10 / I / 20 / A

PAPER CODE : 10

EXAMINATION - I

Duration: 3 Hours

Maximum Marks : 150

Read the following Instructions carefully:

1. **CHECK THE PAPER CODE OF THE QUESTION PAPER WITH PAPER CODE PRINTED IN YOUR ADMIT CARD. IF IT DOES NOT MATCH, REPORT IT IMMEDIATELY TO THE INVIGILATOR.**
2. This Question Paper contains 125 multiple choice objective type questions as follows:

Section A :	Physics	35 Questions	**(Q. No. 1 – 35 of 1 mark each)**
Section B :	Chemistry	35 Questions	**(Q. No. 36 – 70 of 1 mark each) and**
Section C :	Mathematics	55 Questions	**(Q. No. 71 – 100 of 1 mark each, and Q. No. 101 – 125 of 2 marks each)**

3. Attempt all questions from each Section.
4. Each question has four options (A, B, C and D). Choose the correct / most appropriate option **(only one)** for your answer by darkening the bubble with **Blue / Black ball point pen** in the OMR Answer Sheet accordingly.
   For example: ● B C D if your choice of answer is (A).

   Use of Pencil on OMR Sheet is strictly Prohibited.
5. Darkening more than one option bubble in the OMR Answer Sheet against a Question Number shall be **treated as incorrect.**
6. **For every incorrect answer to a question, 25% (1/4th) of the marks carried by that question will be deducted.** No deduction from the total score will be made if **no response** is indicated for a question in the Answer Sheet.
7. All rough works should be done in the space provided in the question paper. Any rough works / calculations done on the OMR Sheet will lead to **Cancellation of your Candidature.**
8. No candidate is allowed to carry any textual material, printed or written, bits of paper, pager, mobile phone, any other electronic gadgets, etc. except the **Admit Card** in the Examination Hall/ Room.
9. Candidates can leave the Examination Hall only after the expiry of one hour of the examination but they will not be allowed to take the Question Paper along with them. However, they can collect the Question Paper after the completion of Examination period.
10. This Question Paper contains 20 printed pages. In case of any discrepancy, please report immediately to the Invigilator on duty in the Hall/ Room.
11. **Adoption of any kind of unfair means / malpractices in the examination hall will render the candidate liable for cancellation of his/her candidature /admission.**
12. Write your Roll No. and Name in the Box provided below:

Roll Number	
Name	

SECTION – A (Physics)

Question numbers 1 – 35 carry 1 mark each:

1. Parsec is the unit of
   [A] Time [B] Distance
   [C] Frequency [D] Angular momentum

2. The numbers of divisions on circular scale of a screw gauge are 50. It moves 0.5 mm on main scale in one rotation. The least count of the screw gauge is
   [A] 0.1 mm [B] 0.001 mm
   [C] 0.01 mm [D] 1.0 mm

3. Who discovered X- rays?
   [A] Coolidge [B] Roentgen
   [C] Maxwell [D] Fermi

4. A particle is projected at 60^0 to the horizontal with a kinetic energy K. The kinetic energy at the highest point is
   [A] K / 4 [B] K
   [C] Zero [D] K / 2

5. A body of mass 2 kg is projected at 20 m/s at an angle of 60^0 above the horizontal. Power due to gravitational force at the highest point is
   [A] 50 W [B] $100\sqrt{3}$ W
   [C] 200 W [D] Zero

6. 1 Watt is equal to
   [A] 418 Calorie per second [B] 1 Joule per second
   [C] 4.18 Joule per second [D] 41.8 Joule per second

7. A lens of power + 6 D is placed in contact with another lens of power – 4 D. What will be the nature and focal length of this combination?
   [A] Concave, 25 cm [B] Convex, 50 cm
   [C] Concave, 20 cm [D] Convex, 100 cm

(Space for rough works)

8. Isobars are
[A] Atoms having the same number of neutrons
[B] Atoms having same mass number but different atomic number
[C] Atoms having same atomic number but different mass number
[D] None of these

9. In uniform circular motion
[A] Both velocity and acceleration are constant
[B] Acceleration and speed are constant but velocity changes
[C] Both velocity and acceleration changes
[D] Both acceleration and speed are constant

10. When torque applied on a system is zero, which of the following will be constant
[A] Force
[B] Linear momentum
[C] Impulse
[D] Angular momentum

