SANSKARAM

GROUP OF SCHOOLS

संस्कारम् के साथ, सफलता का विश्वास।।

CLASS: 10th

8th OLYMPIAD

PAPER

Session : 2024-25

Date: 29.12.2024

Time: 1:00 Hrs. **M.M.: 80**

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. **Please fill up on the particulars given on the OMR sheet carefully no manual rechecking will be done.**
2. Duration of Test is 1 hrs. This Question Paper Contains 80 Questions. All are compulsory. Each question carries one Mark. There is **NO NEGATIVE MARKING.**
3. Answers are to be given on a separate OMR sheet.
4. Use black and blue ball pen only to darken the circle.
5. Mark your answers for questions 1–80 on the single OMR sheet by darkening the circles.
6. Sequence of questions is **PHYSICS 1-20, CHEMISTRY 21-40, BIOLOGY 41-60, MATHEMATICS 61-80.**
7. Rough work can be done anywhere in the booklet but not on the OMR sheet/loose paper.
8. Please return the OMR sheet to the invigilator after the test.
9. Do not fold OMR sheet and not make any stray marks on OMR sheet otherwise OMR sheet will not be evaluate at all.

Student's Name: | | | | | | | | | | | | | | |

Roll No.: | | | | | | Mobile No.: | | | | | | | | | |

SANSKARAM 8TH OLYMPIAD

Q1. A light bulb is placed between two plane mirrors inclined at an angle of 60°. Number of images formed are
a) 2 b) 4 c) 5 d) 6

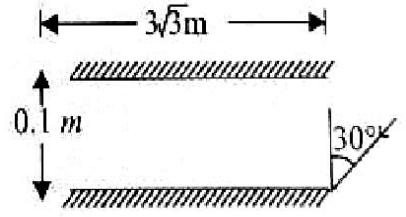
Q2. A ray of light incident on the first mirror parallel to the second and is reflected from the second mirror parallel to first mirror. The angle between two mirrors is
a) 30° b) 60° c) 75° d) 90°

Q3. The light reflected by a plane mirror may form a real image
a) If the rays incident on the mirror are diverging
b) If the rays incident on the mirror are converging
c) If the object is placed very close to the mirror
d) Under no circumstances

Q4. A man runs towards mirror at a speed of 5 m/s and the mirror fixed on a trolley which is moving away at speed of 8 m/s. What is speed of his image?
a) 5 m/s towards man b) 5 m/s away from man c) 3 m/s away from man d) 13 m/s away from man

Q5. Two plane mirrors are parallel to each other and placed 20 cm apart. An object is kept in between them at 15 cm from A. Out of the following at which point an image is not formed in mirror A (distance measured from mirror A)
a) 15 cm b) 25 cm c) 45 cm d) 55 cm

Q6. Two plane mirrors are aligned parallel to each other, as shown in the figure. A light ray is incident at an angle of 30° at point just inside one end of a mirror. The maximum number of times the ray undergoes reflection (including the first one) before it emerges out is



a) 62 b) 90 c) 92 d) 96

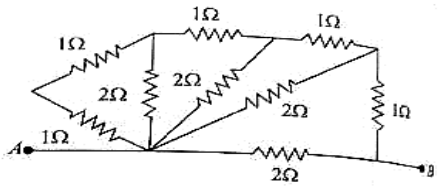
Q7. Velocity of light in medium 1 is 2×10^8 m/s and in medium 2 is 2.25×10^8 m/s. The refractive index of medium 1 with respect to medium 2 is
a) 4/3 b) 3/4 c) $\frac{1}{4}$ d) 9/8

Q8. A convex lens of focal length 40 cm is a contact with a concave lens of focal length 25 cm. The power of combination is
a) – 1.5 D b) – 6.5 D c) +6.5 D d) +6.67 D

Q9. The resistance of a metallic conductor increase with temperature due to
a) Change in carrier density
b) Change in the dimension of the conductor
c) Increase in the number of collisions among the carriers
d) Increase in the rate of collisions between the carriers and a the vibrating atoms of the conductor

