8th All India RPS OLYMPIAD

Online & Offline Mega Event

QUESTION PAPER (PHASE – I)

CLASS - X

ENGLISH (10 Marks)

Q1. A person who deliberately uses ambiguous language to conceal the truth or avoid committing themselves to a definite statement is best described as a/an _____.

(A) Etymologist (B) Equivocator (C) Philanthropist (D) Iconoclast

Q2. A person who abandons their religious or political beliefs, especially after previously professing them - _____

(A) Renegade (B) Apostate (C) Heretic (D) Dissident

Q3. The following sentence is divided into three parts. Identify the part containing a grammatical error. Choose (D) if there is no error.

(A) Scarcely had the negotiations resumed

(B) than both parties discovered

(C) that the terms they had previously agreed upon were no longer acceptable.

(D) No error

Q4. No employee _____ (i) _____ access the archive without authorisation; anyone who discovers a missing file _____ (ii) _____ report it immediately, and the incident _____ (iii)_____ be documented before the end of the day.

(A) may, might, can (B) should, could, ought

(C) shall, must, must (D) can, would, need

Q5. The company spent _____ of its annual allocation on litigation, leaving _____ resources for the research programme than had originally been planned.

(A) a large amount; fewer
(B) a large number; less
(C) a large amount; less
(D) many; lesser

Q6. Choose the grammatically correct transformation.

The gardener says to the playing children, "Do as I say."

(A) The gardener instructs the playing children to do as he says.

(B) The gardener tells to the playing children to do as he said.

(C) The gardener instructs the playing children to do as he said.

(D) The gardener told to the playing children to do as he says.

Q7. Choose the grammatically correct transformation.

The critic said, "How little the author seems to understand the implications of his own argument!"

(A) The critic exclaimed with admiration that the author seemed to understand very little the implications of his own argument.

(B) The critic exclaimed with dismay that the author seemed to understand very little of the implications of his own argument.

(C) The critic asked how little the author seemed to understand the implications of his own argument.

(D) The critic exclaimed that how little the author had understood the implications of his own argument.

Q8. Choose the single grammatically correct option.

There _____ to be several factors that _____ the apparent inconsistency between the findings, none of which _____ adequately investigated so far.

(A) appears … explains … have been
(B) appear … explain … has been
(C) appear … explains … have been
(D) appears … explain … has been

Q9. Choose the correct active-passive voice transformation of the following sentences.

No one has ever accounted for the enormous discrepancy between the two independently verified sets of figures.

(A) The enormous discrepancy between the two independently verified sets of figures has never been accounted for.

(B) The enormous discrepancy between the two independently verified sets of figures has never been accounted.

(C) The enormous discrepancy has never been accounted for by anyone ever between the two sets of figures.

(D) The enormous discrepancy between the two independently verified sets of figures had never been accounted for.

Q10. Choose the correct active-passive voice transformation of the following sentences. Why should the authorities have ignored the warnings that had repeatedly been issued by the inspectors?

(A) Why should the warnings that had repeatedly been issued by the inspectors have been ignored by the authorities?

(B) Why should the warnings that had repeatedly been issued by the inspectors be ignored by the authorities?

(C) Why should have the warnings issued by the inspectors been ignored by the authorities?

(D) Why were the warnings that had repeatedly been issued by the inspectors ignored by the authorities?

MATHEMATICS (20 Marks)

Q11.Which of the following is a rational number ?

(A) Sum of $2 + \sqrt{3}$ and its inverse (B) square root of 18

(C) Square root of $7 + 4\sqrt{3}$ (D) None of these

Q12. If the centroid of the triangle formed by the points (a, b), (b, c) and (c, a) is at the origin, then $a^3 + b^3 + c^3 =$

(A) abc (B) 0 (C) a + b + c (D) 3 abc

Q13. The equation $ax^2 + bx + c = 0$, $a > 0$, $b = 0$, $c > 0$ has

(A) Two equal roots (B) One real root

(C) Two distinct real roots (D) No real roots

Q14. The perimeters of two similar triangles ABC and PQR are respectively, 24 cm and 16 cm. If AB = 7.5 cm and QR = 4 cm, find $\frac{BC}{PQ}$.

(A) $\frac{6}{5}$ (B) $\frac{5}{6}$ (C) $\frac{7}{6}$ (D) $\frac{6}{7}$

Q15. If $\sin\theta + \cos\theta = a$ and $\sec\theta + \operatorname{cosec}\theta = b$, then the value of $b(a^2 - 1)$ is _____.

(A) 2a (B) 3a (C) 0 (D) 2ab

Q16. A hemispherical cavity is cut-out from one face of the cubical wooden solid such that the diameter 2d of the hemisphere is equal to the edge of the cube. Determine the surface area of the remaining solid.

