AIIMS - 2000

Full Paper

Physics

1. A body is allowed to slide down a frictionless track freely under gravity. The track end in a semicircular shaped part of a diameter D. The height (minimum) from which the body must fall so that it completes the circle, is :

   1) (4/5) D
   2) 5D/6
   3) 6D/5
   4) (5/4) D

2. Two cars A and B approach a stationary observer from opposite sides as shown in figure. Observer hears no beats. If the frequency of the horn of the car B is 504 Hz, the frequency of horn of car A will be. :

   1) 529.2 Hz
   2) 492.2 Hz
   3) 540.5 Hz
   4) None of these

3. An insulated charged sphere of radius 5 cm has a potential of 10 V at the surface. The potential at the centre will be :

   1) same as that at 2 cm from the surface
   2) same as that at 4 cm from the surface
   3) 10 V
   4) zero

4. Minimum number of 8μF and 250 V capacitors are used to make a combination of 16μF and 1000 V are :

   1) 16
   2) 32
   3) 64
   4) 8

5. A transverse wave passes through a string with the equation $y = 10 \sin \pi (0.02x - 2.00t)$ where x is in metre and t in second. The maximum velocity of the particle in wave motion is :

1) 9 m/s
2) 63 m/s
3) 49 m/s
4) 70 m/s

6. A solenoid is 1.5 m long and its inner diameter is 4.0 cm. It has 3 layers of windings of 1000 turns each and carries a current of 2.0 A. The magnetic flux for a cross-section of the solenoid is nearly :
   1) 5.1×10^{-5} Wb
   2) 6.2×10^{-5} Wb
   3) 6.31×10^{-3} Wb
   4) 4.5×10^{-7} Wb

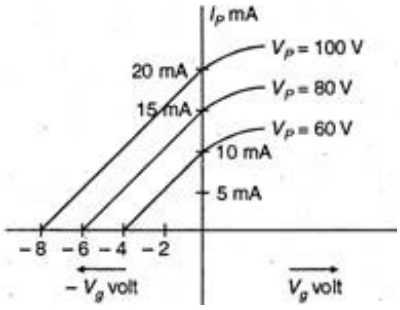
7. Given a current carrying wire of non-uniform cross-section. Which one of the following is constant through out the length of wire ?
   1) Current only
   2) Current and drift speed
   3) Drift speed only
   4) Current, electric field and drift speed

8. The ratio of intensities of two waves is 9 : 1. If they superimpose, the ratio of maximum to minimum intensity will be :
   1) 16: 1
   2) 16 : 9
   3) 4 : 1
   4) 1 : 9

9. A body of mass 5 kg has momentum of 10 kg m/s. When a force of 0.2 N is applied on it for 10 s, the change in its kinetic energy is :
   1) 4.4 J
   2) 2.3J
   3) 2.5 J
   4) 1.5 J

10. The sun emits a light with maximum wave length 510 nm while another star emits a light with maximum wavelength of 350 nm. The ratio of surface temperature of sun and the star will be :
    1) 0.68
    2) 0.48
    3) 0.83
    4) 0.56

11. The variation of anode current in a triode valve corresponding to a change in grid potential at three different values of the plate potential is shown in the given figure. The mutual conductance of triode is :



1) 10×10^{-3} mho
2) 2.5×10^{-3} mho
3) 2.25×10^{-3} mho
4) 9.25×10^{-3} mho

12. A light of intensity I_0 passes through a material of thickness *d*, then the intensity will be :

1) $I = I_0\, e^{-d/\lambda}$
2) $I = I_0\, e^{d\lambda}$
3) $I = I_0\, (1 - e^{-\lambda d})$
4) Zero

13. The surface of zone material is radiated in turn, by waves of λ = 350 nm and 540 nm respectively. The ratio of the stopping potential in the two cases is 2 : 1. The work function of the material is :

1) 3.05 eV
2) 2.05 eV
3) 4.05 eV
4) 1.05 eV

14. In a full wave rectifier circuit operating from 50 Hz mains frequency, then the fundamental frequency in the ripple will be :

1) 50 Hz
2) 100 Hz
3) 125 Hz
4) 150 Hz

15. If each fission of $_{92}U^{235}$ releases 200 MeV, how many fissions must occur per second to produce power of 1 kW?

1) 2.25×10^{18}
2) 3.125×10^{13}
3) 3.2×10^{18}

4) 2.625×10^{13}

16. The real coefficient of volume expansion of glycerine is 0.000597 per°C and linear coefficient of expansion of glass is 0.000009 per°C. Then, the apparent volume coefficient of expansion of glycerine is :
    1) 0.00058 per°C
    2) 0.00057 per°C
    3) 0.00056 per°C
    4) 0.00055 per°C

17. What should be amount of current through the ring of radius of 5 cm so that field at the centre is equal to the earth's magnetic field 7×10^{-5} Wb/m^2 is ?
    1) 0.14 A
    2) 5.57 A
    3) 14 A
    4) None of these

18. Light of wavelength 589.3 nm is incident normally on a slit of width 0.1 mm. The angular width of the central diffraction maximum at a distance of 1 m from the slit, is :
    1) 0.68°
    2) 0.48°
    3) 2.25°
    4) None of these

19. Let E_a be the electric field due to a dipole in its axial plane distant l and let E_q be the field in the equatorial plane distant l, then the relation between E_a and E_q will be :
    1) $E_a = 4E_q$
    2) $E_q = 5E_a$
    3) $E_a = 2E_q$
    4) $E_q = 3E_a$

