6th All India RPS OLYMPIAD 2024-25

QUESTION PAPER

M.M:60 **Time: 60 minutes**

OFFLINE EXAMINATION (PHASE–II)

CLASS - X

Name:_____ Reg. No. _____ Mobile No._____

General Instructions:

1. Duration of the examination is 60 minutes. Question Paper contains 60 questions with maximum 60 marks.
2. There will be negative marking in Phase – II, i.e. ¼ mark will be deducted for each incorrect answer.
3. Use of gadgets is not allowed.
4. Students must abide by the instructions issued during the examination by the invigilator or the centre incharge.
5. Before attempting the question paper ensure that it contains all pages & no question is missing.
6. Immediately fill in the particulars on this page of the test booklet and OMR with BLACK ballpoint pen only. Use of pencil is strictly prohibited.
7. Fill and darken the bubbles completely. Do not put a tick or a cross.
8. Half –filled or over-filled bubbles will not be read by the software & liable to be rejected.

Correct Method

Student's Signature

Wrong Method

Invigilator's Signature

SPACE FOR ROUGH WORK

ENGLISH (10 Marks)

Choose the correct option:

Q1. He told me that _____ blue was her favourite colour.

(a) a (b) the (c) this (d) No article

Direction (Q2 and Q3): Select the indirect speech of the given sentences :

Q2. The teacher said to the student, "Why were you absent yesterday?"

(a) The teacher asked the student that why you were absent the previous day.

(b) The teacher asked the student why he had been absent the previous day.

(c) The teacher asked the student why he had absent the previous day.

(d) The teacher asked the student why he has been absent the previous day.

Q3. He said, " How cruel of him !"

(a) He remarked that it was very cruel of him.

(b) He remarked on his great cruelty.

(c) He remark that it was very cruel of him.

(d) He remarked that it is very cruel of him.

Q4. There is not _____ milk in the bottle.

(a) many (b) much (c) more (d) a few

Q5. If I were in his place, I _____wait a little longer.

(a) will (b) shall (c) would (d)should

Q6. I _____ her for seven years.

(a) have been knowing (b) am known

(c) have known (d) has known

Q7. Who was knocking at the door? (Choose the correct passive voice).

(a) By whom was the door been knocked at?

(b) By whom had the door been knocked at?

(c) By whom was the door being knocked at?

(d) By whom had the door being knocked at?

Q8. I will try to _____the matter as soon as I get free.

(a) look for (b) look about (c) look out (d) look into

Q9. 'A wild goose chase' means _____.

(a) to hunt (b) foolish and useless efforts

(c) A violent chase (d) to speak harshly

Q10. 'Give cold shoulder' means _____.

(a) shiver (b) cold meat

(c) to support (d) to ignore

Mathematics (20 Marks)

Q11. The LCM of two numbers is (a + b) and their HCF is (a – b). If one number is P, then the other number is :

(a) $\frac{Pb}{a}$ (b) Pab (c) $\frac{(a^2 - b^2)}{P}$ (d) $\frac{(a+b)}{P\,(a-b)}$

Q12. In a GP, first term is 1. If 4 T_2 + 5 T_3 is minimum, then its common ratio is _____

(a) $\frac{3}{5}$ (b) $\frac{2}{5}$ (c) $-\frac{3}{5}$ (d) $-\frac{2}{5}$

Q13. If a, b, c and d are in continued proportion, then $(b - c)^2 + (c - a)^2 + (d - b)^2$ = ____.

(a) 0 (b) $(d - a)^2$ (c) $(a - c)^2$ (d) $a^2 + d^2$

Q14. If the sides of a right triangle are 9, 12, and 15 cm long, then the sum of squares of medians is:

(a) 337.5 (b) 537.5 (c) 227.5 (d) none of these

Q15. If y = $x^2 - 2x - 3$, then find the range of y when x∈R .

(a) [-3, ∞) (b) [0, -3] (c) [-4, ∞) (d) [-2, 0]

Q16. Three circles each of radius 1 touch one another externally and they lie between two parallel lines. The minimum possible distance between the lines is_____.

(a) $3 + \sqrt{3}$ (b) 4 (c) $2 + \sqrt{3}$ (d) $2 + \frac{1}{\sqrt{3}}$

Q17. For how many positive integers 'a' is $a^4 - 3a^2 + 9$ a prime number?

