# OUAT QUESTION WITH ANSWERS - 2016

PHYSICS

1. Two small bar magnets are placed in a line at certain distance d apart. If the length of each magnet is negligible compared to d, the force between them will be invers proportional to
   - (a) d^2
   - (b) d
   - (c) d^3
   - (d) d^4

2. If ϕ_1 and ϕ_2 are the angles of dip in two vertical planes at right angles to each of and ϕ is the true angle of dip then.
   - (a) $cot^2 \phi = cot^2 \phi_1 + cot^2 \phi_2$
   - (b) $tan^2 \phi = tan^2 \phi_1 + tan^2 \phi_2$
   - (c) $cot\phi = cot \phi_1 + cot \phi_2$
   - (d) $tan \phi = tan \phi_1 + tan \phi_2$

3. A metalic ring with a cut is held horizontally and a magnet is allowed to fall verlio through the ring, then the acceleration of this magnet is
   - (a) equal to g
   - (b) more than g
   - (c) less than g
   - (d) sometimes less and sometimes more than g

4. A copper rod of length l is rotated about one end perpendicular to the uniform made field B with constant angular velocity ω. The induced e.m.f. between its two ends.
   - (a) $B\omega l^2$
   - (b) $\frac{3}{2} B\omega l^2$
   - (c) $\frac{1}{2} B\omega l^2$
   - (d) $2B\omega l^2$

5. An inductive circuit contains a resistance of 10 ohms and an inductance of 2 h on an alternating voltage of 120 V and frequency 60 Hz is applied to this circuit current in the circuit would be nearly
   - (a) 0.32 A
   - (b) 0.80 A
   - (c) 0.48 A
   - (d) 0.16 A

6. If in a plano-convex lens, radius of curvature of convex surface is 10 cm and the length of lens is 30 cm, the refractive index of the material of the lens will be
   - (a) 1.5
   - (b) 1.66
   - (c) 1.33
   - (d) 3

7. Two transparent media A and B are separated by a plane boundary. The spec light in medium A is 2.0×10^8 ms^{-1} and in medium B is 2.5×10^8 ms^{-1}. The on angle for which a ray of light going from A to B suffers total internal reflection is
   - (a) $sin^{-1} 1/2$
   - (b) $sin^{-1} 2/5$
   - (c) $sin^{-1} 4/5$
   - (d) $sin^{-1} 3/4$

8. Two waves having intensities in the ratio of 9:1 produce interference. The ratio maximum to munimum intensity is equal to
   - (a) 10:8
   - (b) 9:1
   - (c) 4:1
   - (d) 2:1

9. Two slits separated by a distance of 1 mm are illuminated with red light of wavelength 6.5×10^{-7} m. The interference fringes are observed on a screen placed 1 m from the slits. The distance between the third dark fringe and the fifth bright fringe on the same side of central maxima is
   - (a) 0.65 mm
   - (b) 1.62 mm
   - (c) 3.25 mm
   - (d) 4.88 mm

10. X-rays of wavelength 22 pm are scattered from a carbon target at an angle of 85° to the incident beam. The Compton shift for X-ray is
    - (a) 2.2 pm
    - (b) 1.1 pm
    - (c) 0.55 pm
    - (d) 4.4 pm

11. The angular speed of electron in the nth orbit of hydrogen atom is
    - (a) directly proportional to n^2
    - (b) directly proportional to n
    - (c) inversely proportional to n^3
    - (d) inversely proportional to n

12. Ratio of nucler radil of ^{135}Cs to ^{40}Ca is
    - (a) 1.40
    - (b) 1.50
    - (c) 2.750
    - (d) 3.375

13. The material suitable for making a solar cell is
    - (a) PbS
    - (b) GaAs
    - (c) CdSe
    - (d) Ge

14. In semiconductors, which of the following relations is correct at thermal equilibrium ?
    - (a) $n_i = n_e = n_h$
    - (b) $n_i^2 = n_e n_h$
    - (c) $n_i = n_e/n_h$
    - (d) $n_i = n_e + n_h$

15. The T.V. transmission tower in Delhi has a height of 240 m. The distance up to which the broadcast can be received, (talking the radius of earth to be 6.4×10^6 m) is
    - (a) 100 km
    - (b) 60 km
    - (c) 55 km
    - (d) 50 km

16. Eddy currents are induced when
    - (a) metal block is kept in a changing magnetic field.
    - (b) metal block is kept in a uniform magnetic field.
    - (c) a coil is kept in a uniform magnetic field.
    - (d) current is passed in a coil.

17. A magnetic needle of negligible breadth and thickness compared to its length, oscillates in a horizontal plane with a period T. The period of

oscillation of each part obtained on breaking the magnet into n equal parts perpendicular to the length is
(a) T/n
(b) T
(c) Tn
(d) 1/Tn

18. A proton and an alpha particle enter the same magnetic field which is perpendicular to their velocity. If they have same kinetic energy then ratio of radii of their circular path is
(a) 1:1
(b) 1:2
(c) 2:1
(d) 1:4

19. The induced e.m.f. in a coil does NOT depend on
(a) the number of turns in the coil
(b) the rate of change of magnetic field
(c) time of rotation
(d) the resistance of the circuit

20. A current of 10 A is maintained in a conductor of cross-section 1 cm². If the nondensity of free electrons be $9 \times 10^{28} m^{-3}$, the drift velocity of free electrons is
(a) 6.94×10^{-6} m/s
(b) 5.94×10^{-2} m/s
(c) 1.94×10^{-3} m/s
(d) 2.94×10^{-4} m/s

21. If on the x-axis electric potential decreases uniformly from 60 V to 20 V between x = −2 m to x = +2 m, then the magnitude of electric field at the orgin
(a) must be 10 V/m
(b) may be greater than 10V/m
(c) is zero
(d) is 5 V/m

22. The dimensions of Planck's constant equals to that of
(a) Energy
(b) Momentum
(c) Angular momentum
(d) Power

23. The focal power of a lens has the dimensions
(a) [L]
(b) $[ML^2T^{-3}]$
(C) $[L^{-1}]$
(d) $[MLT^{-3}]$

24. The position time graphs of two cars A and B are straight lines making angles and 60° with time axis respectively. The ratio of velocities of A and B is
(a) $1 : \sqrt{2}$
(b) 1 : 3
(c) $\sqrt{3}$:1
(d) 3:1

25. If a ball is thrown vertically upwards with speed u, the distance covered during last t seconds of its ascent is
(a) ut
(b) ½gt²
(c) ut-½gt²
(d) (u+g)t

26. The position of a body moving along x-axis at time t is given by x = (t²−4t+6) and distance travelled by body in time interval t = 0 to t = 3 s is
(a) 5 m
(b) 7 m
(c) 4 m
(d) 3 m

27. If the displacement of a particle varies with time as $\sqrt{x} = t + 7$, then
(a) velocity of the particle is inversely proportional to t
(b) velocity of the particle is proportional to t²
(c) velocity of the particle is proportional to t
(d) the particle moves with constant acceleration

28. The potential energy of a particle varies with distance x from a fixed origin $U = \dfrac{A\sqrt{x}}{x^2 + B}$
(a) $[ML^{7/2}T^{-2}]$
(b) $[ML^{11/2}T^{-2}]$
(c) $[M^2L^{9/2}T^{-2}]$
(d) $[ML^{13/2}T^{-2}]$

29. If the percentage error in the measurement of momentum and mass of an object are 2% and 3% respectively, then maximum percentage error in the calculated value of its kinetic erergy is
(a) 2%
(b) 1%
(c) 5%
(d) 7%

30. The velocities of A and B are $\vec{V}_A = 2\hat{i} + 4\hat{j}$ and $\vec{V}_B = 3\hat{i} + 7\hat{j}$. Velocity of B as observed by A is
(a) $5\hat{i} + 3\hat{j}$
(b) $\hat{i} + 11\hat{j}$
(c) $-\hat{i} + 11\hat{j}$
(d) $2\hat{i} + 3\hat{j}$

31. The horizontal ranges described by two projectiles projected at angles (45°−θ) and (45°+θ) from the same point and same velocity are in the ratio
(a) 2:1
(b) 1:1
(c) 2:3
(d) 1:2

32. The resultant of two vectors at an angle 150° is 10 units and is perpendicular to one vector. The magnitude of the smaller vector is
(a) 10 units
(b) $10\sqrt{3}$ units
(c) $10\sqrt{2}$
(d) $5\sqrt{3}$ units

