding lowers the energy of combining atoms
- (C) Chemical bonding results into a homogeneous mixture
- (D) Chemical bonding may involve transference or sharing of electron
- Q.48 The number of molecules in 5.65 g of ammonia is approximately $x \times 10^{23}$. What is the value of x ?
- (A) 3 (B) 2 (C) 4 (D) 1
- Q.49 Which among the following are isobars?
- (A) ${}_bX^a, {}_bY^{a+1}$ (B) ${}_bX^a, {}_cY^b$ (C) ${}_bX^a, {}_{b+1}Y^a$ (D) ${}_bX^a, {}_{b-1}Y^{a-1}$
- Q.50 Which of the following is a correct graphical representation of latent heat of fusion of water with respect of temperature ?



Space for rough work

PART - IV (MENTAL ABILITY)**(SINGLE CORRECT ANSWER TYPE)**

This section contains (51-60) multiple choice questions. Each questions has four choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct.

- Q.51 If it was Saturday on 17th November, 1962, then what will be the day on 22nd November, 1964?
 (A) Monday (B) Tuesday (C) Wednesday (D) Sunday
- Q.52 Rowlatt act was passed in
 (A) 1919 (B) 1917 (C) 1918 (D) 1920
- Q.53 Imagine a clock where the hour hand makes only one revolution in 1 day (i.e., 24 hr) whereas the minute hand completes one revolution in one hour. What is the angle between the two hands at 14 : 50 hr as per this clock?
 (A) 90° (B) 120° (C) 77.5° (D) 162.5°
- Q.54 Sandip's mother is the only daughter of Rekha's father. How is Rekha's husband related to Sandip ?
 (A) Uncle (B) Brother (C) Grandfather (D) Father
- Q.55 At which place Congress session of September 1920 held.
 (A) Nagpur (B) Calcutta (C) Lahore (D) Madras
- Q.56 The minute hand of a clock overtakes the hour hand at intervals of 65 min. How much in a day does the clock gain or lose ?
 (A) Gains $56\frac{8}{77}$ min (B) Loses $32\frac{8}{11}$ min
 (C) Loses $10\frac{10}{143}$ min (D) Gains $10\frac{10}{143}$ min

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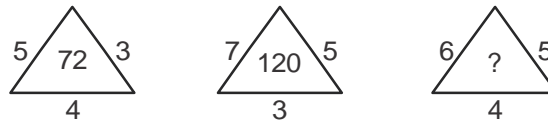
Q.57 A cube of 5 cm has been painted on its surfaces in such a way that two opposite surfaces have been painted blue and two adjacent surfaces have been painted red. Two remaining surfaces have been left unpainted. Now the cube is cut into smaller cubes of side 1 cm each. Then how many cubes will have only two side painted ?

- (A) 16 (B) 18 (C) 19 (D) 24

Q.58 If '+' means '×', '-' means '÷', '÷' means '+' and '×' means '-', then what will be the value of $16 \div 64 - 4 \times 4 + 3 = ?$

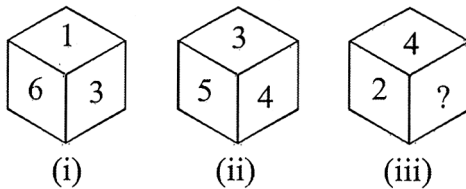
- (A) 20 (B) 15.12 (C) 52 (D) None of these

Q.59 Find the missing character (?).



- (A) 112 (B) 145 (C) 135 (D) 102

Q.60 Three positions of the same dice are given below. Observe the figures carefully and tell which number will come in place of (?).



- (A) 1 (B) 6 (C) 3 (D) 5

Space for rough work