(a) 2 (b) 5 (c) 6 (d) 8

Q18. Find the value of the expression $x^4 - 8x^3 + 18x^2 - 8x + 2$, when $x = 2 + \sqrt{3}$.

(a) 2 (b) 1 (c) 0 (d) 3

Q19. If the orthocentre and centroid of a triangle are (-3, 5) and (3, 3), then its circumcentre is-

(a) (3, -1) (b) (-3, 1) (c) (-3, 5) (d) (6, 2)

Q20. If sin A, sin B, sin C are in AP and cos A, cos B, cos C are in GP, then

$$\frac{\cos^2 A + \cos^2 C - 4\cos A\,\cos C}{1 - \sin A\,\sin C} = ?$$

(a) -2 (b) -1 (c) 0 (d) 2

Q21. The three different face diagonals of a cuboid have lengths 39, 40, 41. The length of the main diagonal of the cuboid that joins a pair of opposite corners is-

(a) $49\sqrt{3}$ (b) 60 (c) 49 (d) $60\sqrt{3}$

Q22. If the mean of x and $\frac{1}{x}$ is M, the mean of x^3 and $\frac{1}{x^3}$ is-

(a) $M(4M^2 - 3)$ (b) $\frac{M^2-3}{2}$ (c) M^3 (d) $M^2 + 3$

Q23. Suppose that $4^a = 5$, $5^b = 6$, $6^c = 7$ and $7^d = 8$. What is 2abcd ?

(a) 5 (b) 3 (c) -6 (d) 10

Q24. 'B' speaks truth in 75% cases and 'A' speaks truth in 80% cases. Find the probability that they contradict each other in a statement.

(a) $\frac{13}{20}$ (b) $\frac{3}{5}$ (c) $\frac{2}{5}$ (d) $\frac{7}{20}$

Q25. The number of real solutions of the equation $(5 + 2\sqrt{6})^{x^2-3} + (5 - 2\sqrt{6})^{x^2-3} = 10$ is -

(a) 2 (b) 3 (c) 4 (d) none of these

Q26. Two dice are thrown together. What is the probability that the sum of the numbers on the two faces is neither divisible by 3 nor 4 ?

(a) $\frac{5}{8}$ (b) $\frac{4}{9}$ (c) $\frac{1}{6}$ (d) $\frac{5}{7}$

Q27. If $\sin\theta + \text{cosec}\,\theta = 2$, then $\sin^8\theta + \text{cosec}^8\theta$ will have the value _____.

(a) 2^8 (b) 2^6 (c) 2^4 (d) 2

Q28. Let $(1 + 2x)^{20} = a_0 + a_1x + a_2x^2 + \_\_\_\_ + a_{20}x^{20}$. Then, $3a_0 + 2a_1 + 3a_2 + 2a_3 + 3a_4 + 2a_5 + \_\_\_\_ + 2a_{19} + 3a_{20}$ equals to _____.

(a) $\frac{5(3^{20})-3}{2}$ (b) $\frac{5(3^{20})+3}{2}$ (c) $\frac{5(3^{20})+1}{2}$ (d) $\frac{5(3^{20})-1}{2}$

Q29. A man at the top of vertical lighthouse, observes a boat coming directly towards it. If it takes 20 minutes for the angle of depression to change from 30° to 60°. The time taken by the boat to reach the lighthouse from the point when the angle of depression was 30° is:

(a) 5 min (b) 10 min (c) 20 min (d) 30 min

Q30. Point P is inside equilateral ΔABC. Points Q, R, and S are the foot of the perpendiculars from P to AB, BC and CA, respectively. Given that PQ = 1 PR = 2 and PS = 3 respectively. What is AB^2 ?