11. Mercury as a thermometric substance is preferred due to
[A] Over a wide range of temperature its expansion is uniform
[B] It does not stick to thermometer glass
[C] It is opaque to light
[D] All of the above

12. A girl swings on a cradle in a sitting position. If she stands, then the time period of girl and cradle will
[A] Decrease
[B] Increase
[C] Remain the same
[D] First increase and then remain constant

13. If V is the volume and P is pressure then at constant temperature the graph between V and 1/P is
[A] Hyperbola
[B] Parabola
[C] A curve of any shape
[D] A straight line

14. An observer standing at the sea coast observes 54 waves reaching the coast per minute. If the wavelength of the waves is 10 m then its speed is
[A] 90 m/s
[B] 90 cm/s
[C] 9 m/s
[D] 9 cm/s

(Space for rough works)

15. A particle of mass 100 g is thrown vertically upwards with a speed of 5 m/sec. How much work to be done by the force of gravity to reach the particle at the highest point?
[A] 1.25 J
[B] 0.5 J
[C] − 0.5 J
[D] − 1.25 J

16. Nuclear force exists between
[A] Proton–Neutron
[B] Proton–Proton
[C] Neutron–Neutron
[D] All of the above

17. If the earth stops rotating, the value of g at the equator will
[A] Increase
[B] Decrease
[C] No effect
[D] None of these

18. Fission chain reaction in a nuclear reactor can be controlled by introducing
[A] Iron rods
[B] Graphite rods
[C] Cadmium rods
[D] None of these

19. Which of the following is **not** due to total internal reflection of light
[A] Brilliance of diamond
[B] Working of optical fiber
[C] Difference between apparent and real depth of a pond
[D] Mirage on hot summer day

20. Which one of the following is **not** a state function?
[A] Temperature
[B] Entropy
[C] Pressure
[D] Work

21. The heat of 100 J is added to a gaseous system whose internal energy is 40 J, then the amount of external work done will be
[A] 70 J
[B] 140 J
[C] 40 J
[D] 30 J

22. The direction of propagation of an electromagnetic wave is
[A] Perpendicular to electric field
[B] Perpendicular to both electric and magnetic field
[C] Perpendicular to magnetic field
[D] Parallel to electric and magnetic field

23. Myopia is corrected by using
[A] Convex lens
[B] Concave lens
[C] Convex mirror
[D] Concave mirror

(Space for rough works)

24. A body at 1500 K emits maximum energy at a wavelength 20,000 Å. If the sun emits maximum energy at wavelength 5500 Å, then the temperature of sun is

[A] 5454 K
[B] 4454 K
[C] 4550 K
[D] 5400 K

25. Magnetic meridian is a

[A] Point
[B] Horizontal plane
[C] Line along N–S
[D] Vertical plane

26. The time period of a simple pendulum on a freely moving artificial satellite is

[A] Zero
[B] 2 Sec
[C] 1 Sec
[D] Infinite

27. A bulb of 220 V, 60 W is operated on 110 V supply, then power developed in it, is

[A] 15 W
[B] 30 W
[C] 65 W
[D] 60 W

28. 1 A current is drawn by a filament of an electric bulb. What would be the number of electrons passing through a cross section of the filament in 16 sec.?

[A] 10^1
[B] 10^2
[C] 10^{20}
[D] 1

29. Three plotting compasses are placed close to a solenoid carrying a current. How many of the compass needles will change direction. If the current through the solenoid is increased? (Ignore the effect of the earth's magnetic field)

[A] Only 1 compass needle
[B] 2 compass needle
[C] 3 compass needle
[D] None of the above

30. Two heater wires of equal length are first connected in series and then in parallel. The ratio of heat produced in the two cases is

[A] 1 : 2
[B] 2 : 1
[C] 1 : 4
[D] 4 : 3

31. A converging lens is used to form an image on a screen. When upper half of the lens is covered by an opaque screen, then

[A] Half of the image will disappear
[B] Complete image will be formed with same intensity
[C] Half of the image will be formed with same intensity
[D] Complete image will be formed with decreased intensity

(Space for rough works)

32. Which of the following celestial phenomena occurs due to stars?
[A] Rainbow
[B] Ozone
[C] Black hole
[D] Comet

33. A small piece of wire is passed through the gap between the poles of a magnet in 0.1 sec. An e. m. f. of 4×10^{-3} V is induced in the wire. The magnetic flux between the poles of the magnet is
[A] 4×10^{-4} Wb
[B] 4×10^{-2} Wb
[C] 0.1 Wb
[D] 10 Wb

