PRACTICE PAPER – I

MATHEMATICS

1. If $f(x) = (a - x^n)^{1/n}$, when $a > 0$ and $n \in N$, then fo $f(x)$ is equal to
   (a) a
   (b) x
   (c) x^n
   (d) a^n

2. The image of the interval $[-1, 3]$, under the mapping $f : R \to R$ given by $f(x) = 4x^2 - 12x$ is
   (a) $[8, 72]$
   (b) $[-8, 72]$
   (c) $[0, 8]$
   (d) none of these

3. If $A = (1,2,3,4)$, then which of the following are function from A to itself?
   (a) $f_1 = \{(x, y) | y = x + 1\}$
   (b) $f_2 = \{(x, y) | x + y > 4\}$
   (c) $f_3 = \{(x, y) | y < x\}$
   (d) $f_4 = \{(x, y) | x + y = 5\}$

4. If $f : R \to R$ be a mapping defined by $f(x) = x^3 + 5$, then $f^{-1}(x)$ is equal to
   (a) $(x + 5)^{1/3}$
   (b) $(x - 5)^{1/3}$
   (c) $(5 - x)^{1/3}$
   (d) $5 - x$

5. Let $f : R \to R$ be a function defined by $f(x) = \cos |5x + 2|$, then f is
   (a) injective
   (b) surjective
   (c) bijective
   (d) none of these

6. The curve represented by $\text{Im}(z^2) = k$, where k is a non-zero real number, is a
   (a) circle
   (b) ellipse
   (c) parabola
   (d) hyperbola

7. If z lies on $|z| = 1$, then $\dfrac{2}{z}$ lies on
   (a) circle
   (b) ellipse
   (c) line
   (d) parabola

8. The maximum value of $|z|$, when $\left| z + \dfrac{z}{z} \right| = 2$ is
   (a) $\sqrt{3} - 1$
   (b) $\sqrt{3}$
   (c) $\sqrt{3} + 1$
   (d) $\sqrt{2} + \sqrt{3}$

9. If $|z| = 3$, then points on $-1 + 4z$ lie on a
   (a) line
   (b) circle
   (c) parabola
   (d) none of these

10. Let a,b,c are in G.P. of common ratio r, $0 < r < 1$. If a, 2b, 3c form an A.P., then r equals
    (a) $\dfrac{1}{2}$
    (b) $\dfrac{1}{3}$
    (c) $\dfrac{2}{3}$
    (d) none of these

11. If $3 + \dfrac{1}{4}(3 + d) + \dfrac{1}{4^2}(3 + 2d) + \ldots + \infty = 8$, then value of d is
    (a) 9
    (b) 5
    (c) 1
    (d) none of these

12. $\dfrac{1}{1+\sqrt{3}} + \dfrac{1}{\sqrt{3} + \sqrt{5}} + \dfrac{1}{\sqrt{5} + \sqrt{7}} + \ldots$
    (a) $\sqrt{2n+1}$
    (b) $\sqrt{n+1}$
    (c) $\sqrt{2n+1} - 1$
    (d) $\dfrac{1}{2}(\sqrt{2n+1} - 1)$

13. If $\alpha, \beta \in R$, are the roots of the equation $ax^2 + bx + c = 0$, $k \in R$, lies between α and β, if
    (a) $ak^2 + bx + c < 0$
    (b) $a^2k^2 + abk + ac < 0$
    (c) $a^2k^2 + abk + ac > 0$
    (d) none of these

14. If the roots of equation $(x - b)(x - c) + (x - c)(x - a) + (x - a)(x - b) = a$ are equal, then
    (a) $a + b + c = 0$
    (b) $a + bw + cw^2 = 0$
    (c) $a - b + c = 0$
    (d) none of these

15. If $x^2 + px + qr = 0$, $x^2 + qx + rp = 0$ and $x^2 + rx + pq = 0$ has a common root, then product to there common roots is
    (a) p q r
    (b) 2 p q r
    (b) $p^2 q^2 r^2$
    (d) none of these

16. If $^n p_r = 720\ ^n C_r$, then value of r is
   (a) 6
    (b) 5
    (c) 4
    (d) 7

17. There are n white and n black balls. The number of ways in which we can arrange these balls in a row so that neighbouring balls are of different colours is

(a) n!   (b) 2n!