33. If the time of flight of a bullet over a horizontal range R is T, then the angle of projection with horizontal is
(a) $\tan^{-1}(gT^2/2R)$
(b) $\tan^{-1}(2R^2/gT)$
(c) $\tan^{-1}(2R/g^2T)$
(d) $\tan^{-1}(2R/gT)$

34. The momentum p(in kg m/s) of a particle is varying with time t (in s) as p = 2 + 3t². The force acting on the particles at t = 3s will be
(a) 18 N
(b) 54 N
(c) 9 N
(d) 15 N

35. A block of mass m as shown in figure is pulled by a force 40 N. The tension at the middle of the block is
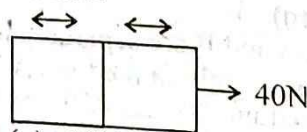
(a) 10N
(b) 20N
(c) 25N
(d) 30N

36. A block of mass 10 kg is released on rough incline plane. Block start descending with acceleration $2 m/s^2$. Kinetic friction force acting on block is (take $g = 10 \, m/s^2$)
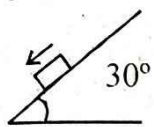
    (a) 10 N
    (b) 30 N
    (c) 50 N.
    (d) $50\sqrt{3}$ N

37. In a conical pedulum the length of strings is l and θ is the angle of string with vertile. The time period of revolution is

  (a) $2\pi\sqrt{\dfrac{l}{g}}$
  (b) $2\pi\sqrt{\dfrac{l\cos\theta}{g}}$

  (c) $2\pi\sqrt{\dfrac{l}{g\cos\theta}}$
  (d) infinite

38. KE of a body is increased by 44%. What is the percent increase in the momentum
 (a) 10%
  (b) 20%
  (c) 30%
  (d) 44%

39. A ball of mass M moving with speed v collides perfectly in elastically with another of mass m at rest. The magnitude of impulse impareted to the first ball is
  (a) Mv
  (b) mv
  (c) $\dfrac{Mm}{M+mv}$
  (d) $\dfrac{M^2}{M+mv}$

40. If radius of earth becomes n times its present value without change in mass, in duration of day becomes :
  (a) $24/n^2$
  (b) $24n^2$
  (c) $24\left(1-\dfrac{1}{n^2}\right)$
  (d) $24(1-n^2)$

41. Three point masses m_1, m_2 and m_3 are placed at the corners of a thin mass rectangular sheet (1.2 m × 1.0m) as shown. Centre of mass will be located at point.
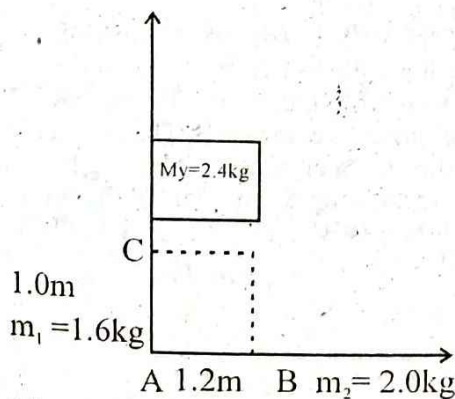
  (a) (0.8, 0.6)m
  (b) (0.6, 0.8)m
  (c) (0.4, 0.4)m
  (d) (0.5, 0.6)m

42. As we go from the equator to the poles, value of 'g'
  (a) remains the same
  (b) decreases
  (c) increases
  (d) first increases and then decreaser

43. The acceleration due to gravity on a planet is 1.96 m/s^2. If it is safe to jump frm height of 3 m on the earth, the corresponding height on the planet will be
  (a) 3 m
  (b) 6 m
  (c) 9 m
  (d) 15 m

44. The acceleration due to gravity g and mean density of the earth p are related by which of the following relations ? (where G is the gravitational constant and R is the radius of the earth)

  (a) $p = \dfrac{3g}{4\pi GR}$
  (b) $p = 3g/4\pi GR^3$
  (c) $p = 4\pi gR^2/3G$
  (d) $p = 4\pi gR^3/3G$

45. When a rubber ball is taken to the bottom of a sea of depth 1400 m, its volume decreases by 2%. The bulk modulus of rubber ball is [density of water is 1 g cc and $g = 10 \, m/s^2$]
  (a) $7\times10^8 N/m^2$
  (b) $6\times10^8 N/m^2$
  (c) $14\times10^8 N.m^2$
  (d) $9\times108 \, N/m^2$

46. Two cubical blocks identical in dimensions float in water in such a way that 1st block flaots with half part immersed in water and second block floats with 3/4 of its volume inside the water. The ratio of densities of blocks is
  (a) 2:3
  (b) 3:4
  (c) 1:3
  (d) 1:4

47. If T is the surface tension of a fluid, then the energy needed to break a liquid drop of radius R into 64 equal drops is
  (a) $6\pi R^2 T$
  (b) $\pi R^2 T$
  (c) $12\pi R^2 T$
  (d) $8\pi R^2 T$

48. A seconds pendulum clock has a steel wire. The clock shows correct time at 25°C. How much time does the clock lose or gain, in one week, when the temperature is increased to 35°C ?
$\alpha_{Steel} = 1.2\times10^{-5}/{}^{\circ}C$
  (a) 321.5s
  (b) 3.828 s
  (c) 82.35s
  (d) 36.28s

49. What is the dimensional formula for thermal resistance ?
  (a) $[M^{-1}L^{-2}T^{-1}K]$
  (b) $[ML^2T^2K^{-1}]$
  (c) $[ML^{-3}T^2K^{-1}]$
  (d) $[M^{-1}L^{-2}T^3K]$

50. Select the correct statement for work, heat and change in internal entergy.
  (a) Heat supplied and work doe depend on initial and final states.
  (b) Change in internal energy depends on the initial and final states only.

(c) Heat and work depend on the path between the two points.

(d) All of these

51. A Certain amount of an ideal monatomic gas needs 20 J of heat energy to raise its temperature by 10°C at constant pressure. The heat needed for the same temperature rise at constant volume will be

(a) 30J
(b) 12J
(c) 200J
(d) 215.3J

52. A scientist says that the efficiency of his heat engine which works at source temperature 127°C and sink temperature 27°C is 26%, then

(a) it is impossible
(b) it is possible but less probable
(c) it is quite probable
(d) Data are incomplete

53. Select the appropriate property of an ideal gas.

(a) Its molecules are infinitesimally small.
(b) There are no forces of interaction between its molecules.
(c) It strictly obeys the ideal gas laws.
(d) All of these

54. By increasing temperature of a gas by 6° C its pressure increases by 0.4%. at constant volume. Then initial temperature of gas is

(a) 1000K
(b) 1500K
(c) 2000K
(d) 750K

55. A boy is swinging in a swing. If he stands, the time period will

(a) first decrease, then increase
(b) decrease
(c) increase
(d) remain same

56. In a simple harmonic wave, minimum distance between particles in same phase always having same speed, is

(a) $\lambda/4$
(b) $\lambda/3$
(c) $\lambda/2$
(d) λ

57. A uniform string resonates with a tuning fork, at a maximum tension of 32N. If it is devided into two segments by placing a wedge at a distance one-fourth of length from one end, then to resonance with same frequency the maximum value of tension for string will be

(a) 2N
(b) 4N
(c) 8N
(d) 16N

58. Two equally charged indentical small balls kept some fixed distance apart exert a repulsive force F on each other. A similar uncharged ball, after touching one of them is placed at the mid-point of line joining the two balls. Force experienced by the thin ball is

(a) 4F
(b) 2F
(c) F
(d) F/2

59. What is the amount of charge possessed by 1 kg of electrons ?

(a) 1.76×10^{11}C
(b) 1.76×10^{-9}C
(c) 1.76×10^{-7}C
(d) 1.76×10

60. Electric charge Q, Q and −2Q respectively are placed at the three corners of equilateral triangle of side a. Magnitude of the electric dipole moment of the system

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

61. Total electric flux associated with unit positive charge in vaccum is

(a) $4\pi\epsilon_0$
(b) $1/4\pi\epsilon_0$
(c) $1/\epsilon_0$
(d) ϵ_0

62. If an electric field is given by $10\hat{i}.3\hat{j}.4\hat{k}$, calculate the electric flux through a surface of area 10 units lying in yz plane.

