6th All India RPS OLYMPIAD 2024-25

M.M:60   **CLASS - X**   **Time: 60 Minutes**

ENGLISH (10)

Q1. Fill in the blank with the correct option :-

He _____ have come by now.

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

Q2. Fill in the blank with the correct option :-

_____ gold that you are wearing, is one of _____ finest qualities.

(a) A, the   (b) The, the   (c) No article, the   (d) A, no article

Q3. Choose the most appropriate indirect speech of the given sentence: -

"What else did you see?" I said to the boy.

(a) I asked the boy what did he see.   (b) I asked the boy what had he seen.

(c) I asked the boy what else he had seen.   (d) I asked the boy what you had seen.

Q4. Choose the most appropriate indirect speech of the given sentence: -

The people said, "Long live the king !"

(a) The people wished that the king would live long.

(b) The people prayed that the king might live long.

(c) The people prayed that the king should live long.

(d) The people wished that the king must live long.

Q5. Fill in the blank with the correct determiner:

I have _____ money to spend on you.

(a) little   (b) the little   (c) few   (d) many

Q6. Fill in the blank with the correct verb:

The president _____ more than 90 countries before he was elected for the 2nd term.

(a) have visited   (b) had visited   (c) visited   (d) will have visited

Q7. 'Achilles' heel' means –

(a) bare foot

(b) to run fast

(c) to wait on

(d) one's vulnerable or susceptible spot

Q8. Fill in the blank with the correct option –

You must not _____his advice.

(a) count on   (b) count for   (c) count in   (d) count about

Q9 'A canary in the coal mine' means -

(a) a bird in a cage

(b) a strange thing

(c) an imminent danger

(d) a thing of interest

Q10. 'To cool one's heels' means -

(a) to give a cold treatment to somebody

(b) to be kept waiting for sometime.

(c) a close chapter

(d) a hot issue

MATHEMATICS (20)

Q11. ABC is a triangle and O is the point of intersection of its medians then :-

(a) $3\left(AB^2 + BC^2 + CA^2\right) = 4\left(OA^2 + OB^2 + OC^2\right)$ (b) $AB^2 + BC^2 + CA^2 = 3\left(OA^2 + OB^2 + OC^2\right)$

(c) $4\left(AB^2 + BC^2 + CA^2\right) = 3\left(OA^2 + OB^2 + OC^2\right)$ (d) None of these

Q12. If 92! is divisible by 5^n, then the maximum value of n is:-

(a) 20   (b) 21   (b) 22   (d) 23

Q13. If p, q and r are prime numbers such that $r = q + 2$ and $q = p + 2$, then the number of triplets of the form (p, q, r) is:-

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

Q14. If $a + b = 2c,$ then value of $\dfrac{a}{a-c} + \dfrac{b}{b-c}$ is

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

Q15. The expression $x^4 + 7x^2 + 16$ can be factorized as:-

(a) $\left(x^2 + x + 1\right)\left(x^2 + x + 16\right)$

(b) $\left(x^2 + x + 1\right)\left(x^2 - x + 16\right)$

(c) $\left(x^2 + x + 4\right)\left(x^2 - x + 4\right)$

(d) $\left(x^2 + x - 4\right)\left(x^2 - x - 4\right)$

Q16. In a right angle triangle, the mid point of hypotenuse is :-

  (a) circumcentre   (b) incentre   (c) orthocentre   (d) centroid

Q17. A, B and C are three friends. Then the probability, all three will have same birthday, is :-

  (a) $\dfrac{1}{365}$ (b) $\left(\dfrac{1}{365}\right)^3$ (c) $\left(\dfrac{1}{365}\right)^2$ (d) None of these

Q18. A trapezium ABCD in which AB||CD is inscribed in a circle with centre O. Suppose the diagonals AC and BD of the trapezium intersect at M and OM = 2. If $\angle AMB = 60^0$, the difference between the lengths of the parallel sides is :-

  (a) 2   (b) $\sqrt{3}$ (c) $3\sqrt{3}$ (d) $2\sqrt{3}$

Q19. The number of edges in a pyramid whose base has 10 edges is :-

  (a) 15   (b) 20   (c) 10   (d) 30

Q20. A bag contains 2 red, 4 yellow and 5 green balls. 3 balls are drawn at random. What is the probability that balls drawn contain different colours?