34. A D. C. motor
[A] Creates mechanical energy
[B] Creates electrical energy
[C] Converts electrical energy into mechanical energy
[D] Converts mechanical energy into electrical energy

35. The group of small pieces of rock revolving round the sun between the orbits of Mars and Jupiter are called
[A] Meteors
[B] Comets
[C] Meteorites
[D] Asteroids

---------- Section-A: (Physics Paper) Ends ----------

(Space for rough works)

SECTION – B (Chemistry)

Question numbers 36 – 70 carry 1 mark each:

36. A mixture of four liquids having their boiling points differing by only a few degrees, can be separated by
[A] Separating funnel
[B] Steam distillation
[C] Fractional distillation
[D] Distillation under reduced pressure

37. C^{12}, C^{13} and C^{14} are called
[A] Isobars
[B] Isotopes
[C] Isoelectronic
[D] Isotones

38. Homogeneous mixtures are called
[A] Mixtures
[B] Solutions
[C] Colloidal solutions
[D] Suspensions

39. Property of alkaline earth metals that increases with their atomic number is
[A] Ionization enthalpy
[B] Solubility of their hydroxides
[C] Solubility of their sulphates
[D] Electronegativity

40. Bohr atomic model can explain
[A] The spectrum of hydrogen atom only
[B] Spectrum of an atom or ion containing one electron only
[C] The spectrum of hydrogen molecule
[D] The solar spectrum

41. The outermost electronic configuration of the most electronegative element is
[A] $ns^2 np^2$
[B] $ns^2 np^4$
[C] $ns^2 np^5$
[D] $ns^2 np^6$

42. Which of the following orbital is not possible?
[A] *2s*
[B] *2p*
[C] *3f*
[D] *4d*

43. The tendency towards complex formation is maximum in
[A] s – block elements
[B] p – block elements
[C] d – block elements
[D] None of these

(Space for rough works)

44. Which one of the following element has highest first ionization potential?
[A] Boron [B] Carbon
[C] Nitrogen [D] Oxygen

45. Sprit of wine is called
[A] CH_3COOH [B] CH_3CHO
[C] CH_3COCH_3 [D] C_2H_5OH

46. The angle between two covalent bonds is maximum in
[A] H_2O [B] NH_3
[C] CO_2 [D] CH_4

47. In N_2 molecule, the atoms are bonded by
[A] One σ , two π bonds [B] Two σ , two π bonds
[C] One σ , one π bonds [D] Three σ bonds

48. Hydrogen bonding is not present in
[A] Glycerin [B] Water
[C] Hydrogen Fluoride [D] Hydrogen Sulphide

49. Which of the following molecule is not an exception to the octet rule?
[A] BF_3 [B] PF_5
[C] CO_2 [D] IF_7

50. Shape of H_2O molecule is
[A] Angular [B] Tetrahedral
[C] Trigonal bipyramidal [D] Pentagonal bipyramidal

51. Which of the following is not a derivative of organic acids?
[A] Anhydrides [B] Esters
[C] Amides [D] Amines

52. The number of molecules in 32 g of oxygen is
[A] 3.2×10^{16} [B] 6.02×10^{23}
[C] 3.2×10^{23} [D] 6.02×10^{10}

(Space for rough works)

53. For the redox reaction $MnO_4^- + C_2O_4^{2-} + H^+ \longrightarrow Mn^{2+} + CO_2 + H_2O$
The correct coefficients of the reactants in the balanced reaction are
[A] $2MnO_4^- + 5C_2O_4^{2-} + 16\ H^+$
[B] $16MnO_4^- + 5C_2O_4^{2-} + 2H^+$
[C] $5MnO_4^- + 16C_2O_4^{2-} + 2H^+$
[D] $2MnO_4^- + 16C_2O_4^{2-} + 5H^+$

54. One millimole of $CaCO_3$ weight is
[A] 100 gm
[B] 1.0 mg
[C] 1 gm
[D] 0.1 gm

55. In a galvanic cell, which one of the following statements is not correct?
[A] Anode is negatively charged
[B] Cathode is positively charged
[C] Reduction takes place at the anode
[D] Reduction takes place at the cathode

