PHYSICS – 5

1. When different parts of a metal are kept at different temperature and current is passed through it, heat is either evolved or absorbed. The effect is called

A. Peltier effect B. Seebeck effect C. Thompson effect D. Joule effect

2. A storage battery is to be charged from a d.c. supply which terminal of the battery be connected to the positive side of the line

A. positive
B. negative
C. both positive and negative
D. first negative and after the lapse of 5 minutes positive

3. The force between two parallel wires carrying currents in the same direction is a

A. force of attraction
B. force of repulsion
C. no resultant force between the wires
D. resultant force acting perpendicular to the flow of wires

4. The motion of an electric charge produces

A. only an electric field
B. only a magnetic field
C. both magnetic and electric field
D. none of the above

5. An ammeter is connected in series with a 2V circuit containing a 2V battery when the switch is closed, the ammeter shows high deflection and comes to zero. The circuit may contain a

A. resistance of 20Ω B. fuse C. diode D. triode

6. Ferromagnetic substances have

A. very high permeability and susceptibility
B. low permeability but high susceptibility
C. high permeability and low susceptibility
D. none of these

7. The permeability of the paramagnetic substance is

A. very large B. very small C. negative D. small but more than 1

8. When a material is subjected to a small field H, the intensity of magnetisation is proportional to

A. $\sqrt{H}$ B. H C. H^2 D. $1/\sqrt{H}$

9. In a capacitance circuit the resistance is

A. ωC B. $1/\omega C$ C. $1/\sqrt{\omega} C$ D $\sqrt{\omega}$ x C

10. In electromagnetic induction, the induced e.m.f. is independent of

A. change of flux
B. time
C. number of lines of force
D. resistance of the cells

11. A coil of area *A* is kept perpendicular to a magnetic field *B*. If coil is rotated by 180^0, then change in the flux will be

A. *BA* B. zero C. 2*BA* D. 3*BA*

12. The displacement current flows in the dielectric of a capacitor when the P.D. across its plates

A. is increasing with time
B. is not decreasing with time
C. has assured a constant value
D. becomes zero

13. Electromagnetic waves

A. are longitudinal waves
B. travel in free space at the speed of light
C. are produced by charges moving with uniform velocity
D. travel with the same speed in all media

14. The frequency of visible light is of the order of

A. 10^8 Hz B. 10^{18} Hz C. 10^{15} Hz D. 10^{12} Hz

15. A concave mirror of focal length 15cm forms an image at a distance of 40 cm from it. The distance of the object from the mirror is

A. 10 cm B. 20 cm C. 24 cm D. 30 cm

16. Binoculars are made conveniently short by making use of right angled isosceles prism of glass. In a normal pair of binoculars, the number of prism is

A. 1 B. 2 C. 4 D. 5

17. A ray incident on a 60° prism of refractive index $\sqrt{2}$ suffers minimum deviation. The angle of incidence is

A. 0° B. 45° C. 60° D. 75°

18. Two electron beams having velocities in the ratio of 1 : 2 are subjected separately to identical magnetic field. The ratio of deflection produced is

A. 4 : 1 B. 1 : 2 C. 1 : 4 D. 2 : 1

19. The ray used for determining the crystal structure of solid is

A. α -ray B. β -ray C. γ -ray D. X-ray

20. For the structural analysis of crystals X-ray are used because

A. X-rays have wavelength of the order of the inter-atomic spacing
B. X-rays are highly penetrating radiation

C. wavelength of X-rays is of order of nuclear size

D. X-rays are coherent radiation

21. An ideal gas at 27^oC is compressed adiabatically to 8/27 of its original volume ($TV^{\gamma-1}$ = Constant and $\gamma = 5/3$). The rise in temperature will be

A. 475^oC B. 402^oC C. 275^oC D. 102^oC

22. When air is replaced by a dielectric medium of constant k, the maximum force of attraction between two charges separated by a distance:

A. decreases k times B. remains unchanged

C. increase k times D. increase k^{-1} times

23. Three identical metal balls,each of radius r are placed touching each other on a horizontal surface such that an equilateral triangle is formed when centres of three balls are joined. The centre of mass of the system is located at

A. horizontal surface B. centre of one of the balls

C. line joining centres of any two balls D. point of intersection of the medians

24. The coefficient of linear expansion of brass and steel are α_1 and α_2 respectively. If we take a brass rod of length l_1 and steel rod of length l_2 at 0^oC, the difference in their lengths ($l_2 - l_1$) will remain same at some temperature, if

A. $\alpha_1 l_1 = \alpha_2 l_2$ B. $\alpha_1 l_2 = \alpha_2 l_2$

C. $\alpha_1^2 l_2 = \alpha_2^2 l_2$ D. $\alpha_1 l_2^2 = \alpha_2 l_1^2$

25. If 1 g of steam is mixed with 1 g of ice, the resultant temperature of the mixture is

A. 270^oC B. 230^oC C. 100^oC D. 50^oC

26. Which of the following when added as an impurity into the silicon produces n-type semiconductor?

A. O B. Al C. B D. Mg

27. The mean radius of the earth is R, its angular speed on its own axis is ω and the acceleration due to gravity at the earth's surface is g. The cube of radius of orbit of a geostationary satellite will be

A. R^2g/ω B. $R^2\omega^2/g$ C. Rg/ω^2 D. R^2g/ω^2

28. Two racing cars of masses m_1 and m_2 are moving in circles of radii r_1 and r_2 respectively. Their speeds are such that each makes a complete circle is the same length of time. The ratio of their angular speeds are

A. $m_1 : m_2$ B. $r_1 : r_2$

C. 1 : 1 D. $m_1 m_2 : r_1 r_2$

29. The moment of inertia of a disc of mass M and radius R about an axis, which is tangential to the circumference of the disc and parallel to its diameter is

A. (3/2) MR^2 B. (2/3) MR^2

C. (5/4) MR^2 D. (4/5) MR^2

30. The escape velocity of a sphere of mass 'm' is given by (G = Universal gravitational constant; M = Mass of the earth and R_e = Radius of the earth)

A. $\sqrt{(GM/R_e)}$ B. $\sqrt{(2GM/R_e)}$

C. $\sqrt{(2GMm/R_e)}$ D. $\sqrt{[(2GM + R_e)/R_e)]}$

31. If a force on a rocket moving with a velocity of 300 m/s is 210 N, then the rate of combustion of the fuel is

A. 0.7 kg/s B. 1.4 kg/s C. 0.07 kg/s D. 10.7 kg/s

32. Two waves of lengths 50 cm 51 cm produced 12 beats per sec. The velocity of sound is

A. 306 m/s B. 331 m/s C. 340 m/s D. 360 m/s

33. A person aiming to reach the exactly opposite point on the bank of a stream is swimming with a speed of 0.5 m/s at an angle of 120^o with the direction of flow of water. The speed of water in the stream is

A. 1 m/s B. 0.5 m/s C. 0.25 m/s D. 0.433 m/s

34. If a unit vector is represented by 0.5i + 0.8j + ck, then the value of 'c' is

A. 1 B. $\sqrt{0.11}$ C. $\sqrt{0.01}$ D. $\sqrt{0.39}$

35. The dimensional formula of magnetci flux is

A. $[ML^2T^{-2}A^{-1}]$ B. $[ML^0T^{-2}A^{-2}]$

C. $[M^0L^{-2}T^{-2}A^{-2}]$ D. $[ML^2T^{-1}A^3]$

36. As the intensity of incident light increases,

A. photoelectric current increases B. photoelectric current decreases

C. kinetic energy of emitted photoelectrons increases D. kinetic energy of emitted photoelectrons decreases

37. The photoelectric function for a metal surface is 4.125 eV. The cut off wavelength for this surface is

A. 4125 Å B. 2062.5 Å C. 3000 Å D. 6000 Å

38. If refractive index of a material of equilateral prism is $\sqrt{3}$, then the angle of minimum deviation of the prism is