(a) 48 (b) 60 (c) 25 (d) 98

Social Science (10 Marks)

Q31. Match the following problems with their solutions :

	Problems		Solutions
(i)	**Debt trap**	**(a)**	**MSP**
(ii)	**Seasonal unemployment**	**(b)**	**Crop insurance**
(iii)	**Pre announced price for farmers' crops**	**(c)**	**Cheap credit**
(iv)	**Crop failure**	**(d)**	**MGNREGA**

(a) (i) – c (ii) – a (iii) – d (iv) – b

(b) (i) – a (ii) – b (iii) – c (iv) – d

(c) (i) – c (ii) – d (iii) – a (iv) – b

(d) (i) – a (ii) – b (iii) – d (iv) – c

Q32. Rohit went to market with his father to buy some books. After completion of purchase, his father made the payment through UPI. Which form of money is being used here?

(a) Bank deposits (b) Currency (c) Both (d) None of these

Q33. Assertion – Sometimes water flows as a sheet over large areas down a slope which washes away the top soil.

Reason – Ploughing along the contour lines can decelerate the flow of water down the slopes and check soil erosion.

(a) Both A and R are true and R is the correct explanation of A .

(b) Both A and R are true, but R is not the correct explanation of A.

(c) A is true but R is false.

(d) A is false but R is true.

Q34. Match the following Iron and Steel plants with states to which they belong:-

	Column I		Column II
(i)	**Bokaro**	**(a)**	**West Bengal**
(ii)	**Bhilai**	**(b)**	**Tamil Nadu**
(iii)	**Salem**	**(c)**	**Chhattisgarh**
(iv)	**Durgapur**	**(d)**	**Jharkhand**

(a) (i) – a (ii) – b (iii) – d (iv) – c

(b) (i) – c (ii) – d (iii) – a (iv) – b

(c) (i) – d (ii) – c (iii) – b (iv) – a

(d) (i) – b (ii) – a (iii) – c (iv) - d

Q35. Certain events are given below. Choose the appropriate chronological order:

(i) Coming of Simon Commission to India

(ii) Demand of Purna Swaraj in Lahore Session of INC

(iii) Government of India Act, 1919

(iv) Champaran Satyagraha

(a) (iii) – (ii) – (iv) – (i)

(b) (i) – (ii) – (iv) – (iii)

(c) (ii) – (iii) – (i) – (iv)

(d) (iv) – (iii) – (i) – (ii)

Q36. Which of the following statements accurately distinguish between Majoritarianism and Power sharing ?

(a) Majoritarianism emphasizes the dominance of the majority community while power sharing emphasizes the sharing of power among different groups.

(b) Majoritarianism emphasizes the need for consensus building, while power sharing emphasizes the exclusion of minority groups.

(c) Majoritarianism emphasizes the importance of accommodating minority interests, while power sharing emphasizes the need for majority rule.

(d) Majoritarianism emphasizes the need for peaceful resolution of conflicts while power sharing emphasizes the use of force to impose the majority's will.

Q37. What does caste hierarchy mean ?

(a) A shift from rural areas to urban areas.

(b) A shift from one occupation to another.

(c) A ladder like formation in which all caste groups are placed from the highest to the lowest level.

(d) None of these

Q38. What is By-election ?

(a) Elections held to fill a vacancy caused by the death or resignation of any house member.

(b) Election held after a specific period.

(c) Election held to form the new government.

(d) Election held in between the fixed term of the house.

Q39. Which of the following statements regarding manufacturing is not true?

(a) Manufacturing helps in modernizing agriculture.

(b) Development of manufacturing industries is a pre-condition for eradication of unemployment and poverty.

(c) Export of manufactured goods expands trade and commerce and brings in much needed foreign exchange.

(d) Manufacturing puts the country into a debt trap.

Q40. Which multinational empire was greatly affected by nationalist movements in its various ethnic regions?

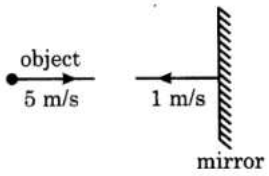
(a) Ottoman Empire (b) Roman Empire

(c) British Empire (d) Spanish Empire

Science (20 Marks) Phy.+Chem. +Bio.