20. A particle of mass 2g and charge 1μC is held at a distance of 1m from a fixed charge 1mC. If the particle is released it will be repelled. The speed of particle when it is at a distance of 10 m from the fixed charge is :
    1) 90 m/s
    2) 100 m/s
    3) 120m/s
    4) 150 m/s

21. A wave is represented by the equation
    $y = a \sin (0.01\ x - 2t)$
    where a and x are in cm and t in second. Velocity of propagation of the wave is :

1) 200 cm/s
2) 100 cm/s
3) 50 cm/s
4) 20 cm/s

22. In an electron microscope the accelerating voltage is increased from 20 kV to 80 kV, the resolving power of the microscope will become :
1) 2R
2) R/2
3) R/3
4) R/4

23. The truth table given for which of the following gates is correct ?

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

1) NAND gate
2) OR gate
3) AND gate
4) NOR gate

24. Potential energy of a satellite having mass *m* and rotating at a height of 6.4×10^6 m from the earth centre is :
1) $-0.6\ mgR_e$
2) $-6.4\ mgR_e$
3) $-0.5\ mgR_e$
4) $-mgR_e$

25. An electron of mass *m* and charge *e* is accelerated from rest through a potential difference V in vacuum. The final speed will be :
1) (eV)/m
2) $V\sqrt{(e/m)}$
3) $\sqrt{(3eV/m)}$
4) $\sqrt{(2eV/m)}$

26. Which one of the following is true about the p-type and n-type semiconductor ?
1) n-type semi-conductor have holes in majority
2) The concentration of electrons and holes are equal in both n-type semiconductors

3) n-type semiconductors have free electrons in majority

4) n-type semiconductor has excess negative charge

27. During the adiabatic expansion of two moles of a gas the internal energy of a gas is found to decrease by 2 J. The work done during the process on gas will be equal to :

1) –2 J

2) 2 J

3) 4 J

4) - 4 J

28. Half-life of a substance is 20 min, then the time between 33% decay and 67% decay will be :

1) 20 min

2) 30 min

3) 60 min

4) 90 min

29. Which one of the following is true ?

1) Momentum is conserved in all collisions but kinetic energy is conserved in elastic collisions

2) Momentum is not conserved in all collisions but kinetic energy is conserved in all collisions

3) Both momentum and kinetic energy are conserved in all collisions

4) Neither momentum nor kinetic energy is conserved in elastic collisions

30. Match the items in list-I with items in list-II and collect the correct answers from the codes given below the lists :

	List-I		**List-II**
I	Myopia	A	Bifocal lens
II	Hyper-metropia	B	Cylindrical lens
III	Presbyopia	C	Concave lens
IV	Astigmation	D	Convex lens

1) I-D, II-C, III-A, IV-B

2) I-C, II-D, III-A, IV-B

3) I-B, II-D, III-A, IV-C

4) I-A, II-B, III-C, IV-D

31. When a ray of light enters a glass slab, then :

1) its frequency and wavelength changes

2) its frequency does not change

3) only frequency changes

4) its frequency and velocity changes

32. Particles nature and wave nature of electromagnetic waves and electrons can be represented by :
    1) photelectricity and electron microscopy
    2) light is refracted and diffracted
    3) X-rays is diffracted, reflected by thick metal sheet
    4) electrons have small mass, deflected by the metal sheet

33. If work done in increasing the size of a soap film from 10 cm x 6 cm to 60 cm x 11 cm is 2 x 10^{-4} J, what is the surface tension?
    1) 2 x 10^{-6} Nm^{-1}
    2) 2 x 10^{-2} Nm^{-1}
    3) 2 x 10^{-10} Nm^{-1}
    4) None of these

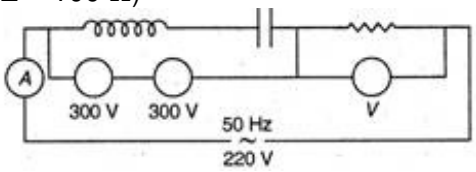
34. A body is released from the top of the tower H metre high. It takes *t* second to reach the ground. Where is the body after *t*/2 second of release ?
    1) At 3H/4 metre from the ground
    2) At 2H/3 metre from the ground
    3) 3H/2 metre from the ground
    4) At 3H/4 metre from the ground

35. Same length of two identical wires are first connected is series and then in parallel, then the amount of heat produced in both the conditions are in the ratio :
    1) 1 : 4
    2) 4 : 1
    3) 2 : 1
    4) 1 : 2

36. For an electron in the second orbit of hydrogen, the moment of momentum as per Bohr's model is :
    1) h/π
    2) 2h/π
    3) 3h/2π
    4) 2πh/3

37. Which one of the following are used to express intensity of magnetic field in vacuum ?
    1) Oersted
    2) Tesla
    3) Gauss
    4) None of these

38. In the circuit shown below what will be the reading of the voltmeter and ammeter?
(Total impedance of circuit Z = 100 Ω)



1) 180 V, 1A
2) 200 V, 2A
3) 100 V, 1A
4) 220 V, 2.2A

39. If the mass of moon is (M/81), where M is the mass of earth, find the distance of the point from the moon, where gravitation field due to earth and moon cancel each other. Given that distance between earth and moon is 60R, where R is the radius of earth.