(c) $2(n!)^2$ (d) $\dfrac{2n!}{(n!)^2}$

18. The number of ways in which mn students can be distributed equally among m sections is

(a) $\dfrac{(mn)!}{n!}$ (b) $\dfrac{(mn)!}{(n!)^m}$

(c) $\dfrac{(mn)!}{m!}$ (d) $(mn)^m$

19. If [x] denote the greatest integer less than or equal to x, then $[(1 + 0.0001)^{10000}]$ equals

(a) 3   (b) 2

(c) 0   (d) none of these

20. If $R = \left(\sqrt{2}+1\right)^{2n+1}$ and $f = R - [R]$, then [R] equal is

(a) $f+\dfrac{1}{f}$ (b) $f-\dfrac{1}{f}$

(c) $\dfrac{1}{f}-f$ (d) none of these

21. $(1 + x)^n - nx - 1$ is divisible by

(a) x   (b) x^2

(c) x^3 (d) x^4

22. The inverse of a symmetic matrix is

(a) symmetric

(b) skew–symmetric

(c) diagonal matrix

(d) none

23. If inverse of a diagonal matrix is

(a) symmetric   (b) skew–symmetric

(c) diagonal   (d) none of these

24. If A is symmetric and $n \in N$, then A^n is

(a) symmetric   (b) skew–symetric

(c) diagonal   (d) none of these

25. The roots of equation $\begin{vmatrix} x-1 & 1 & 1 \\ 1 & x-1 & 1 \\ 1 & 1 & x-1 \end{vmatrix} = 0$ are

(a) 1, 2   (b) –1, 2

(c) 1, –2   (d) –1, –2

26. If P(1, 2), Q (4, 6), R(5, 7), S(a, b) are vertices of a parallelogam PQRS, then

(a) a = 2, b = 4   (b) a = 3, b = 4

(c) a = 2, b = 3   (d) a = 3, b = 5

27. If the quadrilateral formed by lines ax + by + c = 0, a'x + b'y + c = 0, ax + by + c' = 0, a'x + b'y + c' = 0, have perpendicular diagonals, then

(a) $b^2 + c^2 = b'^2 + c'^2$

(b) $c^2 + a^2 = c'^1 + d'^2$

(c) $a^2 + b^2 = a'^2 + b'^2$

(d) none of these

28. The line x + 2y – 9 = 0, 3x + 5y – 5 = 0 and ax + by – 1 = 0 are concurrent if 35x – 22y + 1 = 0 passes through the point

(a) (a, b)   (b) (b, a)

(c) (a, –b)   (d) (–a, b)

29. If the algebraic sum of the perpendicular distance from point (2, 0), (0, 2) and (1, 1) to a variable line be zero, then it pass through the point

(a) (–1, 1)   (b) (1, 1)

(c) (1, –1)   (d) (–1, –1)

30. If the points (0, 01), (1, 0), (0, 1) and (t, t) are concyclic, then t =

(a) –1   (b) 1

(c) 2   (d) –2

31. The greatest distance of the point P(10,7) from the circle $x^2 + y^2 - 4x - 2y - 20 = 0$ is

(a) 10   (b) 15

(c) 5   (d) none of these

32. The equation of tangent to circle $x^2 + y^2 + 4x - 4y + 4 = 0$ that make intercepts on positive co-ordinate axes is

(a) x + y = 2

(b) $x + y = 2\sqrt{2}$

(c) x + y = 4

(d) x + y = 8

33. $\underset{x \to 0}{\text{Lt}} \dfrac{a^x - b^x}{x}$ is equal to

(a) $\log\left(\dfrac{a}{b}\right)$ (b) $\log\left(\dfrac{b}{a}\right)$

(c) log (a b)   (d) none of these

34. $\displaystyle \lim_{x \to 0} \frac{e^x - (1+x)}{x^2}$ is equal to

(a) 0

(b) $\dfrac{1}{2}$

(c) 2

(d) e

35. $f(x) = \sin\left(\dfrac{\pi}{3}\right)[x - x^2]; \ 2 < x < 3$, then $f'\left(\dfrac{\pi}{3}\right)$ equals