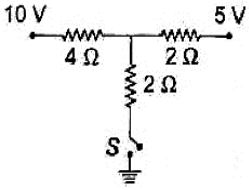
Q10. If a wire of resistance 1 Ω is stretched to double its length, then the resistance will become
a) $\frac{1}{2}\Omega$ b) 2 Ω c) $\frac{1}{4}\Omega$ d) 4 Ω

Q11. What is the resistance between A and B in the following circuit (Fig.)?



a) 1 Ω b) 2 Ω
c) $\frac{1}{2}\Omega$ d) $\frac{3}{2}\Omega$

Q12. When the switch S is closed in the given circuit the current passed through it is



a) 2A b) 1A
c) 0.6A d) Zero

Q13. If a wire of resistance R is fold n times so that its length becomes $\left(\frac{1}{n}\right)^{th}$ of its initial length then its new resistance becomes
a) nR b) n^2R c) $\frac{R}{n}$ d) $\frac{R}{n^2}$

Q14. A rectangular conducting cube (resistivity ρ) has dimensions l × b × h. When current is passed through the length side, the resistance offered by the cube is

a) $\frac{\rho l}{bh}$ b) $\frac{\rho b}{hl}$ c) $\frac{\rho h}{lb}$ d) $\rho\frac{lb}{h^2}$

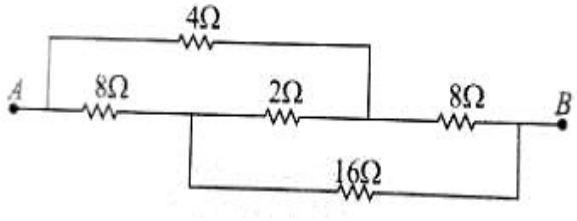
Q15. A wire of resistance 1Ω is stretched so as to change its diameter by 0.25%. The percentage change in its resistance is

a) 1.0% b) 2.0 % c) 4.0% d) 8.0%

Q16. An electric bulb is designed to draw P_0 power at V_0 voltage. If the voltage is V, it draws P power Then,

a) $P=\frac{V_0}{V}P_0$ b) $P=\frac{V}{V_0}P_0$ c) $P=\left(\frac{V_0}{V}\right)^2 P_0$ d) $P=\left(\frac{V}{V_0}\right)^2 P_0$

Q17. In the circuit shown above, some potential difference is applied between A and B. the equivalent resistance between A and B is R.



Which of following statem

1) No current flows through the 2-Ω resistor. 2) R = $\frac{144}{53}\Omega$ 3) R = 8Ω

a) Only 1 is correct b) Only 1 and 2 are correct c) Only 1 and 3 are correct d) Only 3 is correct

Q18. N identical light bulbs, each designed to draw P power from a certain voltage supply, are joined in series across that supply. The total power which they will draw is

a) nP b) P c) P/n d) P/n^2

Q19. The relationship between electricity and magnetism was discovered by

a) Faraday b) Newton c) Maxwell d) Oersted

Q20. The magnetic field lines inside a long, current carrying solenoid are nearly

a) straight b) circular c) parabolic d) elliptical

Q21. The chemical composition of plaster of Paris is:

a) $CaSO_4 . 2H_2O$ b) $CaSO_4 . H_2O$ c) $CaSO_4 . ½ H_2O$ d) $CaSO_4 . 3H_2O$

Q22. The pair of the solutions which have pH value less than 7, is -

a) solution of washing soda and solution of vinegar b) solution of soap and solution of washing soda

c) solution of copper sulphate and solution of washing soda d) solution of copper sulphate and vinegar

Q23. Salt made of non-metallic elements only is:

a) NaCl b) NH_4Cl c) AlN d) $MgCl_2$

Q24. pH of soda water is:

a) 7 b) < 7 c) > 7 d) 0

Q25. Common name of Sodium Carbonate is-

a) Baking Soda b) Washing Soda c) Bleaching Powder d) Quick Lime

Q26. An acid, obtained by destructive distillation of wood which in turn give acetic acid is .....

a) Oxalic acid b) Pyroligneous acid c) Chloro acetic acid d) Citric acid

Q27. Which of the following is a double salt?