Physics (7 Marks)

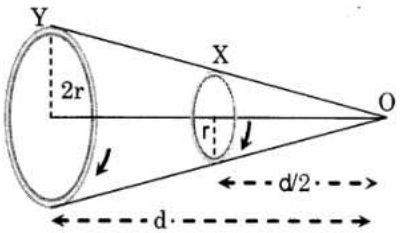
Q41. An object moves with 5 m/s towards right while the mirror moves with 1 m/s towards the left as shown. The velocity of image seen by observer will be :



(a) 7 m/sec towards left (b) 7 m/sec towards right

(c) 5 m/sec towards left (d) 5 m/sec towards right

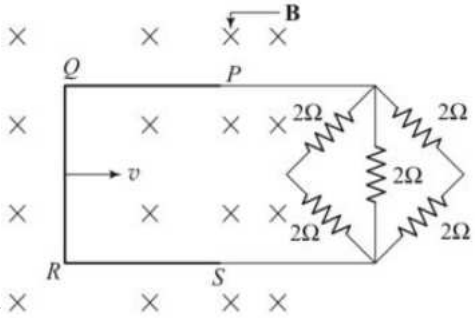
Q42. Two circular coils X and Y, having equal number of turns, carry equal currents in the same sense and subtend same solid angle at point O. If the smaller coil, X is midway between O and Y, then if we represent the magnetic induction due to bigger coil Y at O as B_y and that due to smaller coil X at O as B_x, then :



(a) $\frac{B_Y}{B_x}=1$ (b) $\frac{B_Y}{B_x}=2$

(c) $\frac{B_Y}{B_x}=\frac{1}{2}$ (d) $\frac{B_Y}{B_x}=\frac{1}{4}$

Q43. A square metal frame PQRS of side 15 cm and resistance 1.0 Ω is moved with a speed of 4/3 cm s^{-1} in a uniform magnetic field B = 2.0 T which is perpendicular to the plane of the frame as shown in figure . The frame is connected to a network of resistances as shown. The current induced in the frame is -



(a) 1 mA (b) 2 mA

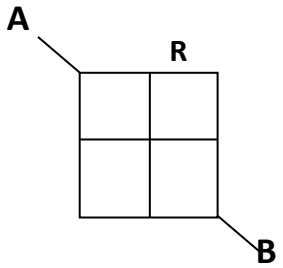
(c) 3 mA (d) 4 mA

Q44. A current passing through a resistance R decreases uniformly to zero in a time interval T and a total charge q passes through resistance. Find the total heat produced in resistance in this process.

(a) $H = \frac{4}{3}\frac{q^2R}{T}$ (b) $H = \frac{3}{4}\frac{q^2R}{T}$

(c) $H = \frac{5}{2}\frac{q^2R}{T}$ (d) $H = \frac{2}{5}\frac{q^2R}{T}$

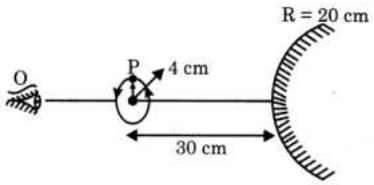
Q45. Each wire shown in figure is of resistance R. The equivalent resistance between the diagonally opposite terminal points A and B is :



(a) R (b) $\frac{3R}{2}$

(c) 2R (d) $\frac{R}{2}$

Q46. A particle P is rotating on a circle of radius 4 cm in clockwise direction with ω = π rad/sec as seen by observer O. What is his observation?



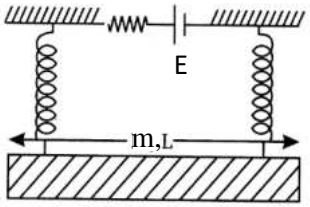
(a) Image will rotate clockwise with ω = π rad/sec.

(b) Image will rotate anticlockwise with ω = π rad/sec.

(c) Image will rotate clockwise with ω = π/4 rad/sec.

(d) None of these

Q47. A straight rod of mass m and length L is suspended from the identical springs as shown in figure. The spring is stretched to a distance x_0 due to weight of the wire.