(a) 100 units
(b) 10 units
(c) 30 units
(d) 40 units

63. A particle A has charge +q and particle B has charge +4q with each of them having the same mass m. When allowed to fall from rest through the same electric potential difference, the ratio of their speeds will become

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

64. A capacitor with plate separation d is charged to V volts. The battery is disconnected and a dielectric slab of thickness d/2 and dielectric constant '2' is inserted between the plates. The potential difference across its terminals becomes

(a) v
(b) 2v
(c) $\dfrac{4v}{2}$
(d) $\dfrac{3v}{4}$

65. A potential difference of 5 V is applied across a conductor of length 10 cm. If drift velocity of electrons is 2.5×10^{-4} m/s, then electron mobility will be

(a) 5×10^{-4}m^{2}V^{-1}S^{-1}
(b) 5×10^{-6}m^{2}V^{-1}S^{-1}
(c) 5×10^{-2}m^{2}V^{-1}S^{-1}
(d) zero

66. A square frame of side l carries a current i. The magnetic field at its centre is B. The same current is passed through a circular coil having the same perimeter as the square. The field at the centre of the circular coil is B'. The ratio of B and B' is

(a) $\dfrac{8\sqrt{2}}{\pi^2}$
(b) $\dfrac{8\sqrt{2}}{\pi^3}$
(c) $\dfrac{8\sqrt{2}}{\pi}$
(d) $\dfrac{4\sqrt{2}}{\pi^2}$

CHEMISTRY

67. Which of the following acts as a poisonous gas ?
    (a) $COCl_2$
    (b) CCl_2F_2
    (c) Benzene
    (d) CH_3C

68. Which of the following is used as fire extinguisher under the name pyrene ?
    (a) CO_2
    (b) CCl_4
    (c) $CH_2=CH-Cl$
    (d) $Cl-CH=C$

69. Drugs can be classified on the basis of
    (a) pharmocological effect
    (b) drug action
    (c) chemical structure
    (d) All of these

70. Soaps are sodium or potassim salt of long chain fatty acids like
    (a) Palmitic acid
    (b) Oleic acid
    (c) Stearic acid
    (d) All of these

71. Which type of detergents are preferably used in liquid dish washing ?
    (a) Cationic detergent
    (b) Anionic detergent
    (c) Non-ionic detergent
    (d) All of these

72. Biodegradable detergent should have
    (a) Phenyl side chain
    (b) Aromatic side chain
    (c) Normal unbranched side chain
    (d) Branched side chain

73. Major point of difference between antiseptic and disinfectant is
    (a) anitiseptic prevents growth of micro organism
    (b) disinfectant kills micro-organism
    (c) disinfctant are not safe to be applied to living tissues
    (d) Both (A) and (B)

74. Which of the following is NOT a constituent of talcum powder ?
    (a) Talc
    (b) Zinc sulphide
    (c) Zinc stearate
    (d) Perfume

75. Grignard reagent is suitable reagent for the preparation of which of the following for carbonyl compound ?
    (a) 1° alcohols
    (b) 2° alcohols
    (c) 3° alcohols
    (d) All of these

76. Phenols can be distinguished from alcohols by
    (a) $FeCl_3$ (neutral)
    (b) Fehling solution
    (c) Tollen's reagent
    (d) 2, 4 - DNP

77. In Reimer-Tiemann reaction, the major product is
    (a) ortho isomer due to intra molecular H-bonding
    (b) meta isomer
    (c) para isomer due to symmetry
    (d) None of these

78. Which of the following statement is TRUE ?
    (a) Molarity of solution is independent of temperature.
    (b) Molality of solution is independent of temperature.
    (c) Mole fraction of solute is dependent on temperature
    (d) The unit of molality is mol dm^{-3}.

79. The unit of rate constant and rate of reaction are same for
    (a) First order
    (b) Zero order
    (c) Second order
    (d) Third order

80. The IUPAC name of phthalic acid is
    (a) Benzene-1, 2-dicarboxylic acid
    (b) Benzene-1, 4-dioic acid
    (c) Cyclo-1,3,5-trien-1, 2-dioic acid
    (d) Benzene-1, 3-dicarboxylic acid

81. Which of the following has NO unit ?
    (a) Molality
    (b) Molarity
    (c) Mole Fraction
    (d) Normality

82. The concentration of glucose in blood is $0.8 gL^{-1}$, the molarity of glucose in the blood should be
    (a) 5.5×10^{-3}
    (b) $4.4 \times 10^{-5} M$
    (c) $5.5 \times 10^{-5} M$
    (d) $4.4 \times 10^{-3} M$

83. Which of the following is the main cause of late discovery of neutron ?
    (a) Neutron in nucleus moves very fast.
    (b) Neutron is highly unstable particle.
    (c) Neutron is charge less particle.
    (d) All of these

84. For a 'p' electron, the orbital angular momentum is
    (a) $\sqrt{6}h$
    (b) $\sqrt{2}h$
    (c) h
    (d) $2h$

85. The partial pressure hydrogen in flask containing 2g H_2 and 32g SO_2 is _____ of total pressure.
    (a) 1/16th
    (b) 1/9th
    (c) 2/3rd
    (d) 1/8th

86. The temperature of a gas is raised from 27°C to 927°C. The root mean square speed of the gas.
    (a) remains same
    (b) gets $\sqrt{927/27}$ times
    (c) gets halved
    (d) gets doubled

87. What is the correct increasing order of liquefiability of the gas ?
    (a) $H_2 < N_2 < CH_4 < CO_2$
    (b) $H_2 < CO_2 < CH_4 < N_2$
    (c) $CO_2 < CH_4 < N_2 < H_2$
    (d) $CO_2 < CH_4 < H_2 < N_2$

88. Which of the following is largest in size ?
    (a) N^{3-}
    (b) O^{2-}
    (c) F^-
    (d) All of these

89. The least electronegetive element has the following electronic configuration :
    (a) ns^2np^5
    (b) ns^2np^4
    (c) ns^2np^3
    (d) ns^2np^6

90. The group of elements in which the last electron is present in the anti-penultima shell of atom is called
(a) f-block elements (b) d-block elements
(c) p-block elements (d) s-block elements

91. In PO_4^{3-} ion, no. of bond pair and lone pair of electrons on phosphorous atoms respectively are
(a) 5, 1 (b) 4, 1
(c) 3, 1 (d) 5, 0

92. At 25°C and 730mm pressure, 380 ml of dry oxygen was collected. If the temperature is constant what volume will the oxygen occupying at 760mm pressure ?
(a) 569 ml (b) 365 ml
(c) 265 ml (d) 621 ml

93. The surface tension of which of the folloiwng liquid is maximum ?
(a) C_2H_5OH (b) CH_3OH
(c) H_2O (d) C_6H_6

94. A cylinder contains either ethylene or propylene of 12 ml of gas required 54 ml oxygen for complete combusition. The gas is
(a) Ethylen
(b) Propylene
(c) 1:1 mixture of two gases
(d) 1:2 mixture

95. Calorific value of ethane, in Ki/g if the reaction is
$$2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O, \Delta H = -745.6 Kcal$$
(a) -12.4 (b) -52
(c) -24.8 (d) -104

96. Exothermic reaction among the following is
(a) combustion of N_2 from NO
(b) decomposition of H_2O
(c) conversion of diamond to graphite
(d) dehydrogenation of ethane of ethene

97. When an ideal gras undergoing, expansion in vaccum shows
(a) $\Delta U = 0$ (b) $W = 0$
(c) $q = 0$ (d) All of these

98. The pH value of 10^{-7} M solution HCl is
(a) equal to 1 (b) equal to 2
(c) less than 7 (d) equal to 0

99. Which causes the change in the value of equilibrium constant of any equilibria ?
(a) Adding of inert gas at constant pressure
(b) Increasing the pressure
(c) Adding of inert gas at constant volume
(d) Decreasing the temperature

100. The no. of H^+ in 10ml of a solution with $p^H = 13$ is
(a) 10^{13} (b) 6.023×10^8
(c) 6.023×10^{10} (d) 6.023×10^{13}

101. Which will undergo cationic hydrolysis ?
(a) NaCl (b) CH_3COONa
(c) $(NH_4)_2SO_4$ (d) H_2CO_3

102. If ionic product of water is $Kw = 10^{-16}$ at 4°C then a solution with pH = 7.5 at 4°C will
(a) turn blue litmus red
(b) turn red litmus blue
(c) be natural to litmus
(d) be alkaline

103. Phosphorous has the oxidation state +3 in
(a) H_3PO_4 (b) H_3PO_3
(c) HPO_3 (d) $H_4P_2O_7$

104. The ratio of number of moles of $KMnO_4$ and $K_2Cr_2O_7$ required to oxidize 0.1 mol Sn^{2+} to Sn^{+4} in acid medium, is
(a) 6:5 (b) 5:6
(c) 1:2 (d) 2:1