1) 2R 2) 3R 3) 5R 4) 6R

40. A ball of mass 10 kg is moving with a velocity of 10 m/s. It strikes another ball of mass 5 kg, which is moving in the same direction with a velocity of 4 m/s. If the collision is elastic their velocities after collision will be respectively :

1) 12 m/s, 6 m/s
2) 4 m/s, 8 m/s
3) 6 m/s, 12 m/s
4) 8 m/s, 4 m/s

41. **Assertion :** Energy is released in nuclear fission.
Reason : Total binding energy of the fission fragments is larger than the total binding energy of the parent nucleus.

1) Both assertion and reason are true and the reason is correct explanation of the assertion
2) Both assertion and reason are true and the reason is not correct explanation of the assertion
3) Assertion is true but reason is false
4) Borh assertion and reason are false

42. A bullet of mass 10 g leaves a rifle at an initial velocity of 1000 m/s and strikes the earth at the same level with a velocity of 500 m/s. The work in overcoming the resistance of air will be :

1) 1250 J
2) 2500 J
3) 3750 J
4) 5000 J

43. A hole is made at the bottom of the tank filled with water (density 1000 kg/m^3). If the total

pressure at the bottom of the tank is 3 atmosphere (1 atmosphere = $10^5 N/m^2$), then the velocity of efflux is :

1) $\sqrt{}(200)$ m/s
2) $\sqrt{}(400)$ m/s
3) $\sqrt{}(600)$ m/s
4) $\sqrt{}(700)$ m/s

44. An equilateral prism is made of a material of refractive index $\sqrt{}3$. The angle of minimum deviation for the prism is :

1) 15° 2) 30° 3) 45° 4) 60°

45. Knowing that the mass of the moon is 1/81 times that of earth and its radius is 1/4 the radius of earth. If the escape velocity at the surface of the earth is 11.2 km/s, then the value of escape velocity at the surface of the moon is :

1) 2.5 km/s
2) 0.15 km/s
3) 0.25 km/s
4) 10 km/s

46. What is the dimensional formula of gravitational constant?

1) $[ML^2T^{-1}]$
2) $[ML^{-1}T^{-2}]$
3) $[M^{-1}L^3T^{-2}]$
4) None of these

47. Which one of the following statement is not correct about the magnetic field ?

1) Inside the magnet the lines go from north pole to south pole of the magnet
2) Tangents to the magnetic lines give the direction of the magnetic field
3) The magnetic lines form a closed loop
4) Magnetic lines of force do not cut each other

48. A doctor prescribes spectacles to a patient with a combination of a convex lens of focal length 40 cm and convex lens of focal length 25 cm then the power of spectacles will be :

1) -3.5 D
2) - 4.5 D
3) -1.5 D
4) -8.5 D

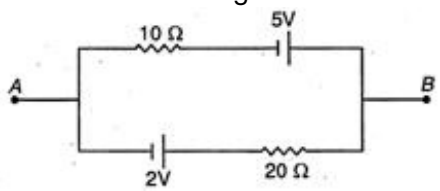
49. Turn ratio in a step up transformer is 1 : 2, if a Leclanche cell of 1.5 V is connected across the input then the voltage across the output will be :

1) 0.25 V
2) 0.5 V

3) 0.75 V

4) zero

50. The current in the given circuit is :



1) 0.6 A

2) 0.4 A

3) 0.1 A

4) 0.5 A

These questions consist of two statements each printed as Assertion and Reason, while answering these questions you are required to choose any one of the following five responses :

A. If both Assertion and Reason are true and the Reason is correct explanation of the Assertion.

B. If both the Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.

C. If the Assertion is true but the Reason is false.

D. If both the Assertion and Reason are false.

E. If Assertion is false but Reason is true.

51. **Assertion :** Cyclotron does not accelerate electron.
Reason : Mass of the electron is very small.

1) A

2) B

3) C

4) D

5) E

52. **Assertion :** The average speed of an object may be equal to arithmetic mean of individual speeds.
Reason : Average speeds is equal to total distance travelled per total time taken.

1) A

2) B

3) C

4) D

5) E

53. **Assertion :** A spaceship while entering the earth's atmosphere is likely to catch fire.
Reason : The temperature of upper atmosphere is very high.

1) A

2) B

3) C
4) D
5) E

54. **Assertion :** A balloon filled with hydrogen will fall with acceleration (g/6) of the moon.
Reason : Moon has no atmosphere.

1) A
2) B
3) C
4) D
5) E

55. **Assertion :** For gas atom the number of degrees of freedom is 3.
Reason : $(C_p/C_{v)} = \gamma$.

1) A
2) B
3) C
4) D
5) E

56. **Assertion :** A turning fork is in resonance with a closed pipe. But the same tuning fork cannot be in resonance with an open pipe of the same length.
Reason : The same tuning fork will not be in resonance with open pipe of same length due to end correction of pipe.

1) A
2) B
3) C
4) D
5) E

57. **Assertion :** The refractive index of diamond is $\sqrt{6}$ and that of liquid is $\sqrt{3}$. If the light travels from diamond to the liquid, it will be totally reflected when the angle of incidence is 30°.
Reason : $n = (1/\sin C)$, where n is the refractive index of diamond with respect to liquid.

1) A
2) B
3) C
4) D
5) E

58. **Assertion :** The setting sun appears to be red.
Reason : Scattering of light is directly proportional to the wavelength.

