PHYSICS 12th

(OBJECTIVE PART)

1. If the medium between the charges is not free space then electrostatic force will be:
(a) Increase (b) Decrease (c) Remain same (d) None of these

2. The number of electrons in one coulomb charge is equal to:
(a) 1.6×10^{-19} (b) 6.25×10^{-19} (c) 6.25×10^{18} (d) 6.25×10^{19}

3. Relative permittivity (€r) for air is:
(a) 1.06 (b) 1.006 (c) 1.0006 (d) 1.6

4. Numerical value of permittivity of free space is:
(a) 9×10^{9} $\mathbf{Nm^2C^{-2}}$ (b) 8.85×10^{-12} $\mathbf{Nm^2C^{-2}}$
(c) $8.85\times10^{-12}\mathbf{N^{-1}m^{-2}C^2}$ (d) $9\times10^{9}\mathbf{N^{-1}m^{-2}C^2}$

5. The electrostatic force between two charges is 42 N. If we place a dielectric of Er =2.1 between the charges then the force become equal to:
(a) 42 N (b) 88.2 N (c) 20 N (d) 2 N

6. The force between two similar unit charges placed one meter apart in air is:
(a) Zero (b) one N (c) 9×10^{9} N (d) 9×10^{-9} N

7. If the distance between the two charged bodies is halved, the force between them becomes:
(a) Double (b) Half (c) four times (d) one fourth

8. The force between two charges is 28 N. If paraffin wax of relative permittivity 2.8 is introduced between the charges as medium, then the force reduces to:
(a) 25 N (b) 20 N (c) 15 N (d) 10 N

9. Two oppositely charged balls A and B attract the third ball C, when place near them turn by turn.
(a) Positively charged (b) Negatively charged
(c) Electrically neutral (d) Positively and negatively charged

10. The study of electric charges at rest under the action of electric forces is known as:
(a) Electromagnetism (b) Electrostatics
(c) Magnetic Induction (d) Electric field

11. The unit of electric intensity other than NC-1 is:
(a) VA^{-1} (b) Vm^{-1} (c) VC^{-1} (d) NC

12. If the distance between two points charges 'is halved, the electric intensity becomes.
(a) Half (b) 1/4 times (c) double (d) 4 time

13. S.I unit of strength of electric field is:
(a) J/C (b) C/V (c) N/C (d) J/N

14. What is the force on a proton placed between two parallel plates containing equal positive charges?
(a) Zero (b) 2.6×10^{-19} N (c) 9×10^{-19} N (d) 5×10^{-19} N

15. Concept of an electric field lines is introduced by:

(a) Coulomb (b) Faraday (c) Einstein (d) Joseph Henry

16. The electric fields created by positive charge is:

(a) Radically inward (b) Zero (c) Circular (d) Radically outward

17. The direction of fields lines around an isolated negative charge '-q' is:

(a) Radically inward (b) Radically out ward (c) Elliptical (d) circular

18. A charge on 4 coulomb is in the field of intensity 4N/C. The force on the charge is:

(a) 8N (b) 16N (c) 4N (d) 1N

19. The force on an electron in a field of 1×108 NC-1 will be:

(a) 1.6×10^{-8} N (b) 1.6×10^{-11}N (c) 1.6×10^{-19} N (d) 1.6×10^{-27} N3

20. Photo copier and inkjet printer are the application of:

(a) Magnetism (b) Electricity
(c) Electro-magnetism (d) Electrostatics

21. Identity the practical application of electrostatics force:

(a) Inkjet printer (b) Z-rays
(c) laser (d) Z.C generator

22. The heart of a photo copy machine is a drum which is made of:

(a) Copper (b) Aluminium (c) Nickel (d) Cobalt

23. The drum in photo copier is coated with layer of:

(a) Aluminium (b) Copper (c) Selenium (d) Silver

24. Which one is photo conductor?

(a) Copper (b) Selenium (c) Mercury (d) Aluminium

25. SI unit of electric flux is:

(a) NmC^{-1} (b) $Nm_{-1}C_{-1}$ (c) Nm_2C_{-1} (d) Nm_3C_{-2}

26. A changing electric flux creates:

(a) Electric fields (b) Gravitational
(c) Magnetic field (d) Electric charge

27. Which one of the following can be taken as measure of electric field intensity?

(a) $\frac{F}{A}$ (b) $\frac{\phi_c}{A}$ (c) $\frac{\phi}{A}$ (d) $\frac{\phi\varepsilon_o}{A}$