105. Oxidation numbers of A, B, C are +2, +5 and −2 respectively. Possible formula of compound is
(a) $A_2(BC_2)_2$ (b) $A_3(BC_4)_2$
(c) $A_2(BC_3)_2$ (d) $A(B_2C)_2$

106. Which is NOT the compound of sodium ?
(a) Chile salt peter (b) Salt petre
(c) Glaubere's salt (d) Soda ash

107. Which one of the following is present as an active ingredinet in bleaching powder for bleaching action ?
(a) $CaCl_2$ (b) $CaOCl_2$
(c) $Ca(OCl)_2$ (d) CaO_2Cl

108. Which allotrope of carbon leads to the formation of bucky ball ?
(a) Graphite (b) Diamond
(c) Fullerence (d) Nano tube

109. Dimer Al_2Cl_6 is formed because
(a) aluminium is electron rich
(b) aluminium is having lone pair of electron
(c) aluminium forms coordinate bonds with chlorine to complete its octlet
(d) aluminium donetes lone pair to form bridge

110. C-O bond length is maximum in
(a) CH_3CHO (b) CO_2
(c) CO (d) CO_3^{2-}

111. In which of the following compound Chiral C-atom is present ?
(a) CH_3CHCl_2 (b) $CH_3CH(OH)CH_3$
(c) $CH_3CH(OH)COOH$
(d) $CH_3C(OH)_2CH_2COOH$

112. Ice crystallises in a hexagonal lattice having the volume of unit cell as $132 \times 10^{-24} cm^3$. If density is 0.92 gcm^{-3} at a given temperature, then number of H_2O molecules per unit cell is
(a) 1 (b) 2
(c) 3 (d) 4

113. The compound produce after the ozonolysis of benzene is
(a) Glyoxal (b) Methanal
(c) Ethanal (d) Hexanal

114. $C_6H_5CH_2CH_3$ can be prepared by
(a) Wurtz reaction

(b) Fitting reaction
(c) Wurtz Fitting recation
(d) Frankland reaction

115. The reaction of $CH_3CH=CH_2$ with HOCl will yield.
(a) 2 - chloro - 1- propanol
(b) 3 - chloro - 2 - propanol
(c) 1 - chloro - 2 - propanol
(d) 1- chloro - 1 - propanol

116. Which of the following shows geometrical isomerism ?
(a) But-1-ene
(b) But-2-ene
(c) Prop-1-ene
(d) Pent-1-ene

117. Which of the following crystal is represented by $a \neq b \neq c$ and $\alpha \neq \beta \neq \gamma \neq 90^{\circ}$?
(a) Orthorhombic
(b) Monoclinic
(c) Triclinic
(c) Triclinic

118. What is the relation between diamond and graphite ?
(a) Polymorphous
(b) Isomer
(c) Isotope
(d) Isomorphou

119. Which of the following is NOT a strong electrolytes ?
(a) NaCl
(b) KNO
(c) NH_4OH
(d) $FeSO_4$

120. Which of the following statement is incorrect ?
(a) Electrons enter through cathode in an electrolytic cells.
(b) Electrons leave through anode in an electrolytic cells.
(c) Cations in the electrolytic cell move towards cathode and anions towards anode.
(d) Cations are reduced at anode and anions are oxidised at cathode in an electrolytic cell.

121. An electrochemical cell has two half cell reactions as,

$A^{2+} + 2e \rightarrow A \qquad E^0 = 0.34V$
$X \rightarrow X^2 + 2e \qquad E^0 = 2.37V$

The cell voltage will be
(a) 2.71 V
(b) 2.03V
(c) −2.71V
(d) −2.03V

122. Which of the following is acidic flux ?
(a) CaO
(b) MgO
(c) SiO_2
(d) All of these

123. Extraction of zinc from zinc blend is achieved by
(a) electrolytic reduction
(b) roasting followed by reduction with carbon
(c) roasting followed by reduction with another metal
(d) roasting followed by self-reduction

124. The alloy used in dental filling contains
(a) Ag and Sn
(b) Ag and Sb
(c) Hg, Ag and Sn
(d) Hg, Ag and Sb

125. Which of the following amino acid is optically inactive ?
(a) Lysine
(b) Glutamine
(c) Serine
(d) Glycine

126. Which of the following carbohydrate CANNOT be digested by human body ?
(a) Starch
(b) Cellulose
(c) Glycogen
(d) All of these

127. Which of the following is water soluble vitamin ?
(a) Vitamin-C
(b) Vitamin-D
(c) Vitamin-A
(d) Vitamin-K

128. An example of natural biopolymer is
(a) Teflon
(b) Rubber
(c) DNA
(d) Nylon

129. Which of the following is mixed ketone ?
(a) Pentanone
(b) Acetophenone
(c) benzophenone
(d) Propanone

130. Benzyl alcohol and sodium benzoate is obtained by the action of concentrated sodium hydroxide on benzaldehyde. This reaction is known as
(a) Perkin reaction
(b) Cannizzaro reaction
(c) Sandmeyer reaction
(d) Claisen condensation

131. Which is most reactive nucleophile in polar aprotic solvent ?
(a) F^-
(b) Cl^-
(c) B^-
(d) I^-

132. An SN_2 reaction at an asymmetric carbon of a compound always gives
(a) an enantiomer of the substrate
(b) a product with opposite optical rotation
(c) a mixture of diastereomers
(d) a product with 100% inversion

MATHEMATICS

133. If the angles A, B and C are in A.P., then $\dfrac{a+c}{b}$ is equal to
(a) $2 \sin \dfrac{A-C}{2}$
(b) $2 \cos \dfrac{A-C}{2}$
(c) $\cos \dfrac{A-C}{2}$
(d) $\sin \dfrac{A-C}{2}$

134. Value of $\tan^{-1}\left(\dfrac{\sin 2 - 1}{\cos 2}\right)$ is
(a) $\dfrac{\pi}{2} - 1$
(b) $1 - \dfrac{\pi}{4}$
(c) $2 - \dfrac{\pi}{2}$
(d) $\dfrac{\pi}{4} - 1$

135. The sum of n terms of the following series $1^3+3^3+5^3+7^3+.....$ is
(a) $n^2(2n^2-1)$
(b) $n^3(n-1)$
(c) n^3+8n+4
(d) $2n^4+3n$

136. The quadratic equation $x^2+15|x|+14=0$ has
(a) only positive solution
(b) only negative solutions
(c) no solution
(d) both positive and negative solution

137. The co-effecient of the (r−1)th, r th and (r+1)th terms in the expansion of (x+1) in the ratio 1:3:5. The pair (n, r) is
(a) (6, 3)
(b) (7, 3)
(c) (5, 3)
(d) (5, 1)

138. The number of solutions of the equation tan x + sec x = 2 cos x lying in the int. $[0, 2\pi]$ is
(a) 0
(b) 1
(c) 2
(d) 3

139. If the function f (x) satisfy $\lim\limits_{x\to 1}\dfrac{f(x)-3}{x^2-1}=\pi$ then $\lim\limits_{x\to 1} f(x)$ is
(a) 1
(b) 2
(c) 3
(d) π

140. The value of $\int e^x\left(\dfrac{1+\sin x}{1+\cos x}\right)dx$ is
(a) $e^x \tan\dfrac{x}{2}+c$
(b) $e^x \cot\dfrac{x}{2}+c$
(c) $e^x \sin x+c$
(d) $e^x \cos \times d$

141. If $ax^2+4xy+y^2+ax+3y+2=0$ represents a parabola, then a is
(a) −4
(b) 4
(c) 0
(d) 6

142. The value of (tan 70° − tan50° + tan10°) is
(a) 2
(b) $\sqrt{3}$
(c) 1
(d) $\dfrac{\sqrt{3}}{2}$

143. If a, b, c are in AP, then 3^a, 3^b, 3^c are in
(a) AP
(b) GP
(c) HP
(d) None of these

144. Variance of the numbers 2, 4, 6, 8 is
(a) 3
(b) 8
(c) 4
(d) 5

145. $\lim\limits_{x\to e}(\log x)^{\frac{1}{1-\log x}}$ is
(a) 0
(b) e
(c) e^{-1}
(d) e^2

146. 7 persons to be seated in a row, Probability that 2 particular persons to six next to each other is
(a) $\dfrac{3}{7}$
(b) $\dfrac{2}{7}$
(c) $\dfrac{4}{7}$
(d) $\dfrac{5}{7}$

147. $\int\limits_{-\pi}^{\pi}(\cos ax - \sin bx)^2\,dx$ is
(a) π
(b) −2π
(c) −π
(d) 2π