1) A
2) B

3) C
4) D
5) E

59. **Assertion :** If the speed of charged particle increases both the mass as well as charge increases.
Reason : If m_0 be rest mass and m the mass at velocity v then $m = (m_0/\sqrt{(1 - (v^2/c^2)})$ where c = speed of light.
1) A
2) B
3) C
4) D
5) E

60. **Assertion :** Mass of moving photon varies inversely as the wavelength.
Reason : Energy of the particle = mass x (speed of light)^2.
1) A
2) B
3) C
4) D
5) E

Chemistry

61. The molecular formula of plaster of Paris is :
1) $2CaSO_4 \cdot H_2O$
2) $CaSO_4 \cdot 2H_2O$
3) $CaSO_4 \cdot 3H_2O$
4) $2CaSO_4 \cdot 1/2H_2O$

62. On mixing 3 g of non-volatile solute in 200 mL of water its boiling point (100°C) becomes 100.52°C. If k_b for water is 0.6 K.kg/mol then molecular weight of solute is :
1) 11.5g mol^{-1}
2) 13.6g mol^{-1}
3) 20.7g mol^{-1}
4) 17.3g mol^{-1}

63. Producer gas is mixture of :
1) $CO + N_2$
2) $CO + H_2$
3) $CO + H_2 + O_2$

4) $CO + H_2 + N_2$

64. Enthalpy of neutralisation of CH_3COOH by NaOH is – 50.6 kJ/mol and the heat of neutralisation of a strong acid with NaOH is – 55.9 kJ/ mol. The value of ΔH for the ionisation of CH_3COOH is :

1) 4.5 kJ/mol
2) 2.6 kJ/mol
3) 5.3 kJ/mol
4) 7.4 kJ/mol

65. van't Hoff factor is :

1) more than one in case of association
2) less than one in case of dissociation
3) equal to (normal molecular mass/observed molecular mass)
4) equal to (observed molecular mass/normal molecular mass)

66. Ethyl alcohol reacts with chlorine to produce :

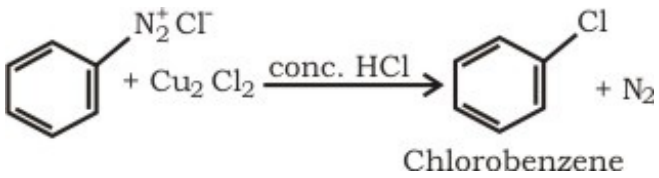
1) $ClCH_2CH_2Cl$
2) CH_2ClCH_2OH
3) $CHCl_2CH_2OH$
4) CCl_3CHO

67. Solid CO_2 is known as dry ice :

1) it melts at 0°C
2) its BP is more than 199°C
3) it directly change to vapours lowering the temperature to - 78° C
4) none of the above

68. Which pair have same percentage of carbon ?

1) CH_3COOH and $C_6H_{12}O_6$
2) CH_3COOH and $C_{12}H_{22}O_{11}$
3) CH_3COOH and C_2H_5OH
4) $C_6H_{12}O_6$ and $C_{12}H_{22}O_{11}$

69. 

Chlorobenzene

Above reaction is known as :

1) Strecker's reaction
2) Sandmeyer's reaction

3) Wolff-Kishner reaction
4) Stephen's reaction

70. pK_a value of four acids are given below. The strongest acid is :

1) 4.5 2) 3.5 3) 2.5 4) 2

71. German silver is an alloy of :

1) Fe, Cr, Ni
2) Ag, Cu, Au
3) Cu, Zn, Ni
4) Cu, Zn, Sn

72. Which of the following has maximum ionisation potential ?

1) Al 2) P 3) Si 4) Mg

73. Bohr's theory is not applicable to :

1) H
2) He^+
3) Li^{2+}
4) H^+

74. The outermost configuration of most electronegative element is :

1) ns^2np^5
2) ns^2np^6
3) ns^2np^4
4) ns^2np^3

75. Deficiency of vitamin-D causes :

1) night blindness
2) rickets
3) scurvy
4) loss of appetite

76. Nitrolim is :

1) CaC_2 and graphite
2) $CaCN_2$ and graphite
3) $Ca(CN)_2$ and graphite
4) $CaCN_2 + N_2$

77. The EAN of Zn in $[Zn(OH)_4]^{2-}$ complex is :

1) 16 2) 32 3) 36 4) 40

78. For reducing one mole of $Cr_2O_7^{2-}$ to Cr^{3+} the charge required is :

1) 2 x 96500 C
2) 6 x 96500 C
3) 0.4 F
4) 0.8 F

79. The correct order of hydration energy of alkali metal is :

1) $Li^+ > Na^+ > K^+ > Rb^+$
2) $Rb^+ > K^+ > Na^+ > Li^+$
3) $Na^+ > K^+ > Li^+ > Rb^+$
4) $K^+ > Rb^+ > Na^+ > Li^+$

80. In the following chemical reaction :
$Ag_2O + H_2O + 2e^- \rightarrow 2Ag + 2OH^-$

1) hydrogen is reduced
2) electrons are reduced
3) water is oxidised
4) silver is oxidised

81. Which of the following molecule contains one lone pair of electron on the central atom ?

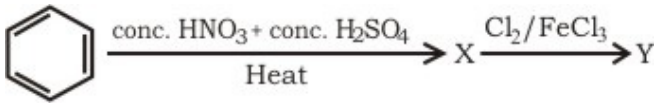
1) NH_3
2) CH_4
3) $CHCl_3$
4) Cl_2

82. The Mohr's salt is shown by :

1) $FeSO_4(NH_4)_2\ SO_4 \cdot 6H_2O$
2) $FeSO_4(NH_3)_2SO_4 \cdot 6H_2O$
3) $K_2SO_4Al_2(SO_4)_3 \cdot 24H_2O$
4) $FeSO_2(NH_2)_4SO_4 \cdot 6H_2O$

83. The de-Broglie wavelength of the electron in the ground state of hydrogen atom is :
[KE = 13.6 eV]; 1 eV = 1.602 x 10^{-19}J

1) 33.28 nm
2) 3.328 nm
3) 0.3328 nm
4) 0.0332 nm

84. 