(A) $(18 + \pi)d^2$ sq.units (B) $(24 + \pi)d^2$ sq.units

(C) $(12 + \pi)d^2$ sq.units (D) $(7 + \pi)d^2$ sq.units

Q17. Which of the following can be the probability of an event?

(A) 120% (B) $\frac{\sqrt{144}}{12}$ (C) $\frac{3}{5} \times \frac{15}{6}$ (D) $\sqrt[3]{1.331}$

Q18. Mean of 1st n natural numbers is:

(A) $\frac{n(n+1)}{2}$ (B) n (C) $\frac{n}{2}$ (D) $\frac{n+1}{2}$

Q19. A steel wire when bent in the form of a square encloses an area of 121 sq. cm. If the same wire is bent into the form of a circle, then find the area of the quadrant of circle. [Use $\pi = \frac{22}{7}$]

(A) 44 cm^2 (B) 38.5 cm^2 (C) 77 cm^2 (D) 154 cm^2

Q20. Roots of the quadratic equation $x^2 + x - (a + 1)(a + 2) = 0$ are _____.

(A) $-(a + 1), (a + 2)$ (B) $(a + 1), -(a + 2)$

(C) $(a + 1), (a + 2)$ (D) $-(a + 1), -(a + 2)$

Q21.The angle of elevation of a cloud from a point h metres above a lake is θ. The angle Of depression of its reflection in the lake is 45°. The height of the cloud is _____.

(A) $\frac{h(1 + \tan\theta)}{(1 - \tan\theta)}$ (B) $\frac{h(1 - \tan\theta)}{(1 + \tan\theta)}$ (C) $h \tan(45^\circ - \theta)$ (D) None of these

Q22. S and U are two points on the side PQ of ΔPQR, such that QU = PS. If ST || QR and UV || PR, then

(A) TV || PQ (B) TV ⊥ PQ

(C) TV and PQ intersect at 60° (D) TV and PQ intersect at 45°

Q23. X takes 3 hours more than Y to walk 30 km. But if X doubles his pace, he is ahead of Y by $1\frac{1}{2}$ hours. The speed of X is

(A) 5 km/hr (B) 9 km/hr (C) $\frac{9}{7}$ km/hr (D) $\frac{10}{3}$ km/hr

Q24. Two different container contains $(2x^3 + 2x^2 + 3x + 3)$ L and $(4x^3 – 2x^2 + 6x – 3)$ L water. What is biggest measure that can measure both quantities exactly?

(A) $(x^2 + 2x)$ L (B) $(2x^2 + 3)$ L (C) $(2x – 1)$ L (D) $(x + 1)$ L

Q25. If $(m + 1)^{th}$ term of an A.P. is twice the $(n + 1)^{th}$ term, then the ratio of $(3m + 1)^{th}$ term to the $(m + n + 1)^{th}$ term is _____.

(A) 1 : 2 (B) 2 : 1 (C) 1 : 1 (D) 1 : 3

Q26. If $\sin(A + B + C) = 1$, then $\tan(A – B) = \frac{1}{\sqrt{3}}$ and $\sec(A + C) = 2$, find A, B and C respectively when they are acute.

(A) 60°, 0°, 30° (B) 30°, 60°, 90°

(C) 60°, 30°, 0° (D) 0°, 60°, 30°

Q27. The system of equations $px + 4y = 32$ and $2qy + 15x = 96$ has infinite solutions. The value of $p – q$ is:

(A) –1 (B) 1 (C) 0 (D) 11

Q28. Two concentric circles of radii a and b, where $a > b$, are given. The length of a chord of the larger circle which touches the other circle is

(A) $\sqrt{a^2 - b^2}$ (B) $2\sqrt{a^2 - b^2}$ (C) $\sqrt{a^2 + b^2}$ (D) $2\sqrt{a^2 + b^2}$

Q29. Let s denote the semi-perimeter of a triangle ABC in which BC = a, CA = b, AB = c. If a circle touches the sides BC, CA, AB at D, E and F respectively, find BD.

(A) $s – b$ (B) $2s + b$ (C) $b + s$ (D) $3b – s$

Q30. The height of a cone is 30 cm. A small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$ of the volume of the given cone, then at what height above the base is the section made?

(A) 20 cm (B) 25 cm (C) 10 cm (D) 15 cm

SOCIAL SCIENCE (10 Marks)

Q31. Where is the headquarter of the European Union located?

(A) London, Britain (B) Brussels, Belgium

(C) Shanghai, China (D) Rome, Italy

Q32.Which one of the following is NOT a criterion for recognition as a State Party in India, according to the Election Commission of India?