(a) $\dfrac{\sqrt{\pi}}{3}$

(b) $-\dfrac{\sqrt{\pi}}{3}$

(c) $-\sqrt{\pi}$

(d) 0

36. If $f(x) = |x - 2|$ and $g(x) = f(f(x))$, then for $x > 20 \ g'(x)$ equals

(a) –1

(b) 1

(c) 0

(d) none of these

37. Find a for which $f(x) = a \sin x + \dfrac{1}{3} \sin 3x$ has extremum at $x = \dfrac{\pi}{3}$ is

(a) 1

(b) –1

(c) 0

(d) 2

38. $f(x) = a \log |x| \ bx^2 + x$ has its extremum value of $x = -1, x = 2$. Then

(a) $a = 2, b = -1$

(b) $a = 2, b = -\dfrac{1}{2}$

(c) $a = -2, b = \dfrac{1}{2}$

(d) none of these

39. $\displaystyle \int_{-1}^{1} x|x|dx =$

(a) 2

(b) 1

(c) 0

(d) none of these

40. $I_n = \displaystyle \int_0^{\pi/4} \tan^n x \, dx$, $n \in N$, then $I_{n+2} + I_n$ equal

(a) $\dfrac{1}{n}$

(b) $\dfrac{1}{n-1}$

(c) $\dfrac{1}{n+1}$

(d) $\dfrac{1}{n+2}$

41. $\displaystyle \int_{-1}^{3} \tan^{-1}\frac{x}{x^2+1} + \tan^{-1}\frac{x^2+1}{x} \, dx =$

(a) π

(b) 2π

(c) 4π

(d) none of these

42. If $I_1 = \displaystyle \int_e^{e^2} \frac{dx}{\log x}$ and $I_2 = \displaystyle \int_1^{2} \frac{ex}{x} \, dx$, then

(a) $I_1 = I_2$

(b) $2I_1 = I_2$

(c) $I_1 = 2I_2$

(d) none of these

43. If $I_1 = \displaystyle \int_x^{1} \frac{1}{1+t^2} \, dt$, $I_2 = \displaystyle \int_1^{1/x} \frac{1}{1+t^2} \, dt$; $x > 0$, then

(a) $I_1 = I_2$

(b) $I_1 > I_2$

(c) $I_2 > I_1$

(d) none of these

44. The point of extremum $\phi(x) = \displaystyle \int_1^{x} e^{-t^2/2}(1 - t^2) \, dt$ are

(a) $x = 1, -1$

(b) $x = -1, 2$

(c) $x = 2, 1$

(d) $x = -2, 1$

45. For vectors $\vec{u}, \vec{v}, \vec{w}$, which is not equal to remaining three?

(a) $\vec{u}.(\vec{u} \times \vec{w})$

(b) $(\vec{v} \times \vec{w}).\vec{u}$

(c) $\vec{v}.(\vec{u} \times \vec{w})$
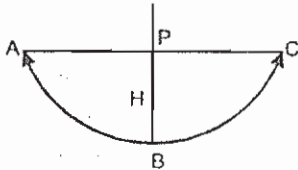
(d) $(\vec{v} \times \vec{u}).\vec{w}$

PHYSICS

46. If we consider electrons and photons of the same wavelength, then they will have same

(a) momentum

(b) energy

(c) angular momentum

(d) velocity.

47. Equation for the change of state was given by

(a) Newton

(b) Clausius

(c) Clausius-Clapeyron

(d) Joules.

48. If n small balls, each of mass m impringe elastically each second on a surface with a velocity u, then the force experienced by the surface in one second will be

(a) 0.5 mnu

(b) 1 mnu

(c) 2 mnu

(d) 4 mnu

49. The equation of sound wave is

$y = 0.0015 \sin(62.4x + 316t)$.