The circuit has total resistance R. When the magnetic field perpendicular to the plane of paper is switched on, then springs are observed to extend further by the same distance. The magnetic field strength is :

(a) $\frac{2mgR}{LE}$ (b) $\frac{mgR}{LE}$ (c) $\frac{mgR}{2LE}$ (d) $\frac{mgR}{E}$

Chemistry (7 Marks)

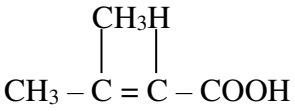
Q48. Match the following columns:

	List – I	List – II
(P)	$H_2S_{(aq)} + Cl_{2(aq)} \rightarrow 2HCl_{(aq)} + S_{(s)}$	1. Oxidation – reduction reaction
(Q)	$CuSO_{4(aq)} + H_2S_{(aq)} \rightarrow CuS_{(S)} + H_2SO_{4(aq)}$	2. Exothermic reaction
(R)	$NaOH_{(S)} + H_2O_{(l)} \rightarrow NaOH_{(aq)} + Heat$	3. Precipitation Reaction

(a) $P-3, Q-1, R-2$ (b) $P-2, Q-1, R-3$

(c) $P-2, Q-3, R-1$ (d) $P-1, Q-3, R-2$

Q49. The correct IUPAC name of the given compound is _____.



(a) 2-methylbut-2-enoic acid (b) 3-methylbut-3-enoic acid

(c) 3-methylbut-2-enoic acid (d) 2-methylbut-3-enoic acid

Q50. What is the number of monochloro derivatives for 2 - methylbutane?

(a)1 (b)2 (c)3 (d)4

Q51. $BaCl_{2(aq)} + Na_2SO_{4(aq)} \rightarrow BaSO_{4(S)} + 2NaCl_{(aq)}$

(1) Displacement (2) Precipitation

(3) Combination (4) Double Displacement

(a) (1) and (3) (b) (1), (2) and (3)

(c) (2) and (3) (d) (2) and (4)

Q52.Which is not an exception to octet rule?

(a) BF_3 (b) $SnCl_4$ (c) BeI_2 (d) ClO_2

Q53. An element reacts with oxygen to give a compound with a high melting point. This compound is also soluble in water. The element is likely to be _____.

(a) calcium (b) carbon (c) silicon (d) iron

Q54. Which compound is present in a sting of honey bee?

(a) Formic acid (b) Acetic acid (c) Baking Soda (d) Washing soda

Biology (6 Marks)

Q55. Blood group of a child is AB. Which of the following statements regarding his mother and father is correct?

(a) Blood group of either mother or father should not be 'A'

(b) Blood group of either mother or father should not be 'O'

(c) Blood group of mother should be 'B'

(d) Blood group of father should be 'A'

Q56. Which of the following is the site of Blackman's reaction in chloroplast?

(a) Thylakoid (b) Granum (c) Stroma (d) Inner membrane

Q57. Select the incorrect differences between transpiration and guttation.

	Transpiration	**Guttation**
i.	**Water is lost in the form of vapours**	**Water is lost in the form of water droplets.**
ii.	**Water lost contains mineral salts**	**Pure water in the form of vapours is lost.**
iii.	**Opening of hydathodes cannot be regulated**	**Opening of stomata is regulated by guard cells.**
iv.	**It occurs in presence of sunlight**	**It occurs at night or early morning.**
v.	**It cools the plant body**	**No such effect is produced on the plant.**

(a) (i) and (iv) (b) (ii) and (iv) (c) (i) and (v) (d) (ii) and (iii)

Q58. All information from our environment is detected by specialised cells called receptors. These receptors are located in our sense organs. ' X' receptors are present in tongue to detect taste, while 'Y' receptors are present in nose to detect smell. Here, 'X' and 'Y' are, respectively _____.

(a) Gustatory receptors and Auditory receptors

(b) Gustatory receptors and Olfactory receptors

(c) Olfactory receptors and Gustatory receptors

(d) Photoreceptors and Thermoreceptors

Q59. Reproductive health refers to healthy reproductive organs with normal functions. The regulation of conception by preventive methods or devices to limit the number of offspring is birth control. A variety of methods are known for birth control. All of the following are correct for the sterilization method of birth control, except:

(a) It involves the removal of a short segment of each vas deferens in male or fallopian duct in female.

(b) It is a safe method but if not performed properly it can cause infections.

(c) It blocks the formation of gametes but not the transport of gametes.

(d) A sterilised man is still capable of ejaculation which consists only of secretions of various glands but no sperms.

Q60. Which group of organisms are not the constituents of a food chain?

(a) Grass, lion, rabbit

(b) Plankton, man, fish

(c) Wolf, grass, snake, tiger

(d) Frog, snake, eagle, grass, grasshopper

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