a) Blue Vitriol b) Glauber's salt c) Potash Alum d) Potassium Ferrocyanide

Q28. The reagent obtained by dissolving Copper sulphate in aqueous solution of Citric acid and Sodium carbonate is.....

a) Bayer's reagent b) Tollen's reagent c) Fehling reagent d) Benedict reagent

Q29. When Sodium carbonate (Na_2CO_3) reacts with Silica (SiO_2) gives.....

a) Soda Glass b) Water glass c) Crook's glass d) Pyrex glass

Q30. In order to decrease the role of setting of Cement, which compound is mixed in it ?

a) $Ca(OH)_2$ (Slaked lime) b) $CaCO_3$ (Calcium Carbonate) c) $CaSO_4.2H_2O$ (Gypsum) d) Al_2O_3 (Alumina)

Q31. Which reagent is able to dissolve gold and platinum?

a) Nitric acid b) Aqua-regia c) Hydrochloric acid d) Sulphuric acid.

Q32. Detergents are salts of -

a) strong acid and strong base b) strong acid and weak base

c) weak acid and strong base d) weak acid and weak base

Q33. Methane with the Molecular formula "CH_4" has –
a) 4 Covalent bonds b) 8 Covalent bonds c) 6 Covalent bonds d) 2 Covalent bonds
Q34. In the presence of concentrated sulphuric acid, acetic acid reacts with alcohol to produce –
a) aldehyde b) alcohol c) ester d) carboxylic acid
Q35. Which of the following gases is known as tear gas?
a) Methyl isocyanide b) Sulphur dioxide c) Chloropicrin d) Nitrous oxide
Q36. Fullerence, an allotrope of carbon contains -
a) 30 six membered rings b) 24 five membered rings and 10 six membered rings.
c) 12 five membered rings and 20 six membered rings d) 18 five membered rings and 15 six membered rings.
Q37. The IUPAC name of $(CH_3)_3C–OH$ is -
a) 2 – Methylpropan–2–ol b) 2–Methylpropan–1–ol. c) 1,1–Dimethyl ethanol d) Butan–1–ol
Q38. Unsaturated hydrocarbon is -
a) CH_4 b) C_2H_6 c) C_2H_4 d) C_2H_5OH
Q39. How many isomers are possible for an alkane having molecular formula C_6H_{14}?
a) 3 b) 4 c) 5 d) 6
Q40. Which test can be used to distinguish between acetylene and ethylene gases?
a) Reaction with Br_2 in CCl_4 solvent b) Conc. H_2SO_4
c) Ammonical cuprous chloride solution d) Hydrogen gas in presence of Pt.
Q41. Metabolic wastes containing nitrogen in our body are due to
a) Carbohydrates b) Proteins c) Fats d) Vitamins
Q42. The effect of antidiuretic hormone (ADH) on the kidney is to increase the
a) Excretion of water b) Excretion of Na' c) Permeability of the distal nephron to water
d) Glomerular filtration rate
Q43. Nissl's granules are found in all except
a) Cyton b) Dendrites c) Axon d) Cell body
Q44. Testis act as the
a) Primary sex organ b) Endocrine gland c) Both (a) and (b) d) None of these
Q45. The site of processing of vision, hearing speech, memory, intelligence, emotions and thoughts is
a) Brain b) Hear c) Lungs d) Kidney
Q46. In reflex action, the reflex arc is formed by
a) Muscle, receptor, brain b) Brain, spinal cord muscle
c) Receptor, spinal cord, muscle d) Receptor, muscle, spinal cord
Q47. In the lunch, you ate boiled green vegetables, a piece of cooked meat, one boiled egg and a sugar candy. Which one of these foods may have been digested first?
a) Boiled green vegetables b) The piece of cooked meat c) Boiled egg d) Sugar candy
Q48. Bicuspid and tricuspid valves are open during:
a) Ventricular systole b) Ventricular diastole c) Atrial systole d) Late joint diastole
Q49. Polycythemia is-
a) Increased RBCs count b) Decreased WBCs count c) Increased WBCs count d) Decreased platelets count
Q50. Cardiac cycle in man takes about
a) 0.5 seconds b) 1.0 seconds c) 1.2 seconds d) 0.8 seconds
Q51. Mastication occurs in
a) Mouth b) Oesophagus c) Stomach d) Ileum
Q52. Which of the following option shows the transport of oxygen to the cell correctly?
a) Lungs →pulmonary vein →left atrium →left ventricle →aorta → body cells
b) Lungs →pulmonary vein →right atrium →right ventricle → aorta → body cells
c) Lungs →pulmonary artery →left atrium → left ventricle → vena cava → body cells
d) Lungs →pulmonary artery →right atrium → right ventricle→ vena cava → body cells
Q53. What is the percentage of oxygen in the expired air when a person is resting?
a) 12% b) 16% c) 20% d) 24%
Q54. What is the function of the pituitary gland?
a) To develop sex organs in males b) To stimulate growth in all organs
c) To regulate sugar and salt levels in the body d) To initiate metabolism in the body
Q55. Which of the following option shows the order of events correctly when a bright light is focused on our eyes?
a) Bright light → receptors in eyes → sensory neuronàspinal cord → motor neurons → eyelid closes
b) Bright light → receptors in eyes → spinal cord → sensory neuron → motor neurons → eyelid closes
c) Bright light → receptors in eyes → sensory neuron → motor neurons → spinal cord → eyelid closes
d) Bright light → receptors in eyes → spinal cordà motor neurons → sensory neuron → eyelid closes