148. If $\tan\alpha=\dfrac{5}{6}$ and $\tan\beta=\dfrac{1}{11}$, then $\alpha+\beta=?$
(a) $-\dfrac{\pi}{4}$
(b) $\dfrac{\pi}{3}$
(c) $-\dfrac{\pi}{3}$
(d) $\dfrac{\pi}{4}$

149. The range of the function $f(x)=\dfrac{1}{4-\sin 2x}$ is
(a) $\left[\dfrac{1}{5},1\right]$
(b) $\left[\dfrac{1}{3},\dfrac{1}{3}\right]$
(c) $\left[\dfrac{1}{3},1\right]$
(d) $\left[\dfrac{1}{5},\dfrac{1}{3}\right]$

150. If $\arg(z-2-3i)=\dfrac{\pi}{4}$, then the locus of z=x+iy is
(a) x + y − 1 = 0
(b) x − y − 1 = 0
(c) x + y + 1 = 0
(d) x − y + 1 = 0

151. $\sin^4 x+\cos^4 x+\sin 2x+\alpha=0$ is solvable if
(a) $-\dfrac{1}{2}\le\alpha\le\dfrac{1}{2}$
(b) $-\dfrac{3}{2}\le\alpha\le\dfrac{1}{2}$
(c) $-1\le\alpha\le 3$
(d) $-3\le\alpha\le-1$

152. The inequality $\dfrac{x-2}{x+2}>\dfrac{2x-3}{4x-1}$ does NOT hold good for which of the following value of x ?
(a) $x<-2$
(b) $-2<x<\dfrac{1}{4}$
(c) $\dfrac{1}{4}<x<1$
(d) $x>4$

153. If $Zr=\cos\dfrac{\pi}{2^r}+\sin\dfrac{\pi}{2^r}; r=1,2,3,......$ then the value of $Z_1, Z_2......\infty$ is
(a) 1
(b) −i
(c) i
(d) −1

154. If the roots of $ax^2+bx+c=0$ are in the ratio m : n, then
(a) $mna^2=(m+n)c^2$
(b) $mnb^2=(m+n)ac$
(c) $mnb^2=(m+n)^2 ac$
(d) $mna^2=(m+n)^2 c^2$

155. The equation $(cop-1)x^2 + (\cos p)x + \sin p = 0$, where x is a variable, has real row then p lies in

(a) $(0, 2\pi)$ (b) $(-\pi, 0)$

(c) $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$ (d) $(0, \pi)$

156. If $\Delta_r = \begin{vmatrix} x & y & z \\ 2^r & 2 \times 3^r & 3 \times 4^r \\ 2 \times (2^n - 1) & 3 \times (3^n - 1) & 4 \times (4^n - 1) \end{vmatrix}$

then $\displaystyle\sum_{r=1}^{n} \Delta_r$ is equal to

(a) 0
(b) xyz
(c) $24xyz (2^n - 1)(3^n - 1)(4^n - 1)$
(d) None of these

157. The co-efficient of $x^r \ (0 \le r \le n-1)$ in the expansion of

$(x+3)^{n-1} + (x+3)^{n-2}(x+2) + (x+3)^{n-3}(x+2)^2 + \ldots + (x+2)^{n-1}$

(a) $^nC_r (3^r - 2^r)$ (b) $^nC_r (3^{n-r} - 2^{n-r})$
(c) $^nC_r (3^n + 2^{n-r})$ (d) $^nC_r (3^r + 2^r)$

158. If all permutation of the letters of the word AGAIN are arranged as in dictionary, then fiftieth word is
(a) NAAGI (b) NAGAI
(c) NAAIG (d) NAIAG

159. If the system of equations $x + 2y - 3z = 1$,

$(p+2)z = 3$, $(2p+1)y + z = 2$ is inconsistent then the value of p is
(a) −2 (b) 0
(c) 2 (d) None of these

160. If $\sin^{-1} a + \sin^{-1} b + \sin^{-1} c = \pi$, then

$a\sqrt{1-a^2} + b\sqrt{1-b^2} + c\sqrt{1-c^2} = ?$

(a) a+b+c (b) $a^2 b^2 c^2$
(c) 2 abc (d) 4 abc

161. If $\tan p\theta + \cos q\theta = 0$, then the the general value of θ is

(a) $\dfrac{(2n+1)\pi}{2(p+q)}$ (b) $\dfrac{n\pi}{p-q}$

(c) $\dfrac{n\pi}{p+q}$ (d) $\dfrac{(2n+1)\pi}{2p-q}$

162. If Z_1, Z_2, Z_3 are vertices of an equilateral triangle with Z_0 its centroid, then $Z_1^2 + Z_2^2 + Z_3^2 = ?$

(a) Z_0^2 (b) $9Z_0^2$ (c) $3Z_0^2$ (d) $2Z_0^2$

163. The number of ways in which one or more balls can be selected out of 10 white, 9 green and 7 blue balls is
(a) 892 (b) 881 (c) 891 (d) 879

164. The integer k for which the inequality $x^2 - 2(4k-1)x + 15k^2 - 2k - 7 > 0$ is valid for any real x, is
(a) 2 (b) 3
(c) 4 (d) None of these

165. If S1, S2 and S3 denote the sum of first n_1, n_2, n_3 terms of an A.P. respectively, then the value of

$\dfrac{S_1}{n_1}(n_2 - n_3) + \dfrac{S_2}{n_2}(n_3 - n_1) + \dfrac{S_3}{n_3}(n_1 - n_2)$ is

(a) $S_1 + S_2 + S_3$

(b) $2(S_1 + S_2 + S_3)$

(c) $(n_1 + n_2 + n_3)(s_1 + s_2 + s_3)$

(d) 0

166. $p \Rightarrow q$ can also be written as
(a) $-p \wedge q$ (b) $p \Rightarrow \sim q$
(c) $-p \Rightarrow q$ (d) None of these

167. If $(\sec\alpha + \tan\alpha)(\sec\beta + \tan\beta)(\sec\gamma + \tan\gamma) = \tan\alpha \, \tan\beta \, \tan\gamma$, then the value of $(\sec\alpha - \tan\alpha)(\sec\beta - \tan\beta)(\sec\gamma - \tan\gamma)$ is
(a) $\cot\alpha \, \cot\beta \, \cot\gamma$
(b) $\tan\alpha \, \tan\beta \, \tan\gamma$
(c) $\cot\alpha + \cot\beta + \cot\gamma$
(d) $\tan\alpha + \tan\beta + \tan\gamma$

168. The number of real solution of the equation $5^{2^2} + 12^{x^2} = 13^{x^2}$ is
(a) 1 (b) 4 (c) 2 (d) 3

169. The total number of terms in the expansion of $(x+y)^{100} + (x-y)^{100}$ after simplify is
(a) 50 (b) 51
(c) 202 (d) None of these

170. Let A and B be 3×3 matrices. The AB = 0 implies
(a) A = 0 and B = 0
(b) $|A| = 0$ or $|B| = 0$
(c) either $|A| = 0$ or $|B| = 0$
(d) A=0 or B=0

171. The derivative of $\tan^{-1}\dfrac{\sqrt{1+x^2}-1}{x}$ w.r.t.

$\tan^{-1}\dfrac{2x\sqrt{1+x^2}-1}{1-2x^2}$ at $x=0$ is

(a) $\dfrac{1}{8}$ (b) $\dfrac{1}{4}$ (c) $\dfrac{1}{2}$ (d) 1

172. Three identical dice are rolled. The probabiliy that the same number with approch each of them is

(a) $\dfrac{1}{6}$ (b) $\dfrac{1}{36}$ (c) $\dfrac{1}{18}$ (d) $\dfrac{3}{28}$

173. If $\vec{a}.\vec{b}=\vec{b}.\vec{c}=\vec{c}.\vec{a}=0$ then $\vec{a}.\left(\vec{b}\times\vec{c}\right)$ is equal to

(a) a non-zero vector   (b) 1

(c) -1 (d) $|ab|$

174. If $\displaystyle\int\dfrac{\cos 4x+1}{\cot x-\tan x}dx = A\cos 4x+B$, then

(a) $A=-\dfrac{1}{2}$ (b) $A=-\dfrac{1}{8}$

(c) $B=-\dfrac{1}{3}$ (d) $B=\dfrac{1}{8}$

175. Two tangents are drawn from the point $(-2,-1)$ to the parabola $y^2=4x$. If α is the angle between these tangents, then $\tan\alpha = ?$