  (a) $\dfrac{8}{33}$ (b) $\dfrac{7}{30}$ (c) $\dfrac{6}{17}$ (d) None of these

Q21. Two steel sheets each of length a_1 and breadth a_2 are used to prepare the surface of two right circular cylinders – one having volume V_1 and height a_2 and the other having volume V_2 and height a_1. Then

  (a) $V_1 = V_2$ (b) $a_1V_1 = a_2V_2$ (c) $a_2V_1 = a_1V_2$ (d) None of these

Q22. The last two digits of $(71)^{52}$ are:-

  (a) 41   (b) 51   (c) 71   (d) 81

Q23. If $\sec\theta - \tan\theta = \dfrac{a+1}{a-1}$, then $\cos\theta$ is :-

  (a) $\dfrac{a^2+1}{a^2-1}$ (b) $\dfrac{a^2-1}{a^2+1}$ (c) $\dfrac{2a}{a^2+1}$ (d) $\dfrac{2a}{a^2-1}$

Q24. If $7\sin^2\theta + 3\cos^2\theta = 4$, then $\tan\theta$ is :-

  (a) $\pm\dfrac{1}{3}$ (b) $\pm\dfrac{1}{2}$ (c) $\pm\dfrac{1}{\sqrt{3}}$ (d) $\pm\dfrac{1}{\sqrt{2}}$

Q25. ABC is a triangle, $\angle A = 90°$ and AD is perpendicular to the hypotenuse. Then $\dfrac{BD}{CD}$ is equal to :-

  (a) $\left(\dfrac{AB}{AC}\right)^2$ (b) $\left(\dfrac{AB}{AD}\right)^2$ (c) $\dfrac{AB}{AC}$ (d) $\dfrac{AB}{AD}$

Q26. The area of two similar triangles are in the ratio of 25 : 36. What is the ratio of their respective heights?

  (a) 5 : 6   (b) 6 : 5   (c) 1 : 11   (d) 2 : 3

Q27. The value of $\sqrt{20+\sqrt{20+\sqrt{20+...}}}$ is :-

    (a) 5   (b) 6   (c) 4   (d) 7

Q28. If $a:b=3:4$ and $a-b=4,$ then the value of $a+b$ is :-

    (a) -28 (b) -30 (c) 28   (d) 30

Q29. When $x^{200}+1$ is divided by $x^{2}-1,$ the remainder is equal to:-

    (a) $x+2$ (b) $2x+3$ (c) 2   (d) -2

Q30. If sum of 'n' terms of an AP is given $S_{n}=2n^{2}+2n,$ then 20th term is :-

    (a) 80   (b) 76   (c) 72   (d) 68

SOCIAL SCIENCE (10)

Q31. Match column I with column II and select the correct answer using the codes given below

	Column I		Colum II
(i)	1859-70	(p)	Battle of Leipzig
(ii)	1866 – 71	(q)	Slav nationalism
(iii)	1905	(r)	Unification of Italy
(iv)	1813	(s)	Unification of Germany

    (a) i – s,   ii – p,   iii – q,   iv – r   (b) i – q, ii – p, iii – s, iv – r

    (c) i – r,   ii – s ,   iii – q,   iv – p   (d) i – q, ii – r, iii – s, iv - p

Q32. Arrange the following events in chronological order:

    (A) Gandhiji leaves for South Africa   **(B) Muslim league founded**

    (C) Indian National Congress founded   **(D) Partition of Bengal**

    (a) A   B   C   D   (b)   C   A   D   B

    (c) A   C   D   B   (d)   A   D   C   B

Q33.   Consider the following statements about power sharing arrangements in Belgium and Srilanka

    (A) In Belgium, the Dutch speaking majority people tried to impose their domination on the minority French speaking community.

    (B) In Srilanka, the policy of the government sought to ensure the dominance of the Sinhala speaking majority.

    (C) The Tamils in Srilanka demanded a federal arrangement of power sharing to protect their culture language and equality of opportunity in education and jobs.

    (D) The transformation of Belgium from unitary government to a federal one prevented a possible division of the country on linguistic lines.

Which of the statements given above are correct?

(a) A, B, C and D   (b) A, B and D   (c) C and D   (d) B, C and D

Q34. On the basis of the following features, identify the correct option :

(i) Candidates in elections make appeals to caste sentiments to muster support.

(ii) Political parties favour some castes and seen as their representatives.

(iii) Preference to the representatives of a particular caste in the government

(iv) Caste composition of the electorate is needed to win support.

(a) Communalism   (b) Casteism   (c) Secularism   (d) Feminism

Q35. Which one of the below is not matched properly ?

(i) BSP   -   Welfare of dalits

(ii) BJP   -   Culture of nationalism

(iii) INC   -   Secularism

(iv) CPI (M)   -   Marxism and Leninism

(v) CPI   -   Communalism

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

Q36. Assertion - Laterite soil develops in areas with high temperature.

Reason - Humus content is low in this type of soil because micro-organisms get destroyed by high temperature.

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

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

(c) A is true but R is false.