A. Securing at least 6% of the total votes in a State Legislative Assembly election

B. A party must secure at least 2 seats in a State Legislative Assembly election.

C. Securing at least 6% of the total votes in a Lok Sabha election in the state and winning at least 1 Lok Sabha seat.

Choose the correct option

(A) A only (B) B only (C) C only (D) Both B and C

Q33. Professor Muhammad Yunus, the founder of Grameen Bank (2018), belongs to Which one of the following nation.

(A) India (B) Pakistan (C) Bangladesh (D) Srilanka

Q34. An astronaut comes under which one of the following sectors of the Indian economy.

(A) Primary Sector (B) Secondary Sector

(C) Tertiary Sector (D) Quaternary Sector

Q35. Identify the soil using the following two clues.

1. It develops over crystalline igneous and metamorphic rocks and is found in parts of Odisha, Chhattisgarh and the Deccan Plateau.

2. It appears yellow when iron occurs in a hydrated form.

Which soil is being described?

(A) Black Soil (B) Laterite Soil (C) Red and Yellow Soil (D) Arid Soil

Q36. What is the full form of ISO?

(A) International Standards Organisation

(B) International Organization for Standardization

(C) Indian Standards Organization

(D) International System of Operations

Q37. In production of fertilizers _____ is entirely imported as the country does not have any reserves of commercially usable.

(A) Mica (B) Potash (C) Phosphate (D) Ammonium

Q38. Per capita consumption of _____ power resource is considered as an index Of development.

(A) Coal (B) Petroleum (C) Solar (D) Electricity

Q39. Jacob and Wilhelm Grimm were born in which German city?

(A) Berlin (B) Frankfurt (C) Hanau (D) Munich

Q40. Under which Act were plantation workers prohibited from leaving tea gardens without permission?

(A) Inland Emigration Act, 1859 (B) Vernacular Press Act, 1878

(C) Rowlett Act, 1919 (D) Government of India Act, 1919

SCIENCE (20 MARKS)

PHYSICS (7 MARKS)

Q41. A ray of light travelling in air falls obliquely on the surface of a calm pond. Which of the following statement(s) is/are is correct?

(i) It will deviate away from the normal.

(ii) It will deviate towards the normal.

(iii) The speed of light in the calm pond will increase.

(iv) The speed of light in the calm pond will decrease.

Choose the appropriate option below,

(A) (i) only (B) (ii) only (C) (i) and (iii) only (D) (ii) and (iv) only

Q42. A ray of light is incident on a rectangular glass slab at an angle of 60º. The angle between the ray coming out of the slab and the normal to the face of rectangular slab from which it comes out is

(A) 30º (B) 60º (C) 90º (D) 0º

Q43. Brilliance of diamond is due to :

(A) T.I.R. (B) diffraction (C) dispersion (D) polarization

Q44. Twelve identical resistors, each of resistance R, are connected to form the edges of a skeleton cube. What is the equivalent resistance of this network between two diagonally opposite corners of the cube (space diagonal)?

(A) $\frac{3}{4}$R (B) $\frac{5}{6}$R (C) $\frac{7}{12}$R (D) $\frac{4}{3}$R

Q45. A strip of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

(A) Each of these increases

(B) Each of these decreases

(C) Copper strip increases and that of germanium decreases

(D) Copper strip decreases and that of germanium increases

Q46. The minimum number of identical bulbs of rating 4V, 6W, that can work safely with desired brightness, when connected in series with a 240V mains supply is:

(A) 20 (B) 40 (C) 60 (D) 80

Q47. A positively charged particle (alpha particle) projected towards west is deflected towards north by a magnetic field. The direction of the magnetic field is:

(A) Towards south (B) Towards east (C) Downward (D) Upward

CHEMISTRY (7 Marks)

Q48. M.P. of which compound is maximum

(A) chlorobenzene (B) o-dichlorobenzene

(C) m-dichlorobenzene (D) p-dichlorobenzene

Q49. An organic liquid 'A' with acidified potassium dichromate gave product 'B'. The compound 'B' on heating with methanol in presence of concentrated sulphuric acid formed compound 'C' which on subsequent treatment with sodium hydroxide formed two products 'D' and 'E'. The product 'D' is known to affect the optic nerve causing blindness. Intake of 'D' in very small quantities can cause death. What are compounds 'A', 'B', 'C', 'D' and 'E'?