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

176. $\displaystyle\int\cos^3\theta^{\log(\sin x)}dx$ equals

(a) $-\dfrac{\sin^4 x}{4}+c$ (b) $-\dfrac{\cos^4 x}{4}+c$

(c) $\dfrac{\theta^{\sin x}}{4}+c$ (d) None of these

177. $\displaystyle\int_{-\pi}^{\pi}\left(\cos px-\sin qx\right)^2 dx$, where p, q are integers, is equal to

(a) $-\pi$ (b) 0   (c) π (d) 2π

178. The value of $\displaystyle\int_{0}^{1000}e^{x+[x]}dx$ is ([ ] denotes the greatest integer function)

(a) $\dfrac{e^{1000}-1}{1000}$ (b) $\dfrac{e^{1000}-1}{e-1}$

(c) $1000(e-1)$ (d) $\dfrac{e-1}{1000}$

179. On the interval $[0,1]$ the function $x^{25}\left(1-x\right)^{75}$ takes its maximum value at the point

(a) 0   (b) $\dfrac{1}{4}$ (c) $\dfrac{1}{2}$ (d) $\dfrac{1}{3}$

180. The general solution of differential equation $x\dfrac{dy}{dx}-\left(1+x\right)y=0$ is

(a) xe^x+c (b) $c+\dfrac{c}{x}$

(c) $xe^{-x}+c$ (d) $c-\dfrac{c}{x}$

181. The area of parallelogram having diagonals $3\hat{i}+\hat{j}-2\hat{k}$ and $\hat{i}+3\hat{j}+4\hat{k}$

(a) $5\sqrt{3}$ sq. units   (b) 7 sq. units

(c) 5 sq. units   (d) 1 sq. unit

182. If $f\left(x\right)=x^{\frac{1}{x}}-1$ for $x\neq 1$ and if f is continuous at x=1 then f(1) is

(a) 0   (b) 1   (c) $\dfrac{1}{e}$ (d) e

183. $y=\log_a x+\log_x a+\log_x x\log_a a$ then $\dfrac{dy}{dx}$ is

(a) $\dfrac{1}{x}+x\log a$ (b) $\dfrac{\log a}{x}+\dfrac{x}{\log a}$

(c) $\dfrac{1}{x\log a}+x\log a$ (d) $\dfrac{1}{x\log a}-\dfrac{\log a}{x(\log x)}$

184. The sin e of the angle between the straight line $\dfrac{x-2}{3}=\dfrac{y-3}{4}=\dfrac{z-4}{5}$ and the pl. $2x-2y+z=5$

(a) $\dfrac{2\sqrt{3}}{5}$ (b) $\dfrac{\sqrt{2}}{10}$

(c) $\dfrac{4}{5\sqrt{2}}$ (d) $\dfrac{10}{6\sqrt{5}}$

185. The domain of the function $f\left(x\right)=\sqrt{x-1}+\sqrt{6-x}$ is

(a) $[1,\infty]$ (b) $(-\infty,6)$

(c) $[1,6]$ (d) None of these

186. If the mean of a Binomial distribution is 3 and its variance is $\dfrac{3}{2}$, then the number trial is

(a) 6   (b) 2

(c) 12   (d) None of these

187. $\int_0^1 \dfrac{log(1+x)}{1+x^2}$ is equal to

(a) $\dfrac{\pi}{8}$

(b) $\dfrac{\pi}{8}log\,2$

(c) $log2$

(d) None of these

188. The integrating factor of differential equation y | $_0\,y\,dx = (log\,y - x)dy$ is

(a) $\dfrac{1}{log\,y}$

(b) $log\,(log\,y)$

(c) $1+log\,y$

(d) $\dfrac{1}{log\,(log\,y)}$

189. The value of $\int_{-2}^{4}|x+1|\,dx$ is

(a) 12

(b) 14

(c) 13

(d) 16

190. The area between the curve $y = 1 - |x|$ and the x – axis is equal to

(a) 1 sq. unit

(b) $\dfrac{1}{2}$ sq. unit

(c) $\dfrac{1}{3}$ sq. unit

(d) 2 sq. unit

191. The equation of the tangent to the curve $y = 4e^{-x\,4}$ at the point where the curve crosses y – axis is equal to

(a) $3x + 4y = 16$

(b) $4x + y = 4$

(c) $x + y = 4$

(d) $4x - 3y = -12$

192. The maximum value of $z = 10x + 6y$ subject to constrainsts $x \geq 0,\, y \geq 0,\, x + y \leq 12,\, 2x + y \leq 20$ is

(a) 72

(b) 80

(c) 104

(d) 110

193. If $\lim\limits_{x \to 0} \dfrac{(e^{kx} - 1)sin\,kx}{x^2} = 4$, then k is

(a) 2

(b) –2

(c) ±2

(d) ±4

194. Find a polynomial $f(x)$ of degree 2 where $f(0) = 8, f(1) = 12, f(2) = 18$.

(a) $x^2 + 3x - 8$

(b) $x^2 - 3x + 8$

(c) $2x^2 - x + 3$

(d) $x^2 + 3x + 8$

195. Given $P(A) = 0.5$, $P(B) = 0.4$, $P(A \cap B) = 0.3$, then $P(\bar{A}\,/\,\bar{B})$ is

(a) $\dfrac{1}{3}$

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

(c) $\dfrac{2}{3}$

(d) $\dfrac{3}{4}$

196. The number of complex numbers z such that $|z - 1| = |z + 1| = |z - i|$ equals

(a) 1

(b) 2

(c) ∞

(d) 0

197. The circles $x^2 + y^2 = 4x + 8y + 5$ intersects the line $3x - 4y = m$ at two distinct points if

(a) $-35 < m < 15$

(b) $15 < m < 65$

(c) $35 < m < 85$

(d) $-85 < m < -35$

198. If the three points $(3q, 0)$, $(0, 3p)$ and $(1, 1)$ are collinear, then which one is TRUE ?

(a) $\dfrac{1}{p} + \dfrac{1}{q} = 1$

(b) $\dfrac{1}{p} + \dfrac{1}{q} = 2$

(c) $\dfrac{1}{p} + \dfrac{1}{q} = 3$

(d) $\dfrac{1}{p} + \dfrac{3}{q} = 1$

199. If $y'' - 3y' + 2y = 0$ where $y(0) = 1, y'(0) = 0$ then the value of y at $x = log\,2$ is

(a) 1

(b) –1

(c) 2

(d) 0

200. The solution of the differential equation $x\,dy - y\,dx = 0$ represents a

(a) parabola

(b) circle

(c) hyperbola

(d) straight line

BIOLOGY

133. Histones are a set of positively charged proteins which are rich in

(a) lysine and asparagine

(b) lysine and arginine

(c) valine and glutamine

(d) valine and serine

134. Select the correct option

Direction of RNA Synthesis	Direction of reading of the template DNA strand
(a) $5' \to 3'$	$3' \to 5'$
(b) $3' \to 5'$	$5' \to 3'$
(c) $5' \to 3'$	$5' \to 3'$
(d) $3' \to 5'$	$3' \to 5'$

135. Volk mann's canal connects

(a) osteocyte with matrix

(b) different bones

(c) haversian canal with matrix

(d) haversian canal with other haversian canals

136. Assertion : A widely used diagnostic test for AIDs is enzyme linked immunosorb assay (ELISA)

Reason : Western blotting test is employed for confirmation of ELIZA negative case

(a) Both assertion and reason are true and reason is the correct explaination assertion.

(b) Both assertion and reason are true but reason is not the correct explanation assertion.

(c) Assertion is true but reason is false.

(d) Both assertion and reason are false.