28. Equation $\boldsymbol{\phi = \bar{E}.\bar{A}}$ is applicable to surface.

(a) Spherical (b) Cylindrical (c) Conical (d) Flat

29. For computation of electric flux, the surface area should be:

(a) Parallel (b) Flat (c) Curved (d) Spherical

30. The electric flux through closed surface depends upon:

(a) Charge (b) Medium (c) Geometry (d) Charge and Medium

31. Total flux through a closed surface depends on:

(a) Shape of surface (b) Charge enclosed only
(c) Medium only (d) Charge and Medium

32. Gauss's Law can only be applied to:

(a) A curved surface (b) A flat surface
(c) A surface of any shape (d) A closed surface

33. The statement $\boldsymbol{\Phi_e = \frac{1}{\varepsilon_o}Q}$ was given by:

(a) Faraday (b) Deserted (c) Gauss (d) Coulomb

34. The electric field intensity due to an infinite sheet of charge:

(a) $\bar{E}.\frac{\sigma}{2\varepsilon_o}\hat{r}$ (b) $\bar{E}.\frac{2\sigma}{2\varepsilon_o}\hat{r}$ (c) $\bar{E}.\frac{1}{2\varepsilon_o}\hat{r}$ (d) $\bar{E}.\frac{\sigma}{\varepsilon_o}\hat{r}$

35. An ECG records the _____ between points on human skin generated by electric process in the heart:

(a) Heart beat (b) pulse rate (c) pressure (d) voltage

36. Special organ called ampullae of lorenzini that are very sensitive to electric field are found in:

(a) Bats (b) Cats (c) Dogs (d) Sharks

37. If charged body is moved against the electric field, it will gain: (2 Time)

(a) Elastic Potential Energy (b) Kinetic Energy
(c) Gravitational Energy (d) Electrical Potential Energy

38. The absolute electric potential at a point distant 20cm from a charge of 2uC is:

(a) $9 \times 10^2 V$ (b) $9 \times 10^3 V$ (c) $9 \times 10^4 V$ (d) $9 \times 10^5 V$

39. A charge of 10-10C between two parallel plates 1 can apart experience a force of 10-5 N:

(a) 10V (b) 10^2V (c) 10^3V (d) 10^4V

40. Electron volt is the unit of:

(a) Potential (b) Potential difference
(c) Electric current (d) Electric energy

41. One electron volt is equal to: (1 Time

(a) $1.6 \times 10^{-19} joule$ (b) $1.6 \times 10^{-19} Coulomb$
(c) $1.6 \times 10^{12} N$ (d) $1.6 \times 10^{18} joule$

42. Charge on electron is:

(a) $1.6 \times 10^{-19} C$ (b) $1.6 \times 10^{19} C$
(c) $1.6 \times 10^{-17} C$ (d) $1.6 \times 10^{17} C$

43. If electric and magnetic forces on an electron balance each other, the electric intensity will be:

(a) $E = \frac{mg}{q}$ (b) $E = \frac{q}{mg}$ (c) $E = \frac{F_c}{q}$ (d) $E = \frac{1}{4\pi\varepsilon_o}\frac{q}{r^2}$

44. The charge on the oil droplet in Millikan's oil drop experiment calculated by using formula.

(a) $q = \frac{mg}{d}$ (b) $q = \frac{V}{mgd}$ (c) $q = \frac{mgd}{V}$ (d) $q = \frac{V}{mgV}$

45. A capacitor is perfect insulator for:

(a) Alternating current (b) Sparking current
(c) Eddy current (d) Direct current

46. Coulomb/ volt is called:

(a) Farad (b) Ampere (c) Joule (d) Henry

47. The net charge on a capacitor (each plate having magnitude of charge of charge q) is:

(a) Infinity (b) 2q (c) q/2 (d) Zero

48. The capacitance of a parallel plate capacitor in vacuum is: (1 Time)

(a) $\frac{\varepsilon_o d}{A}$ (b) $\frac{\varepsilon_o A}{d}$ (c) $\frac{A}{\varepsilon_o d}$ (d) $\frac{d}{\varepsilon_o A}$