Q56. IUCD is for

a) Vegetative propagation b) Contraception c) Increasing fertility d) Avoiding miscarriage

Q57. The transfer of sperms into the female genital tract is called

a) Insemination b) Gametogenesis c) Fertilization d) Gestation

Q58. Which one of the following is not a male sex accessory gland?

a) Seminal vesicle b) Epididymis c) Prostate d) Bulbourethral

Q59. Which of the following is a most widely used contraceptive in India?

a) IUD b) Pills c) Barrier method d) Natural method

Q60. Tubectomy is a method of sterilization in which

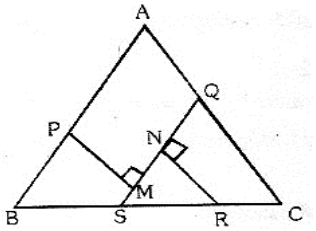
a) Small part of the fallopian tube is removed or tied up b) Ovaries are removed surgically

c) Small part of vas deferens is removed or tied up d) Uterus is removed surgically

Q61. In the figure, in Δ ABC, AB = AC = 10 cm and BC = 12 cm. P and Q are the midpoints of AB and AC, respectively. PM and RN are perpendiculars on SQ. If BS : SR : RC = 1 : 2 : 1, then the length of MN is:

a) $\frac{14}{\sqrt{13}}cm$ b) $\sqrt{13}cm$

c) $\frac{12}{\sqrt{13}cm}$ d) $\frac{10}{\sqrt{13}}cm$



Q62. Two concentric circles with center O, have radii 15 cm and 9 cm. From a point A on the bigger circle tangents AB and AC are drawn to the smaller circle at B and C, respectively, intersecting bigger circles at D and E, respectively OF ⊥ DE at F. The length of OF is:

a) 3.8 cm b) 4.2 cm c) 4.5 cm d) 5.1 cm

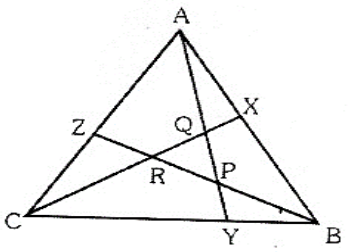
Q63. In the figure, ABC is an equilateral triangle with side 14 cm, AX = $\frac{1}{3}$ AB, BY = $\frac{1}{3}$ BC and CZ = $\frac{1}{3}$ AC. What is the area (in cm^2) of Δ PQR?

a) $7\sqrt{3}$

b) $14\sqrt{3}$

c) $\frac{28\sqrt{3}}{9}$

d) $\frac{49\sqrt{3}}{9}$



Q64. ABEDC is a pentagon such that ABC is an equilateral triangle and BEDC is a square of side 2 cm. A circle passes through its vertices A, E and D. What is the circumference (in cm) of the circle?