The product Y is :

1) p-chloro nitrobenzene
2) m-chloro nitrobenzene
3) o-chloro nitrobenzene
4) o-p-dichloro nitrobenzene

85. Which equation shows correct form of Berthelot equation ?

1) $(P + (a/T\,(V + C)^2))\,(V - b) = RT$
2) $(P + (a/T\,(V - C)^2))\,(V - b) = RT$
3) $(P + (a/TV^2))\,(V - b) = RT$
4) $(P + (a/TV^2))\,(V + b) = RT$

86. Which of the following statement is not correct regarding hydrogen atom ?

1) It resembles with halogens in some properties
2) It resembles with alkali metals in some properties
3) It cannot be placed in first group of periodic table
4) It is the lightest element

87. Which of the following statement is false for the reaction, $H_2 + Br_2 \rightarrow 2HBr$? The rate law is $(dx/dt) = k\,[H_2]\,[Br_2]^{1/2}$.

1) Order of reaction is 1.5
2) Molecularity of the reaction is 2
3) By increasing the concentration of Br_2 four times the rate of reaction is doubled
4) All the above are correct

88. At 298 K equal volumes of SO_2, CH_4 and O_2 are mixed in empty container. The total pressure exerted is 2.1 atm. The partial pressure of CH_4 in mixture is :

1) 0.4 atm
2) 1.2 atm
3) 0.8 atm
4) 0.16 atm

89. During isothermal expansion of one mole of an Ideal gas from 10 atm to 1 atm at 273 K, the work done is [gas constant = 2] :

1) – 795.8 cal
2) – 1072.6 cal
3) – 1381.8 cal
4) – 1599.6 cal

90. Acetic acid on heating with P_2O_5 produce :

1) CH_3COCH_3
2) CH_3CHO
3) $CH_3COCH_2CH_3$
4) $(CH_3CO)_2O$

91. Mac Arthur process is used for the extraction of :

1) Au 2) Ag 3) Cu 4) Zn

92. One mole of an Ideal gas for which $C_v = 3/2R$ is heated reversibly at a constant pressure of 1 atm from 25°C to 100°C. The ΔH is :

1) 37.75 cal
2) 37.552 cal
3) 372.56 cal
4) 37256 cal

93. 0.4 moles of HCl and 0.2 moles of $CaCl_2$ were dissolved in water to have 500 mL of solution, the molarity of Cl^- ion is :

1) 0.8 M
2) 1.6 M
3) 2.4 M
4) 3.6 M

94. Which of the following is the atomic number of metal ?

1) 32 2) 34 3) 36 4) 38

95. Milk is colloid in which :

1) liquid is dispersed in liquid
2) gas is dispersed in liquid
3) sugar is dispersed in water
4) solid is dispersed in liquid

96. Which of the following is greatest paramagnetic ?

1) Cu^+
2) Fe^{2+}
3) Fe^{3+}
4) Cu^{2+}

97. Which of the following compound is formed when $CH_2 = (CH_2)_2COOH$ react with HBr ?

1) $CH_3CHCH_2CH_2BrCOOH$

2) $CH_3CHBrCH_2CH_2COOH$

3) $CH_2BrCH_2(CH_2)_2COOH$

4) $CH_3CHCH_2BrCH_2COOH$

98. Amylose is a polymer of :

1) β-D glucose

2) α-D glucopyranose

3) fructose

4) β-fructose

99. Hypo on treatment with iodine produce :

1) Na_2S

2) Na_2SO_4

3) Na_2SO_3

4) $Na_2S_4O_6$

100. Picric acid is :

1) trinitrophenol

2) trinitrotoluene

3) trinitrobenzene

4) tribromobenzene

101. Which of the following is the sweetest sugar ?

1) Glucose

2) Fructose

3) Sucrose

4) Maltose

102. Ostwald's dilution law is applicable on :

1) strong electrolytes

2) weak electrolytes

3) both strong and weak electrolytes

4) none of the above

103. $A + 2B \rightleftharpoons 2C + D$ initial concentration of B was 1.5 times that of A, but the equilibrium concentration of A and B are found to be equal. The equilibrium constant for the reaction is :

1) 4 2) 8 3) 12 4) 16

104. The oxidation number of sulphur in $H_2S_2O_7$ is :

1) + 2 2) + 6 3) + 4 4) + 8

105. Lucas reagent is :

1) anhy. $AlCl_3$ + conc. HCl

2) anhy. $AlCl_3$ + conc. HNO_3

3) anhy. $ZnCl_2$

4) anhy. $ZnCl_2$ + conc. HCl

106. When 8.3 g copper sulphate reacts with excess of potassium iodide then the amount of iodine liberated is :

1) 42.3 g

2) 25.3 g

3) 4.23 g

4) 3.25 g

107. Deuterium nucleus contains :

1) 1 proton 1 electron

2) 1 proton 1 neutron

3) 2 proton 1 electron

4) 1 proton 2 electron

108. Glucose gives silver mirror with Tollen's reagent. This shows the presence of :

1) —COOH

2) —OH

3) —CHO

4) >C = O

109. Aldol condensation does not take place in :

1) HCHO

2) CH_3CHO

3) CH_3CH_2CHO

4) CH_3COCH_3

110. Glucose reacts with phenyl-hydrazine to produce osazone. Number of molecules of phenyl-hydrazine take part is :

1) 1 2) 2 3) 3 4) 4

These questions consists of two statements each, printed as assertion and reason. While answering these question you are required to choose any one of the following five responses :

A. If both the assertion and the reason are true and the reason is a correct explanation of the assertion.

B. If both the assertion and the reason are true but reason is not a correct explanation of

the assertion.
C. If the assertion is true but the reason is false.
D. If both the assertion and the reason are false.
E. If the assertion is false but the reason is true.