The wavelength of this wave is

(a) 0.2 unit

(b) 0.1 unit

(c) 0.3 unit

(d) 0.4 unit.

50. The dew point and atmospheric temperature on a particular day is found to be 18°C and 25°C. If saturation vapour pressure at 18°C and 25°C be 15.5 mm and 25.7 mm of Hg, then its relative humidity is

   (a) 90%

   (b) 30.0%

   (c) not possible to calculate

   (d) 60.3%.

51. The surface tension of a liquid is 10^9 dyne/cm². It is equivalent to

   (a) 10^5 N/m   (b) 10^7 N/m

   (c) 10^4 N/m   (d) 10^6 N/m

52. When the key K is pressed at time t = 0, then which of the following statement about the current I in the resistor AB of the given circuit is true ?
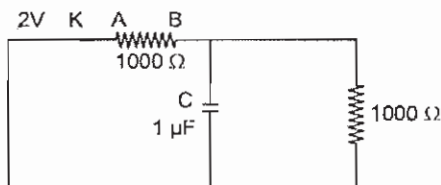
   (a) I oscillates between 1 mA and 2 mA

   (b) I = 1 mA at all t

   (c) at t = 0, I = 2 mA and with time it goes to 1 mA

   (d) I = 2 mA and at all t.

53. Davy's safety lamp is based on

   (a) convection   (b) radiation

   (c) polarization   (d) conduction.

54. R.M.S. velocity of a particle is v at pressure P. If the pressure increases by two times, then R.M.S. velocity will become

   (a) 2v   (b) 0.5v

   (c) 4v   (d) v.

55. Light waves are transverse, because they

   (a) are polarised   (b) reflect

   (c) are not polarised   (d) refract.

56. In a hydrogen discharge tube, it is observed that through a given cross-section 3.13×10^{15} electrons are moving from right to left and 3.12×10^{15} protons are moving from left to right. What is the electric current in the discharge tube and what is its direction ?

   (a) 2 mA towards right

   (b) 1 mA towards right

   (c) 2 mA towards left

   (d) 1 mA towards left.

57. When current flows in a conductor, then the ratio of the intensity of electric field E at any point within the conductor and the current density at a point is called

   (a) specific resistance

   (b) resistance

   (c) inductance

   (d) conductance.

58. A man is standing on a spring platform. Reading of spring balance is 60 kg wt. If man jumps outside from the platform, then reading of spring balance.

   (a) decrease to zero   (b) increase

   (c) remain same   (d) first (b) then (a)

59. What percent of original radioactive atoms is left after five half-lives?

   (a) 5 %   (b) 20 %

   (c) 3 %   (d) 10 %.

60. If the coefficient of friction of a plane inclined at 30° is 0.4, then acceleration of a body sliding freely on it is (g = 9.8 m/s²)

   (a) 4.9 m/s²   (b) 9.8 m/s²

   (c) 2.54 m/s²   (d) 1.51 m/s².

61. If current flowing in a conductor changes by 1%, then power will change by

   (a) 10 %   (b) 1 %

   (c) 100 %   (d) 2 %.

62. Coefficient of performance of an ideal refrigerator working between temperatures T_1 and T_2 ($T_1 > T_2$) is

   (a) $\beta = \dfrac{T_1}{T_1 - T_2}$ (b) $\beta = \dfrac{T_2}{T_1 - T_2}$

   (c) $\beta = \dfrac{T_1}{T_1 + T_2}$ (c) $\beta = \dfrac{T_2}{T_1 + T_2}$

63. If an electron jumps from 1st orbit to 3rd orbit, then

   (a) no gain of energy

   (b) absorb energy

   (c) no loss of energy

   (d) release energy.

64. In a coil of self-inductance 5 henry, the rate of change of current is 2 ampere per second. The e.m.f. induced in the coil is
    (a) 10 V   (b) –10 V
    (c) 5 V   (d) –5 V.