49. Presence of dielectric between the plates of a capacitor is doubled then its capacitance become:

(a) Reduces the electric force (b) Enhances electric force
(c) Does not affect electric force (d) Double electric force

50. A parallel plate capacitor with oil between the plate ($\varepsilon_f = 2$) has a capacitance C. If the oil is removed then capacitance of capacitor becomes:

(a) C (b) $\frac{C}{2}$ (c) $\frac{C}{\sqrt{2}}$ (d) $\sqrt{2C}$

51. Energy stored in the capacitor with the dielectric is:

(a) $\frac{1}{2}\varepsilon_1\varepsilon_0 E^2 Ad$ (b) $\varepsilon_0 EAd$ (c) $\frac{\varepsilon_0 A}{d}$ (d) $\frac{1}{2}\varepsilon_1\varepsilon_0 E^2$

52. The energy density in a capacitor is directly proportional to:

(a) $\varepsilon_0\varepsilon_r$ (b) E^2 (c) C^2 (d) V^2

53. The product of resistance and capacitance is:

(a) Velocity (b) Acceleration
(c) Time (d) Force

54. Drift velocity of electron is:

(a) 10^{-1} m/s (b) 10^{-2} m/s (c) 10^{-3} m/s (d) 10^{-4} m/s

55. A device which converts mechanical energy into electrical energy is called:

(a) D.C generator (b) D.C motor (c) A.C generator (d) Transformer

56. Heat generated by a 50 watt bulb in one hour is:

(a) 36000 J (b) 48000 J (c) 18000 J (d) 180000 J

57. One ohm device the graph between V and I is:

(a) VC^{-1} (b) CV^{-1} (c) AC^{-1} (d) VA^{-1}

58. The SI unit of temperature coefficient of resistivity is:

(a) ohm-m (b) k^{-1} (c) K (d) ohm

59. Good conductors have conductivities of the order of:

(a) $10^{-7}(\Omega m)^{-1}$ (b) $10^{7}(\Omega m)^{-1}$ (c) $10^{2}(\Omega m)^{-1}$ (d) $10^{-7}(\Omega m)^{-1}$

60. Which one has negative temperature co-efficient of resistance?

(a) Carbon (b) Iron (c) Tungsten (d) Gold

61. The resistance of a conductor of length L, cross sectional area 'A' and resistivity is given by:

(a) $R = \frac{\rho}{AL}$ (b) $R = \rho AL$ (c) $R = \rho\frac{L}{A}$ (d) $R = \rho\frac{A}{L}$

62. On increasing the length of wire specific resistance of the wire:

(a) Increases (b) Decreases
(c) Remains unchanged (d) First increase then decreases

63. If fourth band is missing on resistance, its tolerance is:

(a) $\pm 5\%$ (b) $\pm 10\%$ (c) $\pm 15\%$ (d) $\pm 20\%$

64. Resistance tolerance of silver band is:

(a) 10% (b) 6% (c) 7% (d) 5%

Which one of the following bulbs has the least resistance?

(a) 100W (b) 200W (c) 500W (d) 1000W

65. The maximum power (pout) is delivered to a load resistance R, when the internal resistance of the source is: (a) $r = \infty$ (b) $r = R$ (c) r=0 (d) r=R/4

66. Kirchhoff's first rule is the manifestation of law of conservation of:

(a) Momentum (b) Charge (c) Energy (d) Mass

67. Kirchhoff's voltage rule is a way of stating conservation of:

(a) Momentum (b) Charge (c) Energy (d) Mass

68. A current flowing towards the reader is denoted by:

(a) Positive sign (b) A bracket (c) A dot (d) Cross

69. The S.I. unit of $\bar{E}$ is NC-1 and that of $\bar{B}$ is NA-1 m-1 than the unit of E/B is:

(a) ms^{-2} (b) ms (c) ms^{-1} (d) $m^{-1}s^{-1}$

70. Write the S.I unit of magnetic flux:

(a) Tesla (b) Weber (c) Weber m^{-2} (d) Tesla m^{-2}

71. Two parallel wires carrying currents in the opposite direction:

(a) Repel each other (b) Attract each other (c) Have no effect upon each other (d) They cancel out their individual magnetic field