111. **Assertion :** Sucrose undergo mutarotation.
Reason : Sucrose is a disaccharide.

1) A
2) B
3) C
4) D
5) E

112. **Assertion :** Resorcinol turns $FeCl_3$ solution purple.
Reason : Resorcinol have phenolic group.

1) A
2) B
3) C
4) D
5) E

113. **Assertion :** Copper reacts with HCl and liberates hydrogen.
Reason : Hydrogen is present above Cu in the reactivity series.

1) A
2) B
3) C
4) D
5) E

114. **Assertion :** NH_3 absorbs more readily over activated charcoal than CO_2.
Reason : NH_3 is non-polar.

1) A
2) B
3) C
4) D
5) E

115. **Assertion :** Sky appears blue colour.
Reason : Colloidal particles of dust scatter blue light.

1) A
2) B
3) C
4) D

5) E

116. **Assertion :** Acetylene on treatment with alkaline $KMnO_4$ produce acetaldehyde.
Reason : Alkaline $KMnO_4$ is a reducing agent.

1) A
2) B
3) C
4) D
5) E

117. **Assertion :** Entropy of ice is less than water.
Reason : Ice have cage like structure.

1) A
2) B
3) C
4) D
5) E

118. **Assertion :** Use of pressure cooker reduces cooking time.
Reason : At higher pressure cooking occurs faster.

1) A
2) B
3) C
4) D
5) E

119. **Assertion :** Lime water becomes turbid on passing CO_2 but becomes clear on passing more CO_2.
Reason : Lime water is calcium hydroxide, $Ca(OH)_2$.

1) A
2) B
3) C
4) D
5) E

120. **Assertion :** The atoms of different elements having same mass number but different atomic number are known as isobars.
Reason : The sum of protons and neutrons in isobars is always different.

1) A
2) B
3) C
4) D

5) E

Biology

121. 13 celled male gametophyte of *Selaginella* has :
    1) 12 cells of antheridium +1 prothallial cell
    2) 10 cell of antheridium +3 prothallial cell
    3) 9 cell of antheridium +4 prothallial cell
    4) 8 cells of antheridium +6 prothallial cell

122. Which of the following is enucleate at maturity ?
    1) Companion cell
    2) Meristematic cell
    3) Parenchyma
    4) Sieve tube cell

123. Apoenzyme is :
    1) protein
    2) lipid
    3) sugar
    4) vitamin

124. The plants which can withstand narrow range of temperature tolerance, are called :
    1) stenothermal
    2) eurythermal
    3) mesothermal
    4) monothermal

125. Power of regeneration of sponges is due to :
    1) theocytes
    2) archaeocytes
    3) amoebocytes
    4) sclerocytes

126. The edible part of cauliflower :
    1) inflorescence
    2) leaf
    3) flower
    4) stem

127. The role of bacteria in carbon cycle is :
    1) photosynthesis

2) chemosynthesis
3) decomposition of organic compounds
4) evolution of O_2

128. Food chain starts with :
1) autotrophs
2) herbivores
3) carnivores
4) decomposers

129. Which of the following substances is at it lowest level in fish food ?
1) Acting
2) Myosin
3) Cholesterol
4) Tissue fluid

130. Birds are :
1) cold blooded
2) homeothermal
3) poikilothermal
4) homeopoiesis

131. Flora and fauna in lake or ponds is :
1) lentic biota
2) biotic biota
3) abiotic biota
4) field layer

132. Colchicine prevents the mitosis of cell at which of following stage ?
1) Anaphase
2) Metaphase
3) Prophase
4) Interphase

133. Which disease has XXY chromosome constitution ?
1) Down's syndrome
2) Turner's syndrome
3) Klinefelter's syndrome
4) Okazaki syndrome

134. Cell wall is absent in :
1) Amoeba

2) Chara
3) Yeast
4) E. coli

135. Hydrolytic enzymes are found in :
1) peroxisomes
2) lysosomes
3) lepdosomes
4) losmasomes

136. Growth of pollen tube towards embryo is :
1) geotropism
2) chemotaxis
3) phototaxis
4) thigmotaxis

137. Haploid cultures can be obtained by culturing :
1) pollen grains
2) embryo
3) shoot apex
4) root apex

138. Life cycle of *Taenia* is :
1) monogenetic
2) digenetic
3) polygenetic
4) hexogenetic

139. Which of the following is found in algal zone of *Cycas* coralloid roots ?
1) Blue-green algae
2) Red algae
3) Diatoms
4) Brown algae

140. Pigment haemocyanin is found in :
1) Chordata
2) Annelida
3) Mollusca
4) Echinodermata

141. HIV has a protein coat and genetic material :
1) ss RNA

2) ds RNA
3) ss DNA
4) ds DNA

142. Which of the following statement is true ?
1) Spores are gametes
2) Spores and gametes are diploid
3) Gametes are always haploid
4) Spores are always diploid