65. If the new velocity of a body is twice its previous velocity, then kinetic energy will become
    (a) 4 times   (b) 2 times
    (c) 6 times   (d) 0.5 times.

66. The Laplace correction was necessary to Newton's calculation of velocity of sound, because travel of sound in a medium is
    (a) isobaric process
    (b) isothermal process
    (c) isochoric process
    (d) adiabatic process.

67. An electric lamp is connected to 220 V, 50 Hz supply. The peak voltage is
    (a) 311 V   (b) 210 V
    (c) 320 V   (d) 211 V.

68. The discoverer of loudness and intensity of sound is
    (a) Laplace   (b) Newton
    (c) Edison   (d) Bell.

69. Which of the following is not a unit of time ?
    (a) micro-second   (b) hour
    (c) light year   (d) nano-second.

70. The time period of a simple pendulum in a satellite is
    (a) zero   (b) unity
    (c) same as an earth (d) infinity.

71. Which of the following is the smallest unit ?
    (a) fermi   (b) millimetre
    (c) metre   (d) angstrom.

72. The phenomenon of production of e.m.f. in a current carrying metallic strip on applying a magnetic field along a direction perpendicular to the direction of flow of current is known as
    (a) Seeback effect
    (b) Hall effect
    (c) Peltier effect
    (d) Joule effect.

73. Resonance is a special case of
    (a) damped vibration
    (b) forced vibration
    (c) un-damped vibration
    (d) natural vibration .

74. If magnetic material, which moves from stronger to weaker parts of a magnetic field, then it is known as
    (a) diamagnetic
    (b) paramagnetic
    (c) ferromagnetic
    (d) anti-ferromagnetic.

75. What is the magnitude of magnetic force per unit length of a wire carrying a current of 5 A and making an angle of 30° with direction of a uniform magnetic field of 0.1 T?
    (a) 0.25 N-m   (b) 0.35 N-m
    (c) 0.45 N-m   (d) 0.55 N-m

76. Lightning was discovered by
    (a) Ohm   (b) Faraday
    (c) Thomson   (d) Franklin.

77. A simple pendulum with a bob of mass m oscillates from A to C and back to A such that PB is H. If the acceleration due to gravity is g, then the velocity of the bob as it passes through B is

    (a) mgH   (b) zero
    (c) $\sqrt{2gH}$ (d) 2gH

78. Half-life of a radioactive material depends on
    (a) material's amount
    (b) temperature
    (c) disintegration medium
    (d) nature of material.

79. The evaporation of a liquid from its surface is based on
    (a) Thomson's law
    (b) Joule's law
    (c) Bernoulli's law
    (d) Stefan's law.

80. In an equilateral triangular prism, the angle of minimum deviation for a certain wavelength is 40°. The corresponding angle of incidence is
    (a) 30°   (b) 40°
    (c) 45°   (d) 50°.

81. If vector A and B has angle θ between them, then vector product is
    (a) AB
    (b) AB cos θ
    (c) A × B × cos θ
    (d) AB sin θ.

82. Which of the following cannot be resultant of 5 and 10 ?
    (a) 5   (b) 8
    (c) 2   (d) 7

83. $_{92}U^{235}$ and $_{92}U^{238}$ differ as
    (a) $_{92}U^{238}$ has 3 neutrons more
    (b) $_{92}P^{235}$ has 2 protons less
    (c) $_{92}U^{235}$ has 3 protons less
    (d) none of these.

84. What is the mass of a silver atom? (Avogadro's number = 6.022×10^{23} mol and atomic mass of silver = 108)
    (a) 20.12×10^{-31} kg   (b) 17.93×10^{-26} kg
    (c) 17.93×10^{-33} kg   (d) 16.81×10^{-29} kg.

85. The radius of gyration of a disc of mass 50 g and radius 2.5 cm about an axis passing through its centre of gravity and perpendicular to the plane is
    (a) 0.52 cm   (b) 1.76 cm
    (c) 3.54 cm   (d) 6.54 cm.