72. The S.I unit of magnetic induction is:

(a) Weber (b) Tesla (c) Gauss (d) Newton

73. A 5 m wire carrying current 2 A at right angle to uniform magnetic field of 0.5T. the force on the wire is: (1 Time)

(a) 1.5 N (b) 5 N (c) 2.5 N (d) 4 N

74. The SI unit of magnetic induction "B" Tesla is equal to: (7 Time)

(a) $NA^{-1}m^{-1}$ (b) Nam^{-1} (c) $NA^{-1}m$ (d) $NA^{2}m^{-1}$

75. The SI unit of magnetic permeability is: (2 Time)

(a) $WbA^{-1}m^{-1}$ (b) Wbm^{-2} (c) $WbmA^{-1}$ (d) $WbAm^{-1}$

76. The value of permeability of free space in SI unit is: (2 Time)

(a) $4\pi \times 10^{-9} WbA^{-1}m^{-1}$ (b) $4\pi \times 10^{-7} WbA^{-1}m^{-1}$

(c) $4\pi \times 10^{-10} WbA^{-1}m^{-1}$ (d) $4\pi \times 10^{7} WbA^{-1}m^{-1}$

77. The SI unit of flux density is: (2 Time)

(a) $NA^{-1}m^{2}$ (b) $NA^{-1}m^{-1}$ (c) Nm^{-1} (d) $NA^{-1}m$

78. The SI unit of magnetic induction. (2 Time)

(a) Weber (b) Gausses (c) Tesla (d) Nm

79. The field inside a solenoid is given by: (1 Time)

(a) $\mu_o nl$ (b) $\mu_o n^2 l$ (c) $\mu_o nl^2$ (d) $\mu_o Nl$

80. If the number of turns become double but length remain same, then magnetic field in the solenoid become: (1 Time)

(a) Half (b) Double (c) Remain same (d) Zero

81. Magnetic flux density at a point due to current carrying coil is determined by: (2 Time)

(a) Ampere's Law (b) Gauss's Law

(c) Faraday's Law (d) Lenz's Law

82. The relation $B = \frac{\mu_o l}{2\pi r}$ is called:

(a) Ampere's Law (b) Faraday's Law

(c) Lenz's Law (d) Gauss's Law

83. Force on a charged particle is zero when projected at angle with magnetic field.

(a) 0^o (b) 90^o (c) 180^o (d) 270^o

84. The magnetic force on an electron travelling with 108ms-1 parallel to a field strength 1 Webm-2 is:

(a) $10^5 N$ (b) $10^{-10} N$ (c) $1.6 \times 10^{-11} N$ (d) Zero

85. If a charge is at rest in a magnetic field then force on charge is: (1 Time)

(a) Zero (b) $q(\bar{v} \times \bar{B})$ (c) $qvBsin\theta$ (d) $qvBcos\theta$

86. The magnetic force on an electron travelling with 106ms-1 parallel to a field strength 1 Webm-2 is:

(a) 10^{-12}N (b) Zero (c) $1.6 \times 10^{-11} N$ (d) 10^{3}N

87. The Lorentz force on a charged particle moving in electric field E and magnetic field B is given by: (1 Time)

(a) $F = F_E + F_B$ (b) $F = F_E - F_B$ (c) $F = \frac{F_B}{F_E}$ (d) $F = F_E \times F_B$

88. Lorentz force is given by:

(a) $q(\bar{E} - \bar{V} \times \bar{B})$ (b) $q(\bar{E} + \bar{V} \times \bar{B})$

(c) $q[\bar{E} \times (-\bar{V} \times \bar{B})]$ (d) $q(\bar{V} + \bar{E} \times \bar{B})$

89. The sum of electric and magnetic force is called:

(a) Maxwell force (b) Lorentz force

(c) Newton's force (d) Centripetal force

90. The value of e/m is smallest for:
(a) Proton (b) Electron (c) β-particle (d) Positron

91. The unit of $\bar{E}$ is NC-1 and that of $\bar{B}$ NA-1m-1 then the unit of $\frac{\bar{E}}{\bar{B}}$:
(a) ms^{-2} (b) $m^{-1}s^{-1}$ (c) ms (d) ms^{-1}