A. 60^o B. 90^o C. 180^o D. 360^o

39. Colours appear on a thin soap film and on soap bubbles due to the phenomenon of

A. refraction B. dispersion C. interference D. diffraction

40. A plane convex lens is made of refractive index 1.6. If the radius of curvature of the curved surface is 60 cm, then the focal length of the lens is

A. 50 cm B. 100 cm C. 200 cm D. 400 cm

41. After one α and two β-emissions,

A. mass number reduces by 2 B. mass number reduces by 4

C. mass number reduces by 6 D. atomic number remains unchanged

42. If the half-life period of a reaction is 225.8 min, then the value of decay constant for the reaction will be

A. 3.1×10^{-3} B. 3.1×10^{-4} C. 3.1×10^{-6} D. 3.1×10^{-9}

43. Magnetic field intensity in the centre of coil of 50 turns, radius 0.5 m and carrying a current of 2 A is

A. 0.5×10^{-5} T B. 1.25×10^{-4} T C. 3×10^{-5} T D. 4×10^{-5} T

44. Wavelength of light of frequency 100 Hz is

A. 2×10^6 m B. 3×10^6 m C. 4×10^6 m D. 5×10^6 m

45. The internal resistance of a cell of e.m.f. 2 V is 0.1 Ω. It is connected to a resistance of 3.9Ω. The voltage across the cell will be

A. 0.5 V B. 1.5 V C. 1.95 V D. 2 V

46. A bar magnet of magnetic moment M is placed in a magnetic field of induction B. The torque exerted on it is

A. M.B B. - M.B C. M X B D. - B X M

47. If a diamagnetic substance is brought near north or south pole of a bar magnet, it is

A. attracted by the poles

B. repelled by the poles

C. repelled by north pole and attracted by the south pole

D. attracted by north pole and repelled by the south pole

48. If a long hollow copper pipe carries a current, the magnetic field produced will be

A. inside the pipe only
B. outside the pipe only
C. neither inside nor outside the pipe
D. both inside and outside the pipe

49. A straight wire of diameter 0.5 mm carrying a current of 1 A is replaced by another wire of 1 mm diameter carrying the same current. The strength of the magnetic field far away is
A. twice the earlier value
B. one-half the earlier value
C. one-quarter the earlier value
D. same as the earlier value

50. Magnetic field due to 2A current flowing through a circular of radius 5 cm at the centre of the coil is
A. 20 T
B. 30 T
C. 40 T
D. 50 T

51. The degree of freedom of a triatomic gas is
A. 1
B. 2
C. 6
D. 8

52. Ozone layer blocks the radiation of wavelength
A. less than 3 X 10^{-7} m
B. equal to 3 X 10^{-7} m
C. more than 3 X 10^{-7} m
D. none of the above

53. Two bodies with kinetic energies in the ratio of 4 : 1 are moving with equal linear momentum. The ratio of their masses is
A. 1 : 2
B. 1 : 1
C. 4 : 1
D. 1 : 4

54. In a meter bridge, the balancing length from the left end (standard resistance of one ohm is in the right gap) is found to be 20 cm. The value of the unknown resistance is
A. 0.8 Ω
B. 0.5 Ω
C. 1.4 Ω
D. 0.25 Ω

55. A wire of resistance 10 Ω is elongated by 10%. The resistance of the elongated wire is
A. 11 Ω
B. 11.1 Ω
C. 12.1 Ω
D. 13.1 Ω

56. A parallel plate condenser with oil between the plates (dielectric constant of oil K = 2) has a capacitance C. If the coil is removed, then the capacitance of the capacitor becomes
A. √2 C
B. 2 C
C. C/√2
D. C/2

57. In bringing an electron towards another electron, electrostatic potential energy of the system
A. decreases
B. increases
C. becomes zero
D. remains same