(A) A = Ethanol, B = Ethanoic acid, C = Methanol, D = Sodium acetate, E = Methyl ethanoate

(B) A = Ethanol, B = Ethanoic acid, C = Methyl ethanoate, D = Methanol,
E = Sodium acetate

(C) A = Sodium acetate, B = Ethanoic acid, C = Methyl ethanoate, D = Methanol,
E = Ethanol

(D) A = Ethanol, B = Ethanoic acid, C = Methyl ethanoate, D = Sodium acetate,
E = Methanol

Q50. Match reactions given in Column A with the changes given in Column B and choose the correct option

Column (A)	**Column (B)**
(i) $KI + Pb(NO_3)_2$	a. Evolution of CO_2
(ii) SO_2 + acidified $K_2Cr_2O_7$	b. Formation of NH_3 and endothermic reaction
(iii) $Ba(OH)_2 + NH_4Cl$	c. Change in colour from orange to green
(iv) Na_2CO_3 + Dil. HCl	d. Formation of Yellow Precipitate

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

Q51. In the following reaction :

$$[Cu(H_2O)_3(OH)]^{+} + [Al(H_2O)_6]^{3+} \longrightarrow [Cu(H_2O)_4]^{2+} + [Al(H_2O)_5(OH)]^{2+}$$

(P) (Q) (R) (S)

(A) (P) is an acid and (Q) is a base

(B) (P) and (Q) both are acid

(C) (R) is the conjugate acid of (P) and (S) is the conjugate base of (Q)

(D) (R) is the conjugate base of (P) and (S) is the conjugate acid of (Q)

Q52. The gas that gives a black precipitate with aqueous $Pb(NO_3)_2$ solution and a white precipitate with aqueous $ZnCl_2$ solution is

(A) CO_2 (B) NO_2 (C) NH_3 (D) H_2S

Q53. Consider the two statements below one labeled as Assertion (A) and other as Reason (R). Examine these two statements carefully and decide if Assertion (A) and Reason (R) individually true and if so (R) is a correct explanation of (A) select your answer using the code below:

Assertion (A) : Magnesium imparts characteristic colour to the flame.

Reason (R) : Due to small size and high effective nuclear charge ionization enthalpy of magnesium is high.

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

(B) Both A & R are true but R is not correct explanation of A.

(C) A is true R is false.

(D) A is false R is true.

Q54. Compound A on strong heating in a boiling tube gives off reddish brown fumes and a yellow residue. When the aqueous solution of A is treated with a few drops of sodium hydroxide solution, a white precipitate appeared. Identify the cation and anion present in the compound A:

(A) Cu^{2+} NO_3^{-} (B) Pb^{2+} Cl^{-}

(C) Zn^{2+} SO_4^{2-} (D) Pb^{2+} NO_3^{-}

BIOLOGY (6 Marks)

Q55. A drug prevents the release of neurotransmitter from the ending of motor neuron but there is no change in the activity of sensory neuron, spinal cord and muscle. A student touches a hot object while the drug is still active. Which outcome is most likely to occur?

(A) Sensory receptors fail to detect the heat

(B) Sensory impulse will not reach the spinal cord because the sensory neuron cannot receive the signal

(C) No muscle response as neuromuscular junction becomes non functional

(D) Muscles contract normally as motor neurons pass signals to muscles without releasing any chemicals

Q56. A farmer grows two types of crops, crop P and crop R in his field using different reproductive methods. Crop P was grown by a method that was a lot quicker and produced almost similar types of plants. Crop R was grown by a method that was comparatively slower and produced plants with some difference.

Depending upon this information, identify the methods used to grow these two crops.

(A) Crop P : Sexual reproduction , Crop R : Asexual reproduction

(B) Crop P : Vegetative propagation , Crop R: Sexual reproduction

(C) Crop P : Sexual reproduction , Crop R : Cross pollination

(D) Crop P : Self pollination , Crop R : Vegetative propagation

Q57. A plant is grown in a well lit room with adequate water in the soil. On a humid day, rate of water loss from its leaves decreases because

(A) High humidity in the air reduces the rate of transpiration by decreasing the moisture gradient

(B) High humidity in the air prevents absorption of water from the roots

(C) High humidity increases the root pressure in the plant

(D) High humidity causes xylem to transport sugar instead of water

Q58. Which of the following is the most direct and primary consequence of traumatic rupture of diaphragm?

(A) Digestion in the stomach stops completely

(B) Organs like stomach, liver, intestine move upward causing hindrances in respiration

(C) Automatic increase in lung capacity and blood oxygen level

(D) Lungs slides down and collapse with the stomach and intestine

Q59. In Mirabilis jalapa, red flowered plant cross with white flowered plant to produce pink flowered plants. If 2 such pink flowered plants are crossed, what percentage of offspring is expected to be pink?

(A) 25% (B) 50% (C) 75% (D) 100%

Q60. In a grassland ecosystem, solar energy falling on green plants is 200KJ. What amount of energy will be received by tertiary consumer?

(A) 2J (B) 2KJ (C) 20J (D) 20KJ