CHEMISTRY

86. The main constituent of a natural gas is
    (a) C_3H_8 (b) C_6H_6
    (c) C_2H_2 (d) CH_4.

87. In towns, a layer of air is condensed as smoke due to pollution. It is called
    (a) smoke   (b) smog
    (c) fog   (d) mist.

88. How many coulombs are required for the oxidation of 1 mole HP to O_2?
    (a) 3.86×10^5 C   (b) 1.93×10^5 C
    (c) 4.825×10^4 C   (d) 9.65×10^4 C.

89. The constituent of light oil is
    (a) anthracene   (b) benzene
    (c) aniline   (d) phenol.

90. Which of the following structure is planar?
    (a) C_2H_2 (b) CH_4
    (c) C_2H_6 (d) C_2H_4

91. $NaHCO_3$ is prepared by
    (a) dow process
    (b) solvay process
    (c) bosch process
    (d) none of these.

92. Which of the following ion has the highest magnetic moment ?
    (a) Sc^{3+} (b) Zn^{2+}
    (c) Mn^{2+} (d) Ti^{3+}.

93. Which of the following has zero dipole moment?
    (a) CH_2Cl_2 (b) CCl_4
    (c) CH_2Cl (d) $CHCl_3$.

94. Both ethane and methane can be obtained in one step reaction from
    (a) CH_3OH (b) C_2H_5OH
    (c) CH_3Br (d) C_2H_4.

95. Colloidal found effective in medicines is
    (a) colloidal gold
    (b) colloidal sulphur
    (c) colloidal antimony
    (d) all of these.

96. Which of the following set belongs to the same period of the periodic table ?
    (a) Cu, Ni, Zn   (b) Li, Na, K
    (c) F, Cl, Br   (d) Li, Mg, Ca.

97. Formula of Plaster of Paris is
    (a) $CaSO_4.(1/2)H_2O$
    (b) $CaSO_4. H_2O$
    (c) $CaSO_2. (3/3)H_2O$
    (d) $CaSO_4. 2H_2O$.

98. Which of the following is endothermic reaction ?
    (a) $3H_2 + N_2 \longrightarrow 2NH_3$
    (b) $C + O_2 \longrightarrow CO_2$
    (c) $PCl_3 + Cl_2 \longrightarrow PCl_5$
    (d) $N + (1/2)O_2 \longrightarrow NO$.

99. Milk is an emulsion of
 (a) fat dispersed in milk
 (b) fat dispersed in water
 (c) water dispersed in oil
 (d) water dispersed in fat.

100. Which of the following statements regarding hydrogen peroxide is false ?
 (a) It is strong oxidizing agent
 (b) It is decomposed by MnO_2
 (c) It behaves as a reducing agent
 (d) It is more stable in basic solution.

101. Chloroform, on warming with Ag powder, gives
 (a) C_2H_2
 (b) C_6H_6
 (c) C_2H_4
 (d) none of these.

102. Osmotic pressure can be increased by
 (a) increasing volume
 (b) increasing temperature
 (c) decreasing temperature
 (d) none of these.

103. If the pH of a solution is 4, then its OH concentration is
 (a) 10^{-14}
 (b) 10×10^{-5}
 (c) 10^{-4}
 (d) 10^{-10}

104. Which of the following is used as a moderator in nuclear reactor ?
 (a) H_2O
 (b) D_2O
 (c) NaOH
 (d) alum.

105. Which of the following is used as "control rod" in fission reactor ?
 (a) Cadmium rod
 (b) Steel
 (c) Aluminium rod
 (d) Graphite rod.

106. Paraldehyde is formed by the polymerisation of
 (a) CH_3OH
 (b) CH_3CHO
 (c) CH_3CH_2OH
 (d) HCHO.

107. Glass is soluble in
 (a) $HClO_4$
 (b) HF
 (c) aqua regia
 (d) H_2SO_4.

108. Indicator used in the titration of oxalic acid and NaOH is
 (a) phenolphthalene
 (b) methyl red
 (c) thymol blue
 (d) methyl orange.