(d) If both A and R are false.

Q37. What is coke ?

(a) It is the hardest and blackest form of coal.   (b) It is a type of soil.

(c) Coke is an evaporated form of iron ore.   (d) Coke is a metallic mineral.

Q38. With reference to the importance of manufacturing industry, consider the following statements.

(A) Manufacturing industries help in modernising agriculture.

(B) Export of manufactured goods increase trade and commerce and brings foreign exchange.

Which of the statement (s) given above is/are correct ?

(a) A only   (b) B only   (c) Both are correct   (d) Neither A or B

Q39. _____ is the value of all final goods and services produced with a country during a particular year.

   (a) GDP   (b) GNP   (c) Inflation rate   (d) Industrial output

Q40. Devaluation of currency means

    (a) reduction in value of currency vis-à-vis other currencies

    (b) permitting currency to seek its worth in other markets

    (c) fixing value of currency

   (d) increase in value of currency vis a-vis other currencies.

SCIENCE (20)

PHYSICS (7)

Q41. A ray of light falls on transparent sphere with centre at C as shown in figure. The ray emerges from the sphere parallel to line AB. The refractive index of the sphere is :
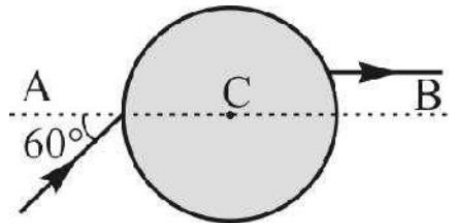
    (a) $\sqrt{2}$ (b) $\sqrt{3}$ (c) 3/2   (d) 1/2

Q42. A prism having an apex angle 4^0 and refractive index 1.5 is located in front of a vertical plane mirror as shown in figure. Through what total angle is the ray deviated after reflection from the mirror ?
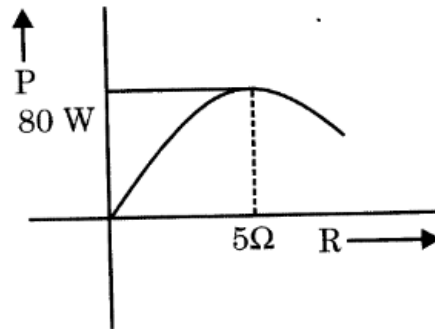

    (a) 176^0 (b) 4^0 (c) 178^0 (d) 2^0
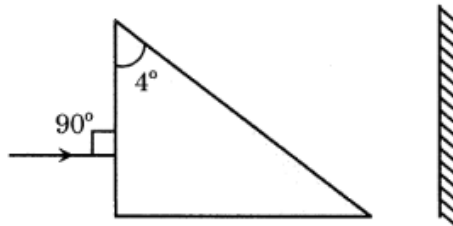
Q43. A charge of 2×10^{-2} C moves at 50 revolution per second in a circle of diameter 2m. The current linked with the circuit will be:

    (a) 1A   (b) 2πA   (c) 0.4 A   (d) 0.6 A

Q44. If power dissipated across a load resistance vs load resistance curve is shown, then emf of cell will be :
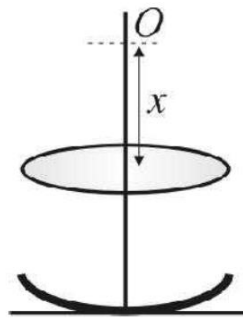

    (a) 80 V   (b) 60 V   (c) 20 V   (d) 40 V

Q45. Two protons having speed v_0 & $2v_0$ enters in a uniform magnetic field in perpendicular to it, then ratio of their time period $T_1 : T_2$ will be :

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

Q46. A convex lens of focal length 40 cm is held co-axially 12 cm above a mirror of focal length 18 cm. An object held x cm above the lens gives rise to an image coincident with it. Then x is equal to :

    (a) 12 cm   (b) 15 cm   (c) 18 cm   (d) 30 cm

Q47. A conducting wire bent in the form of a parabola $y^2 = 2x$ carries a current $i = 2A$ as shown in figure. This wire is placed in a uniform magnetic field $\vec{B} = -4\hat{k}$ tesla . The magnetic force on the wire is (in newton):
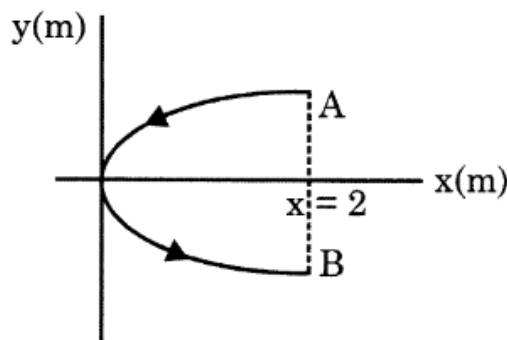
    (a) -16 $\hat{i}$ (b) 32 $\hat{i}$ (c) -32 $\hat{i}$ (d) 16 $\hat{i}$