56. The equipment used to carry out the fission reaction in a controlled manner is called
[A] Moderator
[B] Nuclear reactor
[C] Nuclear fusion
[D] Thermonuclear fission

57. An α-particle is
[A] An electron
[B] A proton
[C] A positron
[D] A helium nucleus

58. Radioactive iodine is used in the therapy of disease related to
[A] Bone
[B] Kidney
[C] Blood Cancer
[D] Thyroid

59. The chemical formula of Plaster of paris is
[A] $(CaSO_4)_2.H_2O$
[B] $CaSO_4.H_2O$
[C] $CaSO_4.\frac{1}{2}H_2O$
[D] $CaSO_4.5H_2O$

60. Brass is an alloy of
[A] Copper and Aluminium
[B] Copper and Iron
[C] Copper and Magnesium
[D] Copper and Zinc

61. Which of the following is used to oxidize ethanol to ethanoic acid?
[A] Al_2O_3
[B] Pyridine
[C] Acidified $K_2Cr_2O_7$
[D] All of the above

(Space for rough works)

62. The monomer tetrafluroethylene can be used for the preparation of
[A] PMMA [B] Polyurethane
[C] Teflon [D] Polyethylene

63. Soaps are formed by saponification of
[A] Alcohols [B] Esters of fatty acids
[C] Glycosides [D] Carboxylic acids

64. Number of acidic hydrogen's present in butyne-1 is
[A] 2 [B] 3
[C] 4 [D] 1

65. Calorific value gives the
[A] Amount of light [B] Amount of heat
[C] Fuel efficiency [D] None of these

66. Which of the following would not decolorize 1% alkaline $KMnO_4$?
[A] C_2H_4 [B] C_2H_6
[C] C_2H_2 [D] C_3H_6

67. Which fuels are used for running automobiles?
[A] Diesel [B] Wood
[C] Charcoal [D] None of these

68. Fehling's test is positive for
[A] Acetaldehyde [B] Benzaldehyde
[C] Alcohol [D] Ethers

69. The type of pollution which is likely to affect Taj Mahal in Agra to a greater extent is
[A] Water pollution [B] Soil pollution
[C] Noise pollution [D] Air pollution

70. Acid rain is caused by oxides of
[A] Sulphur, Nitrogen [B] Sulphur, Carbon
[C] Carbon, Nitrogen [D] Phosphorous, Carbon

---------- Section-B: (Chemistry Paper) Ends ----------

(Space for rough works)

SECTION – C (Mathematics)

Question numbers 71 – 100 carry 1 mark each:

71. Ram covers one round of circular path in 26 minutes and Mohan takes 91 minutes for the same circular path. Suppose they both start from the same point at 7:00 AM and go in the same direction. The time of their meeting again at the starting point will be

[A] 08 : 02 AM
[B] 09 : 03 AM
[C] 11 : 00 AM
[D] 10 : 02 AM

72. Let $\frac{p}{q}$ be a rational number having terminating decimal representation. Which of the following option is correct?

[A] $q = 80$
[B] $q = 24$
[C] $q = 35$
[D] $q = 81$

73. If p, q are the zeros of $x^2 + ax + c$, then value of $p^3 + q^3 - 3ac$ is

[A] $-c^3$
[B] a^3
[C] $-a^3$
[D] c^3

74. One out of two zeros of the polynomial $p(x) = 4\sqrt{5}x^2 - 2\sqrt{5}x - 2\sqrt{5}$ lies between two real numbers b and c. The possible values of b and c are

[A] $b = -1,\ c = -2$
[B] $b = 0,\ c = -1$
[C] $b = 5,\ c = 6$
[D] None of these

75. The value of k for which pair of linear equations $x + 2y = 1,\ kx + (k-1)y = 4$ have no solution, is

[A] -1
[B] 1
[C] -2
[D] 2

76. The value of $[1 - \{1 - (1 - x^2)^{-1}\}^{-1}]^{-\frac{1}{2}}$ is

[A] x
[B] $1/x$
[C] 1
[D] None of these

77. Let the pair of linear equations are $3x + 4y = a,\ 7x + 8y = b$ such that $a \neq 0$ and $b \neq 0$. The pair of equations have

[A] No solution
[B] Unique solution
[C] Infinite solution
[D] None of these

(Space for rough works)