137. In the pedigree shown in the figure, individuals with the solid symbols suffer from genetic disease caused by a recessive allele at an autosomal locus. You would conns the couple marked A and B, that the probability that each of their children will have the disease is
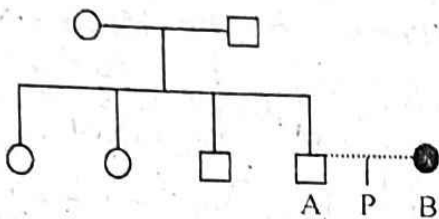
    (a) 0%   (b) 25%
    (c) 50%   (d) 75%

138. Which of the following is correct order of the evolutionary history of man ?
    (a) Peking man, Homo sapiens, Neanderthal man, Cro magnon man
    (b) Peking man, Neanderthal man, Heidelberg man, Cro magnon man
    (c) Peking man, heidelberg man, Neanderthal man, Cro magnon man
    (d) Peking man, Neanderthal man, Homo sapins, Heidelberg man

139. The linkage map of a chromosome of Drosophila has 66 units, with yellow body (y) gene at one end bobbed hair (b) gene at other end. What would be the recombination frequency between these two genes 'Y' and 'b' ?
    (a) 100% (b) $\leq 50\%$ (c) 66%   (d) >50%

140. A health disorder myxoedema that results from the deficiency of thyoxine in adults lead to
    (i) a low metabolic rate
    (ii) increase in body weight
    (iii) tendency to retain water in tissues
    (iv) rise in body temperature
    Choose the correct code :
    (a) i and iv   (b) iv only
    (c) ii and iv   (d) i, ii, iii and iv

141. On which part of the brain a 'drunk person' has the earliest effect ?
    (a) Cerebrum   (b) Pons varolii
    (c) Cerebellum   (d) Medulla oblongata

142. If you were outside for a long time on a hot, dry day without anything to drink, which of the following would happen ?
    (a) The production of thyroxin by thyroid gland would increase.
    (b) The osmotic pressure of blood would decrease.
    (c) The re-absorption of fluids from kidney tubules would decrease.
    (d) The secretion of anty-diuretic hormone from pituitary gland would increase.

143. Acid rain is produced by excess
    (a) NO_2 and SO_2 from burning fossil fuels
    (b) production of NH_3 by industries
    (c) release of CO by incomplete combustion
    (d) formation of CO_2 by combustion and animal respiration

144. Which of the following combination represents the vector of cloning capacity of DNA from smaller to bigger ?
    (a) BAC, YAC, Plasmid, Cosmid
    (b) Plasmid, BAC, YAC, Cosmid
    (c) YAC, Plasmid, BAC, Cosmid
    (d) Plasmid, Cosmid, BAC, YAC

145. Group of sporangia or a sporophyll is known as
    (a) Inducium   (b) Prothallus
    (c) Sorus   (d) Strobilus

146. Teichoic acid is found in the cell wall of
    (a) Clostridium   (b) Salmonella
    (c) Anabaena   (d) Rhizobi

147. If 400 pollengrains are produced in a single monothecous anther then, what was number of pollen grain mother cells in each of the sporangia ?
    (a) 200 (b) 100   (c) 50   (d) 25

148. Zygospore differs from zoospores by
    (i) being diploid
    (ii) being actively motile
    (iii) being sexual spore
    (iv) helps indispersal of species
    (v) does not undergo meiosis before germination.
    (a) a, c and d only   (b) b, d and e only
    (c) a and c only   (d) All except b

149. How many of the listed characters are NOT indicative Down's Syndrome ?
    Big and wrikled tongue, Gynaeco mastia, Simple palmerease under develop feminine characters, Broad flat face Azoospermia, Congnital heart disease.
    (a) 2   (b) 1   (c) 3   (d) 4

150. 'Myotonic dystrophy' in human is controlled by
    (a) X linked receive gene
    (b) X linked dominant gene
    (c) autosomal dominant gene
    (d) autosomal recessive gene

151. From the following listed molecules how many are nucleosides ?
    Thymidylate, Gyanosine, Uridine, Cytosine Guanilic acid, Adenosine, Adenylate
    (a) 4   (b) 3   (c) 2   (d) 6

152. Which of the following statements is correct ?
    (a) In cholorophyceae the stored food material is starch and the major pigments chlorophyll a and b.
    (b) In phaeophyceae, laminarin is the stored food and major pigments are chlorophyll a and b.

(c) In rhodophyceae, floridean strach is the stored food and the major pigments are chlorophyll a, d and phycoerythrin.

(d) Both (a) and (c)

153. The type of epithelial cells which line the inner surface of fallopian tubes, bronchio and small bronchi are known as
(a) squamous epithelium
(b) columnar epithelium
(c) ciliated epithelium
(d) cubical epithelium

154. Synaptonemal complex is formed during which stage of meiosis ?
(a) Pachytene   (b) Diplotene
(c) Diakinesis   (d) Zygotene

155. Which one of the following is NOT an auto immune disease ?
(a) Grave's disease   (b) Addison's disease
(c) Rheumatoid arthritis (d) Insomnia

156. A probe which is a molecule used to locate specific sequences in a mixture of DNA or RNA molecules could be
(a) a single stranded DNA
(b) a single stranded RNA
(c) either RNA or DNA
(d) can be ss DNA but not ss RNA

157. In a standard ECG which one of the following alphabet is the correct representation of the respective activity of the human heart ?
(a) S-Start of systole
(b) T-depolarisation of ventricle
(c) P-depolarisation of the atria
(d) R-repolarisation of ventricles

158. Catalytic converters are fitted into automobiles to reduce emission of harmful gases. Catalytic converters change unburnt hydrocarbons into
(a) Carbondioxide and water
(b) Carbon dioxide
(c) methane
(d) carbondioxide and methane

159. Which of the following relations is correct ?

(a) $\psi_w = \psi_s - \psi_p$

(b) $\psi_w = \psi_m - \psi_s$

(c) $\psi_w = \psi_s - \psi_p$

(d) $\psi_w = \psi_m - \psi_s + \psi_p$

160. Vitellogenesis occurs during the formation of
(a) ootid in the fallopian tube
(b) secondary oocyte in the fallopian tube
(c) primary oocyte in the graffian follicle
(d) oogonial cell in the graffian follicle

161. Hot spots are the area of in situ conservation. The key criteria for determining a hot sopt is / are
(a) location in developed / underdeveloped cavity
(b) vicinity to the sea
(c) number of endemic species and degrees of threat
(d) All of these

162. Which of the following triat is controlled by dominant autosomal genes ?
(a) Polydactyly
(b) Huntington's chorea
(c) PTC (phynyl thio carbamide) tasting
(d) All of these

163. _____ produced by bacterium streptococcus and modified by genetic engineering is used as a clot buster for removing clots from the blood vessels of patients which have undergon myocardial infarction leading to heart attack.
(a) Lipase
(b) Streptokinase
(c) Cyclosporine
(d) Antibiotic streptomycin\

164. Ectopic pregnancy is
(a) abnormal growth of the foetus in the womb
(b) foetus growing half in fallopian tube and half in uterus
(c) implanation near the cevix
(d) growth of the foetus outside the uterus

165. Which of the following situation will be fatal to first foetus ?
(a) If Rh^+ man marries Rh^+ woman
(b) If Rh^- man marries Rh^+ woman
(c) If Rh^+ man marries Rh^- woman
(d) If Rh^- man marries Rh^- woman

166. The placenta of human beings belong to the category of
(a) haemochorialis
(b) syndermochorialis
(c) endotheliochorialis
(d) epitheliochorialis

167. The presence of arginase confirms that
(a) urea is being produced in excess
(b) urea cycle may be operating
(c) arginine is being converted into ornithine
(d) arginine is being converted to citrulline

168. Two cells A and B are contiguous. Cell A has osmotic pressure 10 atm, turgor pressure 7 atm and diffusion pressure deficit 3 atm. Cell B has osmotic pressure 8 atm, turgor pressure 3 atm and diffusion pressure deficit 5 atm. The result will be
(a) no movement of water
(b) equilibrium between two cells
(c) movement of water from cell A to B
(d) Movement of wter from cell B to A

169. A long day plant flowers only if exposed to a light period.
    (a) more than its critical day length
    (b) less than its critical day length
    (c) equal to its critical day length
    (d) slightly less than its critical day length

170. The strand of DNA acting as template for mRNA transcription is
    i. coding strand.
    ii. non-coding strand
    iii. sense strand
    iv. anti-sense strand
    Choose the correct one from the codes given below.
    (A) I & II
    (B) II and IV
    (C) I and II
    (D) II and III

171. Germinal epithelium of ovary has
    (a) cuboidal cells
    (b) columnar cells
    (c) squamous cells
    (d) stratified cells

172. How parasymphathetic neural signal is assoicated with heart ?
    (a) Both heart rate and cardiac output increases.
    (b) Heart rate decreases but cardiac output increases.
    (c) Both heart rate and cardiac reduce.
    (d) Heart rate is increased without affecting the cardiac output.