109. Which of the following is not a mode of dissociation of radioactive substance ?
 (a) electron capture
 (b) fission
 (c) α-particle emission
 (d) β-mission.

110. Electroplating was discovered by
 (a) Newton
 (b) Faraday
 (c) Dalton
 (d) Arrhenious.

111. Unit of molarity is
 (a) kilogram/litre
 (b) gram/litre
 (c) mole/litre
 (d) none of these.

112. Brownian movement is found in
 (a) unsaturated solution
 (b) suspension
 (c) colloidal solution
 (d) saturated solution.

113. Diamond is used in glass cutting due to its
 (a) high metallic bonding
 (b) extreme hardness
 (c) high metallic bonding
 (d) high refractive index.

114. NH_3 and H_2O form NH_4OH by
 (a) electrovalent bond
 (b) covalent bond
 (c) coordinate bond
 (d) none of these.

115. CCl_4 is used as a fire extinguisher, because
 (a) its boiling point is low
 (b) its melting point is high
 (c) it gives incombustible vapour
 (d) it forms covalent bond.

116. Which of the following is correct sequence for ionic radius ?
 (a) $Al^{3+} > Na^+ > Cl$
 (b) $Na^+ > Al^{3+} > Cl^-$
 (c) $Al^{3+} > Cl^- > Na^+$
 (d) $Cl^- > Na^+ > Al^{3+}$.

117. Ethane and methane are prepared in one step by
 (a) C_2H_5OH
 (b) CH_3Br
 (c) C_2H_5CHO
 (d) C_2H_5Br.

118. It is impossible to know simultaneously the position and momentum of a moving particle with absolute exactness at any instant. This is known as

   (a) Aufbau principle

   (b) Hund's rule

   (c) Heisenberg principle

   (d) Pauli's principle.

119. Atomic number means

   (a) number of neutrons

   (b) number of protons

   (c) number of nucleons

   (d) number of electrons.

120. A neutral atom (Atomic No. > 1) contains

   (a) neutron + electron

   (b) proton only

   (c) neutron + proton + electron

   (d) neutron + proton.

121. Tetraethyl lead is used as

   (a) anti-knock agent

   (b) pain killer

   (c) mosquito repellent

   (d) fire extinguisher.

122. Higher percentage of carbon is found in

   (a) peat

   (b) anthracite

   (c) bituminous

   (d) all of these.

123. Which of the following is used as refrigerant?

   (a) SiC

   (b) CO_2

   (c) CF_2Cl_2

   (d) $CHCl_3$

124. Which pair of substances gives the same gaseous product, when these react with water ?

   (a) K and KO_2

   (b) Ca and CaH_2

   (c) Ba and BaO_2

   (d) Na and Na_2O_2.

125. A mixture containing benzene and chlorobenzene is separated by

   (a) crystallization

   (b) sublimation

   (c) distillation

   (d) separating tunnel.

INTELLIGENCE, LOGIC & REASONING

126. 5 out of 2250 parts of the earth is sulphur. What is the percentage of sulphur in the earth ?

   (a) $\frac{1}{3}$ %   (b) $\frac{1}{2}$ %

   (c) $\frac{4}{9}$ %   (d) $\frac{2}{9}$ %.

127. A person pays a tax at the rate of 10 paise in a rupee. If he pays a tax of ₹ 18.25, then the total amount on which tax is paid is

   (a) ₹ 231.6   (b) ₹ 182.5

   (c) ₹ 276.4   (d) ₹ 226.3.

128. A train 50 metres long passes a platform 100 metres long in 10 second. What is the speed of the train per second?

   (a) 20 m/s

   (b) 15 m/s

   (c) 25 m/s

   (d) 16 m/s.

129. Simplify: $0.12 \times 0.13 + 2 + 2$

   (a) 4.0121   (b) 1.0016

   (c) 6. 1281   (d) 2.0078.

Directions (Q. 130–131): *Insert the missing number in the following questions.*

130. 2, 3. 8, 4, 32, 5. ————————

   (a) 128   (b) 6

   (c) 156   (d) 27.