92. Work done on a charged particle moving in a uniform magnetic field is: (1 Time)
(a) Maximum (b) Zero (c) Minimum (d) Negative

93. Brightness in cathode ray oscilloscope is controlled by:
(a) Grid (b) Filament (c) Anode (d) Cathode

94. The brightness of the spot on CRO screen is controlled by:
(a) Deflecting plates (b) Cathode (c) Grid (d) Anode

95. Cathode ray oscilloscope works by deflecting a beam of:
(a) Neutrons (b) Protons (c) Electrons (d) Positron

96. Output wave form of sweep or time base generator is:
(a) Saw tooth wave (b) Digital wave
(c) Sinusoidal wave (d) Square wave

97. Output waveform of built in voltage of the CRO is: **(2 Time)**
(a) Sinusoidal (b) Saw tooth (c) Rectangular (d) Square

98. Sensitivity of a galvanometer can be increased by:
(a) Decreasing the value of tensional couple
(b) Decreasing number of turns
(c) Decreasing area of plane of coil
(d) Decreasing magnetic field

99. The sensitivity of galvanometer is given by:
(a) $\frac{CAN}{B}$ (b) $\frac{C}{BAN}$ (c) $\frac{BAN}{C}$ (d) $\frac{BN}{CA}$

100. In order to measure potential difference voltmeter is always connected in:
(a) Series (b) Parallel
(c) Both A and B (d) Neither in series nor in parallel

101. When ohm meter gives full scale deflection it indicates: **(1 Time)**
(a) Zero resistance (b) infinite resistance
(c) Small resistance (d) very high resistance

102. A battery is used in:
(a) Ohmmeter (b) Ammeter
(c) Galvanometer (d) Voltmeter

103. To convert a galvanometer into a volt meter a high resistance is connected:
(a) in series (b) in parallel
(c) in perpendicular (d) Along tangent

104. Which one of the following resistance is used to convert a Galvanometer into an Ammeter?
(a) High resistance (b) Low resistance in series with galvanometer
(c) Shunt (d) High resistance series with galvanometer

105. Shunt resistance is: **(1 Time)**
(a) Low resistance (b) High resistance
(c) Zero resistance (d) Impedance

106. Which one has the least resistance:
(a) Galvanometer (b) Ammeter (c) Voltmeter (d) Ohm meter

107. Useful device to measure resistance, current and voltage is an electronic instrument called:

(a) Voltmeter (b) Ammeter
(c) Ohmmeter (d) Digital Multi meter
(1 Time)

108. A 20.0 cm wire charging a current of 10.0A is placed in a uniform magnetic field of 0.30T. If the wire makes Electromagnetic induction obeys law of conservation of:
(a) Charge (b) Energy (c) Momentum (d) Mass

109. When a conductor move across a magnetic field, an emf is set up is called:
(a) Variable (b) Constant emf (c) Back emf (d) Induced emf

110. The relation of emfs of two cells $\frac{E_1}{E_2}$ is:
(a) $\frac{I_2}{I_1}$ (b) $\frac{I_1}{I_2}$ (c) $\frac{1}{I_1 I_2}$ (d) $\frac{1}{I_2}$

111. A metal rod of 1 m is moving at a speed of 1ms-1 in a direction making an angle 300 with 0.5 T magnetic field. The emf produced is:
(a) 0.25 N (b) 2.5 N (c) 0.25 V (d) 2.5 V

112. The motional emf depends upon the:
(a) Length of conductor (b) Speed of conductor
(c) Strength of magnetic (d) All of these

113. Emf is induced due to change in: (1 Time)
(a) Charge (b) Current (c) Magnetic flux (d) Electric field

114. Len's Law is in accordance with the law of conservation of: (8 Time)
(a) Momentum (b) Angular momentum (c) Energy (d) Charge

115. Lenz's law deal with: (2 Time)
(a) Magnitude of emf (b) Direction emf
(c) Direction of induced current (d) Resistance