143. Rough E.R. differs from smooth E.R. due to the presence of :
1) DNA
2) nucleus
3) ribosome
4) enzyme

144. Scales in *Chondrichthyes* are :
1) placoid
2) canoid
3) cycloid
4) sysamoid

145. Cranium of human contains :
1) 12 bones
2) 8 bones
3) 14 bones
4) 20 bones

146. How may ovaries are found in birds ?
1) One ovary
2) Two ovaries
3) Three ovaries
4) Many ovaries

147. Most reduced form of stem is found in :
1) bulb
2) rhizome
3) tree
4) stem

148. Okazaki fragments form :

1) leading strand
2) lagging strand
3) non sense strand
4) senseful strand

149. The name of vitamin C is :
1) ascorbic acid
2) glutamic acid
3) aspartic acid
4) enolic acid

150. Gamma globulin are synthesized inside :
1) liver
2) kidney
3) bone marrow
4) lymph and lymphoid tissue

151. Chromosomes with equal arms are called :
1) metacentric
2) telocentric
3) acentric
4) polycentric

152. Which of the following snake is not poisonous ?
1) Naja-naja
2) Python
3) Hydrophis
4) Bungarus

153. Double membrane structure of cell are :
1) nucleus
2) chloroplast
3) mitochondria
4) all of these

154. Binomial nomenclature was introduced by :
1) Linnaeus
2) Darwin
3) Bentham and Hooker
4) Aristotle

155. Cambium of root is an example of :

1) apical meristem
2) intercalary meristem
3) primary meristem
4) secondary meristem

156. Reabsorption in tubules of nephrons occurs by :
1) osmosis
2) diffusion
3) filteration
4) active transport

157. Acid rain is due to pollution of :
1) dust
2) pesticides
3) SO_2 and NO_2
4) carbon particle

158. The egg case in female cockroach is formed by secretion of :
1) collaterial gland
2) mushroom gland
3) conglobate gland
4) prothoraic gland

159. The poisonous fluid present in nematocysts of *Hydra* is :
1) toxin
2) venom
3) hematin
4) hypnotoxin

160. *Antedon* belong to which of the following class ?
1) Asteroidea
2) Ophiuroidea
3) Crinoidea
4) Echinoidea

161. Glycolysis occur in :
1) mitochondria
2) chloroplast
3) parenchyma
4) sieve tube cell

162. Electron microscope was invented by :

1) Robert Hooke
2) Knoll and Ruska
3) Pasteur
4) Schwann and Schleiden

163. Polygenic genes show :
1) similar genotype
2) different phenotype
3) different karyotype
4) different genotype

164. In *Opuntia* spines are modification of :
1) stem
2) root
3) leaf
4) flower

165. Which of the following antibiotic was discovered by Alexander Flemming ?
1) Streptomycin
2) Tetracycline
3) Penicillin
4) Terramycin

166. The basic unit of classification is :
1) genus
2) species
3) variety
4) subspecies

167. The enzyme responsible for the reduction of molecular nitrogen to the level of ammonia in the leguminous root nodule :
1) nitrogenase
2) nitrate reductase
3) nitrite reductase
4) amminase

168. 10% law of energy transfer was given by :
1) Lindmann
2) Tansley
3) Stanely
4) Darwin

169. Malignant tertain malaria is caused by :

1) P. vivax
2) P. malariae
3) P. ovale
4) P. falciparum

170. Which of the following is a fungus ?

1) Nostoc
2) E.coli
3) Yeast
4) Chara

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B. If both the Assertion and the Reason are true but the Reason is not a correct explanation of Assertion.
C. If the Assertion is true but the Reason is false.
D. If both the Assertion and the Reason are false.
E. If the Assertion false but the Reason is true.

171. **Assertion :** In collateral vascular bundles phloem is situated towards inner side.
Reason : In monocot stem, cambium is present.

1) A
2) B
3) C
4) D
5) E

172. **Assertion :** *Ginkgo biloga* is living fossil.
Reason : Organism which have persisted and remain unchanged for the past several million years while their relatives disappeared.

1) A
2) B
3) C
4) D
5) E

173. **Assertion :** Saline water is not given to patients of hypertension.
Reason : Saline water can cause vomiting and may drop blood pressure suddenly causing cardiac arrest.

1) A
2) B

3) C
4) D
5) E

174. **Assertion :** Histones are basic proteins of major importance in packaging of eukaryotic DNA, DNA and histones comprise chromatin forming the bulk of eukaryotic chromosomes.
Reason : Histones are five major types H_1, H_2A, H_2B, H_3 and H_4

1) A
2) B
3) C
4) D
5) E

175. **Assertion :** Bacteria have three basic shapes, *i.e.,* round, rod, spiral.
Reason : Cocci and bacilli may form clusters or chain of a definite length.

1) A
2) B
3) C
4) D
5) E

176. **Assertion :** Tongue is a gustatoreceptor.
Reason : Receptors for gustatory sensations are located in taste buds.

1) A
2) B
3) C
4) D
5) E

177. **Assertion :** Rabies, an infection of mammals which involve central nervous system, which may result in paralysis and finally death.
Reason : This is caused by neurotropic bacteria in saliva of rabies animal.

1) A
2) B
3) C
4) D
5) E

178. **Assertion :** Phenylketonuria is recessive hereditary disease caused by body's failure to oxidise an amino acid phenylalanine to tryosine because of a defective enzyme.
Reason : It results the presence of phenylalanine acid in urine.