$p+q = -\frac{a}{1} \quad pq = c$

$+a)2a(p+q)^3 - 3ac$

$= -$

$x+2y=1$

$kx+(k-1)y=4$

78. The length of the longest pole that can be placed in a room 12 m long, 8 m broad and 9 m high, is

[A] 16 m [B] 17 m
[C] 18 m [D] 19 m

79. D and E are points on the sides of AB and AC respectively of a ΔABC. Given AD = 6 cm, DB = 4 cm and EC = 3cm. If DE is parallel to BC, then AE is

[A] 4.5 cm [B] 4 cm
[C] 5.5 cm [D] 5 cm

80. The corresponding sides of two similar triangle Δ_1 and Δ_2 are 2 cm and 3 cm respectively. If area of triangle Δ_2 is 81 cm^2, then area of triangle Δ_1 is

[A] 27 cm^2 [B] 54 cm^2
[C] 36 cm^2 [D] 45 cm^2

81. A square sheet of paper is converted into a cylinder by rolling it along its length. What is the ratio of the base radius to the side of the square?

[A] $\frac{1}{2\pi}$ [B] $\frac{\sqrt{2}}{\pi}$
[C] $\frac{1}{\sqrt{2}\pi}$ [D] $\frac{1}{\pi}$

82. Let us consider an equilateral triangle ABC. D is any point on BC such that AD is perpendicular to BC. If $AB^2 = x\,AD^2$, then x is

[A] 4/5 [B] ¾
[C] 5/4 [D] 4/3

83. The diagonals of a quadrilateral divide each other proportionally. Which of the following option is most correct?

[A] Two sides are parallel [B] Two sides are non-parallel
[C] Both [A] and [B] [D] None of these

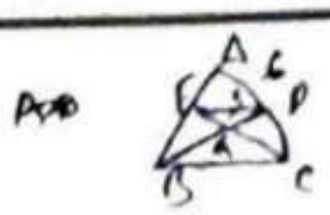
84. The m^{th} term of an A. P. is n and n^{th} term is m. The r^{th} term of the A. P. will be

[A] $m + n + r$ [B] $m + n - 2r$
[C] $\frac{1}{2}(m + n + r)$ [D] $m + n - r$

85. A triangle cannot be drawn with the following three sides

[A] 2 m, 3 m, 4 m [B] 3 m, 4 m, 8 m
[C] 4 m, 6 m, 9 m [D] 5 m, 7 m, 10 m

(Space for rough works)



86. The value of $3 \tan 47^\circ \tan 43^\circ + cosec\ 34^\circ - \sec 56^\circ$ is
[A] 1 [B] 3
[C] 0 [D] 2

87. If $(cosec\ A - \sin A)(\sec A - \cos A) = y \sin 2A$, then the value of y is
[A] -2 [B] $-1/2$
[C] 2 [D] $1/2$

88. For what value of k, the equation $2x^2 + kx + 4 = 0$ has equal roots
[A] $4\sqrt{2}$ [B] $3\sqrt{2}$
[C] $2\sqrt{5}$ [D] $2\sqrt{3}$

89. Which of the following measure(s) satisfies (satisfy) a linear relationship between two variables?
[A] Mean [B] Median
[C] Mode [D] All of these

90. For a moderately skewed distribution, which of the following relationship holds?
[A] Mean – Mode = 3(Mean – Median) [B] Median – Mode = 3(Mean – Median)
[C] Mean – Median = 3(Mean – Mode) [D] Mean – Median = 3(Median – Mode)

91. If the roots of equation $(b-c)x^2 + (c-a)x + (a-b) = 0$ are equal, then the value of b is
[A] $\frac{(c-a)}{2}$ [B] $\frac{(c+3a)}{2}$
[C] $\frac{(c+a)}{2}$ [D] $\frac{(3c+a)}{2}$

92. 21^{st} term of series $\frac{1}{2}, \frac{7}{2}, \frac{13}{2}, \ldots\ldots\ldots$ is
[A] $\frac{121}{2}$ [B] $\frac{123}{2}$
[C] $\frac{119}{2}$ [D] $\frac{117}{2}$

93. The value of $\frac{1}{1+x^{(b-a)}+x^{(c-a)}} + \frac{1}{1+x^{(a-b)}+x^{(c-b)}} + \frac{1}{1+x^{(b-c)}+x^{(a-c)}}$ is
[A] 0 [B] 1
[C] x^{a-b-c} [D] None of these