a) $3\sqrt{3}\pi$ b) $4\sqrt{3}\pi$ c) 4π d) 8π

Q65. An octahedral die whoso faces are numbered 1 through 8 (only one number on one face) is thrown three times. What is the probability that the product of the numbers obtained in first two throws is equal to the number obtained in the third throw?

a) $\frac{9}{216}$ b) $\frac{3}{128}$ c) $\frac{3}{64}$ d) $\frac{5}{128}$

Q66. If $\sin\theta = \frac{m^2+2mn}{m^2+2mn+2n^2}$, then $\frac{1}{\sec\theta-\tan\theta} - \frac{1}{\cos\theta}$ is equal to:

a) $\frac{m^2+mn}{n^2+2mn}$ b) $\frac{n^2+mn}{m^2+mn}$ c) $\frac{m^2+mn}{n^2+mn}$ d) $\frac{m^2+2mn}{2(n^2+mn)}$

Q67. The number of real solution of the pair of equation $x + y + xy = 19$ and $x^2 + y^2 = 25$ is

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

Q68. When the decimal point of a certain positive decimal number is moved two places to the right, the new number is two times the sum of the original number and the reciprocal of the original number. The product of 42 and the original numbers is

a) 3 b) 6 c) 7 d) 14

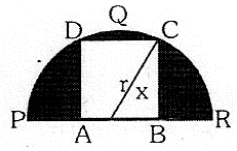
Q69. If an arc subtending an angel of 75° at the centre of a circle A and another arc subtending an angle of 55° at the centre of circle B are of same length, then the ratio of area of circle A to that of circle B is

a) 11 : 15 b) 11 : 25 c) 121 : 225 d) 121 : 625

Q70. In the figure, PQR is a semicircle and ABCD is a square of side x cm, if the area of the shaded part is $(5\pi - 8)$ cm^2, then the value of x is

a) $2\sqrt{2}$ b) 4

c) $4\sqrt{2}$ d) 8



Q71. A right circular cylinder whose diameter is equal to its height is inscribed in a right circular cone of base diameter 16 cm and height 3 times the base diameter. The axes of both solids coincide. What is the volume (in cm^3) of the solid inside the cone but outside the cylinder?

a) 296 π b) 512 π c) 432 π d) 592 π

Q72. $\frac{1}{y}-\frac{1}{x}=5$ and $\frac{1}{y}+\frac{1}{x}=7$ then x = ?

a) 1 b) $\frac{1}{6}$ c) $\frac{1}{2}$ d) $\frac{1}{3}$

Q73. The number of real zeroes of the polynomial $x^2 + 4|x| + 8$

a) 4 b) 2 c) 1 d) 0

Q74. $(18)^{23}$ is divided by 17 to give the remainder –

a) 1 b) 2 c) 17 d) 9

Q75. The probability of having 53 Sundays and 53 Mondays in a leap year?

a) $\frac{2}{7}$ b) $\frac{1}{7}$ c) 0 d) $\frac{3}{7}$

Q76. Two rights circular cones have the same height. The radii of their bases are a and b, they are melted and recast into a cylinder of same height. The radius of the base of the cylinder is

a) $\frac{a+b}{\sqrt{3}}$ b) $\frac{a+b}{3}$ c) $\frac{\sqrt{a+b}}{3}$ d) $\sqrt{\frac{a^2+b^2}{3}}$

Q77. The radius of two cylinders are in the ratio 2:3 and their heights are in the ratio 5:3. The ratio of their volumes –

a) 10 : 17 b) 20 : 27 c) 10 : 27 d) 20 : 37

Q78. Value of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots _____

a) 0 only b) 4 c) 4 and 8 d) 0 and 8

Q79. If $S_n = 3x^2 + 2n$. What is a_n = ?

a) 6n – 1 b) 6n + 1 c) 5n + 6 d) None of these

Q80. The volume of greatest sphere that can be cut off from a cylindrical log of wood of base radius 1cm and height 5cm.

a) $\frac{4}{3}\pi cm^3$ b) $\frac{10}{3}\pi cm^3$ c) 5π cm^3 d) $\frac{20}{3}\pi cm^3$