173. Some hormones are given in Column I. Match the source and function with Column II and choose the currect code.

Column I	Column II
(a) Oxytocin	1. Pineal gland, regulate the circadian behaviour
(b) progesterone	2. Posterior pituitary, facilitates, birth
(c) Thymus	3. neck region, proliferation and regulation of T-lymphocyte
(d) Melatonin	4. gonads, maintains pregnacy and uterus wall thickening

    Codes :
    (a) a-2, b-4, c-3, d-1
    (b) a-3, b-2, c-4, d-1
    (c) a-4, b-2, c-1, d-3
    (d) a-1, b-2, c-3, d-4

174. DNA fingerprinting is used for the detection of criminals, paternity test etc. What is the basis of DNA fingerprinting ?
    (a) The relative amount of DNA in the ridges and groves of the fingerprint.
    (b) Satellite DNA occuring as highly repeated short DNA segments.
    (c) The relative proportions of purine and pyrimidine in DNA
    (d) The relative difference in the DNA occurrence in the blood skin and saliva.

175. During prolonged fastings, in what sequence are the following organic compounds used up by the body ?
    (a) First carbohydrate, next fats and lastly proteins.
    (b) First fats, next carbohydrates and lastly proteins.
    (c) First carbohydrates, next proteins and lastly carbohydrates.
    (d) First proteins, next lipid and lastly carbohydrates.

176. Duodenum has characteristic Burner's gland which secrets two hormones called
    (a) kinase, estrogen
    (b) secretin, cholecystockinin
    (c) prolactin, parathormone
    (d) estradiol, progesteron

177. The richest source of Vit. B_{12} is
    (a) goat's liver and spirulina
    (b) chocolate and green gram
    (c) rice and hen's egg
    (d) carrot and chicken's breast

178. Which one of the following mammalian cells is NOT capable of metabolizing glucose to carbon dioxide aerobically ?
    (a) Unstriated muscle cells
    (b) Liver cells
    (c) Red blood cells
    (d) White blood cells

179. If for some reason our goblet cells are non-functional, this will advarsely affect
    (a) production of somatostatin
    (b) secretion of sebum from the sebaceous glands
    (c) maturation of sperms
    (d) stop movement of foods down the intestine

180. Two friends are eating together on a dining table. One of them suddenly starts cough while swallowing some food. This coughing would have been due to improvement of
    (a) epiglottis
    (b) diaphragm
    (c) neck
    (d) tongue

181. Listed below are four respiratory capacities (i-iv) and four jumbled respiratory volume of normal human adult.

Respiratory capacities	Respiratory volume
i. Residual volume	2500 ml.
ii. Vital capacity	3500 ml.
iii. Inspiratory reserve volume	1200 ml.
iv. Inspirtory capacity	4500 ml.

    Which one of the following is that correct matching of two capacities and volume
    (a) (ii) –2500 ml, (iii) –4500 ml.
    (b) (iii) –1200ml, (iv) –2500ml.
    (c) (iv) –3500ml, (v) –1200 ml.
   (d) (i) –4500ml., (ii) –3500ml.

182. What is TRUE about RBC's in humans ?
    (a) They carry about 20-25 percentage of CO_2.
    (b) They transport 99.5% of O_2.
    (c) They transport about 80% oxygen only and the rest 20% of it is transporter dissolved state in blood plasma.
    (d) They do not carry CO_2 at all

183. 'RH factor' is related with
    (a) space travel   (b) blood transfusion
    (b) air pressure   (d) blood pressure

184. Angiotensiogen is a protein produced and secreted by
    (a) Juxtanglomerular cells (JG cells)
    (b) macula densa cells
    (c) endo thelial cells (cells lining the blood vessels)
    (d) liver cells

185. Given below is the ECG of a normal human, which one of its components is correctly interpreted below ?
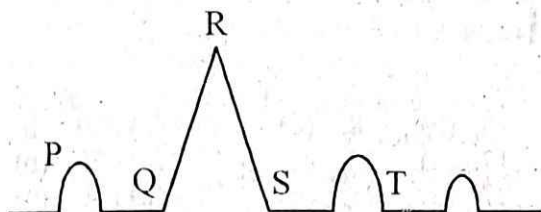
    (a) Complex Q RS-one complete pulse
    (b) Peak T-initiation of total cardiac concentration
    (c) Peak P and Peak R together systolic and diastolic blood pressure
    (d) Peak P–initiation of left atral contraction only

186. If due to some injury the chordae tendineae of the tricus pid valve of the human heart is partially non-functional, what will be the immidiate effect ?
    (a) The flow of blood into the aorta will be slowed down.
    (b) The pace maker will stop working.
    (c) The blood will tend to flow back into the left atrium.
    (d) The flow of blood into the pulmonary artery will be reduced

187. A person who is on a long hunger strike and is surviving only on water will have
    (a) less amino acids in his urine
    (b) more glucose in his blood
    (c) less urea in his urine
    (d) more sodium in his urinel

188. A fall in glomerural filration rate (GFR) activates
    (a) Juxtaglomerular cells to release renin
    (b) Adrenal cortex to release aldosterone
    (c) Adrenal medulla to release adrenaline
    (d) Posterior pituitary to release vasopressin

189. The contractile protein of skeletal muscle involving ATP as activity is
    (a) troponin   (b) tropomyosin
    (c) myosin   (d) α-actinin

190. In gymnosperm, the pollen chamber represents
    (a) a cell in the pollen grain in which the sperms are formed.
    (b) a cavity in the ovule in which pollen grains are stored after pollination.
    (c) an opening in the megagametophyte through which the pollen tube approaches the egg.
    (d) the microsporangium in which pollen grains develop

191. Triploblastic unsegmented, acoelomate exibiting bilateral symmetry repro body asexually and sexually, with some parasitic forms.
    (a) Annelida   (b) Plathyhelminthes
    (c) Ctenophora   (d) Cnidari

192. Proton gradient is very important across the membrane because
    (a) building up of proton gradient release energy
    (b) building up proton gradient increase the pH towards lumen side of the thyl membrane
    (c) breakdown of proton gradient release CO_2
    (d) breakdown of proton gradient release energy.

193. In the electron transport system present in the inner mitochondrial membrane complexes I and IV are respectively.
    (a) NADH dehydrogenase and $FADH_2$
    (b) NADH dehydrogenase and cytochrome-C oxidase complex
    (c) NADH dehydrogenase and ATP synthase
    (d) NADH dehydrogenase and cytochrome a_3

194. In haemoglobin, amino acid acts as a blood buffer ?
    (a) Histidine   (b) Glutamine
    (c) Aspartic acid   (d) Lysine

195. Lipids are found in acid insoluble fraction during the analysis of chemical composition of tissue. Give the reason.
    (a) It has very high molecular weight
    (b) It is polymer
    (c) On grinding, the biomembranes are broken down into pieces and form insovesicles.
    (d) It has low molecular weight.

196. Match the following columns.

Column-I	Column-II
a. Bt tobacco	1. Vitamin-A
b. Lepidopterans	2. High yield and pest resistance
c. Bt cotton	3. Manduca sexta
d. Golden rice	4. Tobacco budworm

    Codos :
    (a) a-3, b-4, c-2, d-1   (b) a-1, b-2, c-4, d-3
    (c) a-4, b-2, c-3, d-1   (d) a-3, b-1, c-2, d-4

197. RAS is associated to which of the following hormones ?
    (a) Mineralocorticoids   (b) Glucocorticoids
    (c) Both (a) and (b)   (d) None of these

198. Consider the given diagram and identify the lables A, B, C, D and E.
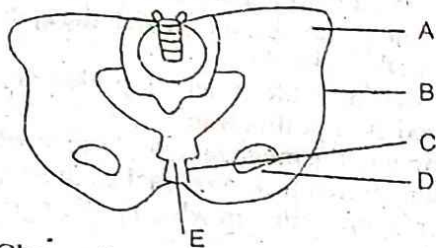
Choose the correct option identifying the labels.

(a) A-illium, B-Acetabulum, C-Pubic symphysis,
    D-Ischium, E-Pubis

(b) A-stapes, B-Acetabulum, C-Pubic symphysis,
    D-Ischium, E-Pubis

(c) A-Incus, B-Acetabulum, C-Pubic symphysis,
    D-Ischium, E-Pubis

(d) A-coccyx, B-Acetabulu, C-Pubic symphysis,
    D-ischium, E-Pubis

199. In females, the hormone inhibin is secreted by
    (a) granulosa and theca cells
    (b) granulosa cell and corpus luteum
    (c) granulosa and cumulus oophorous cells
    (d) granulosa and zona pellucida

200. Which of the following Chargaff's rule is
     incorrect ?
    (a) The DNA molecule has equal A-T and G-C
        base pairs.
    (b) Purine (A+G) are always equal to pyrimidines
        (T+C).
    (c) The amount of A is always equal to that of
        'T' and the amount of 'G' is always equal to
        that of C.
    (d) The base ratio A+T/G+C varies for given
        species.