131. 1, 3, 6. 10. 15, ———————— 28, 36, 45

   (a) 21   (b) 17

   (c) 22   (d) 19

Directions (Q. 132–133): *Choose the correct relation.*

132. If WATER is written as XBUFS, then SALT will be written as

   (a) WZKS   (b) UCNV

   (c) WZSK   (d) TBMU.

133. If SING is written as UKPI, then TAKE will be written as
 (a) VCMG
 (b) VCGM
 (c) WDHN
 (d) WDNH.

Directions (Q. 134–135) : *Read the given information and answer the following questions:* ABCDEFG and H are the family members of a family. B is the sister of G and G is the brother of C. E is wife of A, whose father is H. D is the husband of B and F is the son of G. A is the father of B.

134. How 'D' is related to 'C' ?
 (a) brother-in-law
 (b) son
 (c) uncle
 (d) brother.

135. How 'H' is related to 'C' ?
 (a) father
 (b) son
 (c) uncle
 (d) grand-father.

ENGLISH LANGUAGE & COMPREHENSION

Directions (Q. 136–138) : *Read the passage and answer the following questions.*

If I had been asked in my early youth whether I preferred to have dealings only with men or only with books, my answer would certainly have been in favour of books. In later years, this has become less and less the case. Not that I have had so much bitter experiences with men than with books, on the contrary, purely delightful books even now come my way more often than purely delightful men. But the many bad experiences with men have nourished the meadow of my life as the noblest book could not do.

136. In his early youth. the author
 (a) liked to have more dealings with men than with books
 (b) liked to have more dealings with books than with men
 (c) liked to have dealings more with men than with books
 (d) preferred to have dealings only with books.

137. Which one of the following statements best reflects the main argument of the passage?
 (a) It is the experience with other human beings that nourishes one's life and not necessarily books
 (b) Books are always better than men
 (c) Neither men nor books give any worthwhile experience
 (d) There are more purely delightful men than purely delightful books.

138. The author says that in later years his love of books diminished because
 (a) He had given up the habit of reading books
 (b) He did not get many delightful books to read
 (c) Even the bad experiences he had with men were more valuable than what the noblest book gave
 (d) He had better experience with men than with books.

Directions (Q. 139–141) : *Choose the incorrect word in the given sentence.*

139. 'Our college has good furniture's
 (a) good   (b) our
 (c) furnitures   (d) has.

140. 'Can your child recognise English alphabets'
 (a) your   (b) can
 (c) alphabets   (d) recognise.

141. 'The magistrate issued orders for the release of'
 (a) orders   (b) the
 (c) release   (d) issued.

Directions (Q. 142 – 144) : *Choose antonym for the given words from each set.*

142. AMNESTY
 (a) remission   (b) pardon
 (c) punishment   (d) mercy

143. SEQUENCE
 (a) progression   (b) succession
 (c) break   (d) chain

144. AGNOSTIC

    (a) believer   (b) atheist

    (c) enmity   (d) unbeliever.

Directions (Q. 145 – 1146) : *Choose synonym from the given words from each set.*

145. GROUSE

    (a) brave   (b) complain

    (c) lazy   (d) tired.

146. ABSOLUTION

    (a) sensual   (b) convicton

    (c) amnesty   (d) charge.

Directions (Q. 147 – 148) : *Pick up from answers-choices which will complete the sentences correctly.*

147. So quickly..................he reached on time.

    (a) did he run that

    (b) he ran that

    (c) would be run that

    (d) he ran as.

148. These days, my house is under

    (a) the repairs

    (b) repairs

    (c) the repair

    (d) repair.

Directions (Q. 149 – 150) : *Select the pair of words, which are related in the same way as the capitalised words are related to each other*

149. WIND : AIR : : ?

    (a) request : command

    (b) ocean : sea

    (c) government : legislator

    (d) master : servent.

150. MEANS : METHOD : : ?

    (a) elegance : style

    (b) air : kite

    (c) teacher : pupil

    (d) smoke : cigar.