(Space for rough works)

$2x^2 + kx + 2 = 0$
$\Rightarrow k = -\frac{2}{x} - 2x$
$\Rightarrow x(2x + k) + 2 = 0$
$\Rightarrow 2x + k = -\frac{2}{x}$
$\Rightarrow k = \frac{-2 - 2x^2}{2x}$

94. The sum of an A. P. is $3n - n^2$. The first negative term is
[A] - 3 [B] - 2
[C] - 1 [D] - 4

95. If a, b and c are non-zero and $a + \frac{1}{b} = 1$ and $b + \frac{1}{c} = 1$, then the value of abc is
[A] 3 [B] - 1
[C] 1 [D] - 3

96. The two radii of concentric circles are 13 cm and 5 cm respectively. The length of a chord of the larger circle, which touches the smaller circle, is
[A] 24 cm [B] 21 cm
[C] 20 cm [D] 18 cm

97. In a right angled triangle ABC, right angled at C, AB = 5 cm, AC = 4 cm and CB = 3 cm. The radius of circle drawn inside the triangle and touching the each side of triangle is
[A] 2 cm [B] 1.5 cm
[C] 2. 5 cm [D] 1 cm

98. The angle between the two tangents to a circle drawn from an external point is 60°. The angle subtended by the line segment joining the points of contact at the centre is
[A] 130° [B] 120°
[C] 100° [D] 110°

99. Number of solutions of the two equations, $4x - y = 2$ and $2y - 8x + 4 = 0$, is
[A] Zero [B] Two
[C] One [D] Infinitely Many

100. Suppose a bird is flying above lake. At a particular instant angle of elevation of bird from a point 2 m above the surface of a lake is 30° and angle of depression of the reflection in the lake is 45°. The height of bird above the surface of lake is

[A] $\frac{2(\sqrt{3}-1)}{\sqrt{3}+1}$ cm [B] $\frac{(\sqrt{3}-1)}{\sqrt{3}+1}$ cm
[C] $\frac{2(\sqrt{3}+1)}{\sqrt{3}-1}$ cm [D] $\frac{(\sqrt{3}+1)}{\sqrt{3}-1}$ cm

(Space for rough works)

Question numbers 101 – 125 carry 2 marks each:

101. A bag contains 6 red balls and some black balls. If the probability of drawing a black ball is thrice that of a red ball, the number of black balls are
[A] 16 [B] 18
[C] 17 [D] 14

102. Two coins are thrown simultaneously. The probability that head will not come up on either of them is
[A] $\frac{1}{4}$ [B] $\frac{1}{2}$
[C] $\frac{3}{4}$ [D] None of these

103. For specific values of a, b and c the point (1, c) divides the line segment joining the points $(-1, a)$ and (4, b) internally in the ratio m : n. If $\alpha = \frac{m}{n}$, then the value of α is
[A] $\frac{1}{3}$ [B] $\frac{5}{3}$
[C] $\frac{4}{3}$ [D] $\frac{2}{3}$

104. The value of k for which following points $(k, -2)$, (5, 1) and (3, 4) are collinear, is
[A] 6 [B] 7
[C] 5 [D] 8

105. The area of a sector of circle is $12\pi\ cm^2$. If the angle of sector is 30°, then radius of circle is
[A] 13 cm [B] 11 cm
[C] 12 cm [D] 12.5 cm

106. A chord of a circle of radius 10 cm subtends an angle of 60° at the centre. The area of triangle formed by chord and radii is
[A] $25\sqrt{3}\ cm$ [B] $20\sqrt{3}\ cm$
[C] $22\sqrt{3}\ cm$ [D] $23\sqrt{3}\ cm$

107. The value of $\theta(0 \leq \theta \leq 90^0)$ satisfying $2\ sin^2\theta = 3\ cos\theta$ is
[A] 60^0 [B] 45^0
[C] 90^0 [D] 30^0

(Space for rough works)

108. A drinking glass is in the form of frustum of a cone. The radii of its two circular ends are 3 cm and 6 cm respectively. If the volume of glass is $189\pi\ cm^3$, then height of glass is
[A] 8 cm
[B] 9 cm
[C] 7 cm
[D] 10 cm