1) A

2) B
3) C
4) D
5) E

179. **Assertion :** Blood pressure is arterial blood pressure.
Reason : Blood pressure is measured by sphygmomanometer.
1) A
2) B
3) C
4) D
5) E

180. **Assertion :** Aflatoxins are produced by *Aspergillus flavus*.
Reason : These toxins are useful to mankind.
1) A
2) B
3) C
4) D
5) E

General Knowledge

181. Which one of the least populated state in India ?
1) Nagaland
2) Himachal Pradesh
3) Orissa
4) Sikkim

182. Shakti Sthal is the name given to :
1) The factory where India's newly designed battle tanks are being manufactured
2) The samadhi of Indira Gandhi
3) The nuclear reactor at Kalpakam at Chennai
4) None of the above

183. Which one of first Indian missile (earth to earth) was tested successfully from Shri Hari Kota ?
1) Prithvi
2) Nag
3) Agni
4) none of these

184. 'Sun city' is in :

1) USA
2) South Africa
3) France
4) Denmark

185. Tallest tower in the world is :
1) C.N. Tower
2) Kutub Minar
3) Angel
4) None of these

186. Who was known as the "Lady of the Lamp"?
1) Sarojini Naidu
2) Joan of Arc
3) Florence Nightinagale
4) None of the above

187. Who was appointed as the first Indian Governor general of India ?
1) C. Raj Gopalachari
2) Radha Krishana
3) Y.C. Grace
4) V.V. Giri

188. World Tourism day was declared on :
1) 1st October
2) 11th February
3) 27th September
4) none of these

189. Nasik is situated on the bank of :
1) Narmada
2) Krishna
3) Kauvery
4) Godavary

190. Grand Trunk road was built by :
1) SherShah Suri
2) Shaha Jahan
3) Lord Bentick
4) Lord Mount Battan

191. Rial is the currency of :

1) Afganistan
2) Iran
3) Iraq
4) Jordan

192. William's cup is related to :
1) basket ball
2) table tennis
3) volley ball
4) foot ball

193. 'The Satanic Verses' a controversial book is written by :
1) Gyani Jail Singh
2) Khushwant Singh
3) Kuldip Nayyar
4) Salman Rushdie

194. 'Abhigyan Shakuntalam' was written by :
1) Surdas
2) Tulsidas
3) R.N. Tagore
4) Kalidas

195. Full form of H.T.T.P. is :
1) Hyper Terminal Transformation
2) Hyper Text Transfer Protocol
3) High Technology Test Principles
4) Hyper Taxt Training Programme

196. Kushi Nagar, the famous Buddhist pilgrimage centre in the state of :
1) U.P.
2) M.P.
3) Bihar
4) Orissa

197. "Divine" comedy was written by :
1) Goethe
2) Milton
3) Dante
4) Shakespears

198. The contribution of Sarkaria commission was related between :

1) state and centre
2) centre and union territories
3) one state to other state
4) none of the above

199. Which city is known as Pink city ?
1) Jaipur
2) Paris
3) New York
4) London

200. Weight of blood in the body is :
1) about 7 litres in normal body or 7% of the total body weight
2) about 5 litres in normal body or 5% of the total body weight
3) about 10 litres in normal body or 10% of the body weight
4) none of the above

Answer Key

1) 4	2) 1	3) 3	4) 2	5) 2	6) 3	7) 1	8) 3	9) 1	10) 1
11) 2	12) 1	13) 4	14) 2	15) 2	16) 2	17) 2	18) 1	19) 3	20) 1
21) 1	22) 1	23) 2	24) 3	25) 4	26) 3	27) 1	28) 1	29) 1	30) 2
31) 2	32) 1	33) 2	34) 1	35) 2	36) 1	37) 1	38) 4	39) 4	40) 3
41) 1	42) 3	43) 2	44) 4	45) 1	46) 3	47) 1	48) 3	49) 4	50) 3
51) 1	52) 1	53) 3	54) 1	55) 2	56) 3	57) 5	58) 3	59) 5	60) 2
61) 1	62) 4	63) 1	64) 3	65) 3	66) 4	67) 3	68) 1	69) 2	70) 4
71) 3	72) 2	73) 4	74) 1	75) 2	76) 2	77) 3	78) 2	79) 1	80) 3
81) 1	82) 1	83) 3	84) 2	85) 3	86) 3	87) 4	88) 2	89) 3	90) 4
91) 2	92) 3	93) 2	94) 4	95) 1	96) 3	97) 2	98) 2	99) 4	100) 1
101) 2	102) 2	103) 1	104) 2	105) 4	106) 3	107) 2	108) 3	109) 1	110) 3
111) 5	112) 1	113) 5	114) 3	115) 1	116) 4	117) 2	118) 1	119) 2	120) 3
121) 1	122) 4	123) 1	124) 1	125) 2	126) 1	127) 3	128) 1	129) 3	130) 2
131) 1	132) 2	133) 3	134) 1	135) 2	136) 2	137) 1	138) 2	139) 1	140) 3
141) 1	142) 3	143) 3	144) 1	145) 2	146) 1	147) 1	148) 2	149) 1	150) 4
151) 1	152) 2	153) 4	154) 1	155) 4	156) 4	157) 3	158) 1	159) 4	160) 3
161) 3	162) 2	163) 2	164) 3	165) 3	166) 2	167) 1	168) 1	169) 4	170) 3
171) 4	172) 1	173) 3	174) 2	175) 2	176) 1	177) 3	178) 1	179) 2	180) 3
181) 4	182) 2	183) 1	184) 2	185) 1	186) 3	187) 1	188) 3	189) 4	190) 1
191) 2	192) 1	193) 4	194) 4	195) 2	196) 1	197) 3	198) 1	199) 1	200) 1