CHEMISTRY (7)

Q48. A solid compound 'X' on heating gives CO_2 gas and a residue. The residue mixed with water form 'Y'. On passing CO_2 through 'Y' , it turns milky and in excess of CO_2 through 'Y' a clear solution 'Z' in obtained. On boiling Z compound 'X' is reformed. The compound X and Z are respectively :-

(a) K_2CO_3 and Na_2CO_3

(b) Na_2CO_3 and $CaCO_3$

(c) $CaCO_3$ and $Ca(HCO_3)_2$

(d) Na_2CO_3 and $Ca(HCO_3)_2$

Q49. Which of the following compound (s) can react with both sodium carbonate and bicarbonate ?

(i) HCl

(ii) CH₃COOH

(iii) H₂SO₄

(a) only (i)

(b) (i), (ii) & (iii)

(c) only (ii)

(d) (i) & (ii)

Q50. If the acid present in our stomach react with the base obtained on electrolysis of brine solution to form a salt 'S' then the P^H of the aqueous solution of salt 'S' is :

(a) less than 7

(b) Between 11 to 13

(c) 14

(d) 7

Q51. Observe the following pairs of organic compounds:

(i) C_4H_9OH and $C_5H_{11}OH$

(ii) $C_7H_{15}OH$ and $C_5H_{11}OH$

(iii) $C_6H_{13}OH$ and C_4H_7OH

Which of these pair is a homologous series according to increasing order of carbon atom?

(a) (iii) only

(b) (i) only

(c) (ii) only

(d) All of these

Q52. Two organic compounds 'A' and 'B' react with sodium metal and both produce the same gas 'X', but with sodium hydrogen carbonate only compound B reacts to evolve a gas 'Y'. Identify A, B, X and Y.

(a) A = Acetic acid   B = Formic acid   X = Carbondioxide   Y = Hydrogen

(b) A = Methyl alcohol   B = Ethyl alcohol   X = Hydrogen   Y = Carbondioxide

(c) A = Ethylene   B = Ethyl alcohol   X = Carbondioxide   Y = Hydrogen

(d) A = Ethyl alcohol   B = Acetic acid   X = Hydrogen   Y = Carbondioxide

Q53. The bond present in N_2O_5 are :

(a) Only ionic

(b) Covalent and co-ordinate

(c) only covalent

(d) covalent and ionic

Q54. The IUPAC name of $(C_2H_5)_2 CHCH_2OH$ is :

(a) 3-ethyl butan-1-ol

(b) 2-methyl pentan-1-ol

(c) 2-ethyl butan-1-ol

(d) 2-ethyl pentan-1-ol

BIOLOGY (6)

Q55. How many semilunar cusps are present in a semilunar valve of human heart?

(a) Two   (b) Four   (c) Three   (d) Five

Q56 In the presence of enzyme sucrase, sucrose is broken down into:-

(a) One molecule of fructose and one molecule of galactose

(b) Two molecules of glucose

(c) One molecule of glucose and one molecule of galactose

(d) One molecule of glucose and one molecule of fructose

Q57. Sexual mode of reproduction produces variations because

(A) Gametes are produced by meiotic division.

(B) It occurs due to repeated mitotic division.

(C) Pairing occurs during the formation of gametes.

(D) Meiotic division involves crossing over between the homologous pair of chromosomes.

The correct reasons are

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

Q58. Some neurons are specialized for rapid signal conduction. In these neurons:-

(a) Axons are encased in myelin sheath.   (b) Cell bodies are not present.

(c) Axons are not encased in myelin sheath.   (d) Dendrites are directly connected with axons.

Q59. A non-biodegradable pesticide was sprayed in a grassland. If a food chain in that area is composed of only four steps then after some time, organisms of which group show maximum biomagnification?

(a) Producers   (b) Secondary consumers

(c) Primary consumers   (d) Secondary carnivores

Q60. Match the following columns and select the correct option.

Column-I	Column-II
A. Haemophilia	(i) Recessive autosomal disorder
B. Phenylketonuria	(ii) Chromosomal disorder
C. Myotonic dystrophy	(iii) Recessive X-linked disorder
D. Down's syndrome	(iv) Dominant autosomal disorder

(a) A(iii), B(ii), c(i), d(iv)   (b) A(iv), B(ii), c(iii), d(i)

(c) A(ii), B(i), c(iii), d(iv)   (d) A(iii), B(i), c(iv), d(ii)