58. The time period of a simple pendulum is 2 s. If the length is increases by 4 times, then

its period becomes
A. 16 s B. 12 s C. 8 s D. 4 s

59. A p-n junction diode can be used as
A. amplifier B. regulator C. condenser D. rectifier

60. In forward bias, the width of potential barrier in a p-n junction diode
A. increases B. decreases
C. remains constant D. none of the above

61. Sodium has body-centred packing. If distance between two nearest atoms is 3.7 Å, the lattice parameter is
A. 3.3 Å B. 3.9 Å C. 4.3 Å D. 4.8 Å

62. Depletion layer consists of
A. electrons B. immobile C. holes only D. both 1) and 3)

63. Alpha particles are
A. protons B. positrons
C. neutrally charged D. ionised helium atoms

64. Knowledge connected with non-living bodies comes under the branch of science is called
A. life sciences B. biological sciences
C. physical sciences D. none of the above

65. The quantity used as the standard of measurement is called the
A. dimension B. unit C. velocity D. none

66. The units adopted for measuring fundamental quantities are called the
A. fundamental units B. numbers C. derived units D. none of the above

67. Let f(x) and F(x) be two functions of x such that differential coefficient of F(x) with respect to x is f(x). Then integral part of f(x) is called
A. F'(x) B. F(x)
C. $\int F(x)\,dx$ D. none of the above

68. A stone falls freely from rest and the total distance covered by it in the last second of its motion equals the distance covered by it in the first three seconds of its motion. The stone remains in the air for
A. 5 seconds B. 7 seconds
C. 3 seconds D. none of the above

69. A body is projected horizontally with a velocity of 4 m/s. The velocity of the body after 0.7s is nearly (take g = 10m/s^2)

A. 9 m/s
B. 7 m/s
C. 8 m/s
D. none of the above

70. The acceleration of a particle, starting from rest varies with time according to the relation a = kt + c. The velocity v is the particle at a time t will be

A. (1/2)kt^2 + ct
B. kt^2 + ct
C. kt^2 + (3/2)ct
D. none of the above

71. At the top of the trajectory of a particle, the directions of its velocity and accelerations are

A. inclined to each other at an angle of 30^o
B. parallel to each other
C. perpendicular to each other
D. none of the above

72. A man is pulling on a rope attached to a block on a smooth horizontal table. The tension in the rope will be the same at all points

A. if either the rope is not accelerated or is massless
B. if and only if the rope is massless
C. if and only if the rope is not accelerated
D. none of the above

73. A gun is aimed horizontally at a target in line with its barrel. The target is released at the very instant the gun is fired. The bullet will

A. pass above the target
B. pass below the target
C. hit the target
D. none of the above

74. A container filled with water and having a wooden block floating in it, is allowed to fall freely under gravity. During the fall, the upthrust on the wooden block will be

A. zero
B. equal to the weight of the block in air
C. equal to the loss of water of the block in water
D. none of the above

75. Two bodies of masses m and 4m are moving with equal kinetic energy. The ratio of their linear momenta is

A. 1 : 2
B. 2 : 1
C. 3 : 2
D. none

76. A shell fired from a gun at an angle to the horizontal explodes in mid air. Then the centre of the mass of the shell fragments will move

A. along the same parabolic path along which the intact shell was moving
B. vertically down
C. horizontally
D. none of the above

77. The centre of mass of a system of two particles is
A. on the line joining them at a point whose distance from each particle is proportional to the square of the mass of that particle
B. on the line joining them at a point whose distance from each particle is inversely proportional to the square of the mass of that particle
C. both 1) and 2)
D. none of the above

78. A bullet hits and gets embedded in a solid block resting on a frictionless surface. In this process,
A. both momentum and kinetic energy are conserved
B. momentum is conserved
C. kinetic energy is conserved
D. none of the above

79. The swing of a spinning cricket ball in the air can be explained on the basis of
A. sudden change in wind direction
B. buoyancy of air
C. Bernoulli's theorem
D. turbulence caused by wind