109. A metal box of length 4 cm, breadth 3 cm and height 2 cm is dropped in a cylindrical vessel of radius 8 cm containing some water. If metal box is completely immersed in water, then rise in level of water in the vessel is
[A] $\frac{20}{175}$ cm
[B] $\frac{23}{175}$ cm
[C] $\frac{17}{176}$ cm
[D] $\frac{21}{176}$ cm

110. Which of the following is not the measure of central tendency of frequency distribution?
[A] Standard deviation
[B] Mean
[C] Mode
[D] Median

111. In a frequency distribution if median is 4 times of mean, then using empirical relation mode is
[A] 9 times of mean
[B] 8 times of mean
[C] 10 times of mean
[D] 11 times of mean

112. H.C.F of two polynomials $P(y)$ and $Q(y)$ is $(y-2)$ and their L.C.M. is $(y^3+5y^2-2y-24)$. If $Q(y)$ is (y^2+y-6), then the polynomial $P(y)$ is
[A] y^2-2y-8
[B] y^2-5y+6
[C] y^2+2y-8
[D] None of these

113. The graph of these two equations $x+2y=5$ and $3x+6y=15$ are
[A] Intersect at infinite points
[B] Coincident
[C] Both [A] and [B]
[D] None of these

114. Two circles of different radius are
[A] Similar and congruent
[B] Congruent but not similar
[C] Neither similar nor congruent
[D] Similar but not congruent

115. If $tan^4\theta + tan^2\theta = 1$, then the value of $cos^4\theta + cos^2\theta$ is
[A] 8
[B] 10
[C] 1
[D] 2

(Space for rough works)

116. Four horses are tethered with equal ropes at 4 corners of a square field of side 42 meters, so that they just can reach one another. The area left ungrazed is

[A] 378 m^2 [B] 438 m^2
[C] 786 m^2 [D] None of these

117. If (–5, 4) divides the line segment between the coordinate axes in the ratio 1 : 2, then what is its equation?

[A] $8x + 5y + 20 = 0$ [B] $5x + 8y - 7 = 0$
[C] $8x - 5y + 60 = 0$ [D] $5x - 8y + 57 = 0$

118. If n^{th} term of an A. P. is $2n + 3$, then sum of n terms (S_n) is

[A] $n(4-n)$ [B] $n(3+n)$
[C] $n(4+n)$ [D] $n(3-n)$

119. Two tangents PA and PB are drawn to circle with center O from an external point P. If AB is chord of circle and $\angle$ APB is 60°, then $\angle$ OAB is

[A] 20° [B] 30°
[C] 40° [D] 50°

120. A pole stands on a bank of river. From a point on the other bank directly opposite to the pole, angle of elevation of the top of the pole is 45°. From another point 10 m away from this point on the line joining this point to the foot of the pole, angle of elevation is 30°. The width of river is

[A] $\frac{20}{\sqrt{3}-1}$ m [B] $\frac{10}{\sqrt{3}+1}$ m
[C] $\frac{20}{\sqrt{3}+1}$ m [D] $\frac{10}{\sqrt{3}-1}$ m

121. Two dices are thrown simultaneously. The probability of getting 7 as sum of numbers on both dices is

[A] $\frac{1}{6}$ [B] $\frac{1}{4}$
[C] $\frac{1}{8}$ [D] $\frac{1}{9}$

122. The king, ace, queen and jack of spade are removed from a pack of 52 cards. A card is drawn from remaining cards. The probability of getting a card of an ace is

[A] $\frac{1}{12}$ [B] $\frac{1}{52}$
[C] $\frac{1}{16}$ [D] $\frac{1}{48}$

(Space for rough works)

123. A circular Choco pie of radius 3 cm is placed at the center of circular plate. If the circumference of plate is 20π *cm*, then area of vacant portion of plate is

[A] 90π cm^2 [B] 91π cm^2
[C] 89π cm^2 [D] 92π cm^2

124. A point on x-axis which is equidistant from the points $(5, 2)$ and $(1, -2)$ is

[A] $(3, 0)$ [B] $(4, 0)$
[C] $(0, 3)$ [D] $(0, 4)$

125. If $(1, 2), (4, a), (b, 6)$*and* $(3, 5)$ are the vertices of a parallelogram taken in order, the value of a and b are

[A] $a = 2, b = 6$ [B] $a = 3, b = 5$
[C] $a = 5, b = 1$ [D] $a = 3, b = 6$

---------- **Section-C:** (Mathematics **Paper) Ends** ----------

(Space for rough works)