80. Ohm's law deals with the relation between
A. capacity and potential
B. current and potential difference
C. charge and capacity
D. none of the above

81. For accurate measurements, the resistance of a voltmeter should be
A. as small as possible
B. as large as possible
C. infinity
D. none of the above

82. A big dry cell A and a small dry cell B have the same e.m.f. The internal resistance of A
A. is less than that of B
B. is greater than that of B
C. is equal to that of B
D. none of the above

83. E.m.f. of a cell is
A. scalar quantity
B. a vector quantity
C. both 1) and 2)
D. none of the above

84. In liquids, the flow of electricity is through
A. neutral medium B. positive ions C. negative ions D. both 2) and 3)

85. A moving coil type of galvanometer is based upon the principle that
A. a wire carrying current produces magnetic field
B. a wire carrying a current experiences a torque in magnetic field

C. it has ordinary magnetic field
D. none of the above

86. Specific resistance of a conductor depends on
A. nature of the conductor
B. length and diameter of the conductor
C. volume of the conductor
D. none of the above

87. Iron is ferromagnetic
A. at any temperature
B. below 770^oC
C. above 770^o
D. at normal temperature

88. In dia, para and ferromagnetism, the universal property of all substances is
A. diamagnetism B. magnetism C. paramagnetism D. ferromagnetism

89. Earth's magnetic field always has a horizontal component except at
A. an altitude of 60^oC
B. a latitude of 45^oC
C. magnetic pole
D. none of the above

90. Magnetic moment is
A. a universal constant
B. a scalar quantity
C. a vector quantity
D. none of the above

91. Two magnetic lines of force
A. start from south pole
B. can't intersect
C. intersect at many points
D. none of the above

92. Soft iron has very
A. high retentivity
B. low retentivity
C. both 1) and 2)
D. none of the above

93. The value of permeability of paramagnetic substance is
A. > 1 B. < 1 C. = 1 D. none

94. Earth's magnetic field always has a horizontal component except at the
A. magnetic poles
B. equator
C. geographical poles
D. none of the above

95. Inside a hollow spherical conductor,
A. electric field is zero
B. electric field is constant
C. electric field changes with distance from the centre of the sphere
D. none of the above

96. Dielectric strength of the medium
A. increases with moisture content
B. decreases with increasing strength
C. increases with rise in temperature
D. is same for all insulating materials

97. Midway between two equal and similar charges, a third equal and similar charge is placed, then this third charge will
A. remain in equilibrium
B. be in unstable equilibrium
C. not be in equilibrium
D. none of the above

98. Which one of the following devices is used for measuring very high temperature?
A. Pyrometer
B. Gas thermometer
C. Mercury thermometer
D. none of these

99. The absorptive power of a perfectly black body is
A. 1
B. 0.5
C. 0.25
D. zero

100. 1080 g of ice at 0^oC is mixed with 1080 g of water at 80^oC. The final temperature of the mixture will be
A. 40^oC
B. 60^oC
C. 0^oC
D. 90^oC

Solutions:

1	2	3	4	5	6	7	8	9	10
C	A	C	B	A	D	D	B	B	C
11	12	13	14	15	16	17	18	19	20
C	A	B	C	A	C	B	D	D	A
21	22	23	24	25	26	27	28	29	30
B	A	D	A	C	A	D	C	C	B
31	32	33	34	35	36	37	38	39	40
A	A	C	B	A	A	C	A	C	B
41	42	43	44	45	46	47	48	49	50
C	B	B	B	C	C	B	B	D	C
51	52	53	54	55	56	57	58	59	60
C	A	D	D	C	D	B	D	D	B
61	62	63	64	65	66	67	68	69	70
C	B	D	C	B	A	B	A	C	A
71	72	73	74	75	76	77	78	79	80

C	A	C	A	A	A	B	A	C	B
81	82	83	84	85	86	87	88	89	90
B	A	A	D	B	A	B	A	C	C
91	92	93	94	95	96	97	98	99	100
B	A	A	A	A	B	A	A	A	C