116. Lenz's law deals with:
(a) Direction of emf (b) Magnitude of emf
(c) Direction of induced of current (d) Resistance (2 Time)

117. Mutual induction play role in: (6 Time)
(a) Generator (b) D.C motor
(c) Galvanometer (d) Transformer

118. The mutual inductance of the coils depend upon: (1 Time)
(a) Stiffness of the coils (b) Density of coils
(c) Material of coils (d) Geometry of the coils

119. SI unit of Henry which is: (8 Time)
(a) VsA^{-1} (b) $Vs^{-1}A$ (c) $Vs^{-1}A^{-1}$ (d) VsA

120. The self induction emf is sometimes called: (4 Time)
(a) Motional emf (b) Constant emf (c) Back emf (d)Variable emf

121. Unit of self induction is: (1 Time)
(a) Weber (b) Tesla (c) Henry (d) Farad

122. Henry is SI unit of: (2 Time)
(a) Current (b) Resistant
(c) Flux (d) Self induction

123. Self induction does not depend on: (1 Time)
(a) Number of turns of the coil (b) Area of cross-section of the core (c) Nature of material of the core (d) Current through inductor

124. The energy stored in the inductor per unit volume is:

(a) $\frac{1}{2}\frac{B^2}{\mu_o}$ (b) $\frac{1}{2}\frac{B}{\mu}$ (c) $\frac{1B}{2u_o^2}$ (d) $\frac{1B}{2u_o}$

125. The energy stored in inductor is: (4 Time)

(a) $\frac{1}{2}LI$ (b) $\frac{1}{2}LI$ (c) $\frac{1}{2}L^2I$ (d) $\frac{1}{2}L^2I^2$

126. The self inductance of solenoid is: (2 Time)

(a) $L=\mu_o naL$ (b) $L=\mu_o N^2 AI$ (c) $L=\mu_o n^2 AL$ (d) $L=\mu_o NAL$

127. If 10 A current passes through 100 mH inductor, then energy stored is: (1 Time)

(a) 100 J (b) 5 J (c) 20 J (d) zero

128. When current flowing through an inductor is doubled, then energy stored in it becomes: (1 Time)

(a) Half (b) Four times (c) One forth (d) Double

129. Energy stored per unit volume in magnetic field is called: (1 Time)

(a) Energy density (b) Electric flux (c) Work (d) Power

130. A.C generator based upon the:

(a) Lenz's Law (b) Maxwell's relation
(c) Faradays Law of electromagnet induction
(d) Mutual induction

131. Which one is not present in A.C generator? (5 Time)

(a) Armature (b) Magnet
(c) Slip rings (d) Commutator

132. The emf produced by an alternating current generate is: (2 Time)

(a) $N\omega AB\sin\theta$ (b) $N\omega AB\cos\theta$
(c) $N\omega AB\sin 2\theta$ (d) $N\omega AB\cos 2\theta$

133. In A.C generator, when plane of coil is perpendicular to magnetic field, then output of generator is:

(a) $N\omega AB\sin\theta$ (b) $N\omega AB\cos\theta$ (c) Maximum (d) Zero

134. Commentator was invented by:

(a) Henry (b) Ousted (c) Maxwell (d) William sturgeon

135. The only difference between the construction of D.C and A.C is: (1 Time)

(a) Carbon burshes (b) Coil (c) Commutator (d) Magnetic field

136. The devices in the circuit that consume electrical energy are known as:

(a) Dissipaters (b) Generator (c) load (d) Motor

137. A device which convert electrical energy into mechanical energy is called:

(a) Transformer (b) A.C generator (c) D.C Motor (d) D.C generator (2 Time)

138. When a motor is covered loaded then magnitude of back emf:

(a) Increases (b) Decreases (c) Remain constant (d) Zero

139. When the back emf is zero, its draw: (1 Time)

(a) Zero current (b) Minimum current
(c) Maximum current (d) Steady current

140. With the speed of motor, magnitude of back emf:

(a) remain same (b) Increases
(c) decreases (d) First increases then decreases

141. When motor is just started, back emf is almost: (1 Time)
(a) Maximum (b) Zero (c) Minimum (d) Infinite

i. The working principle of transformer is: (1 Time)
(a) Self induction (b) Electromagnetic induction
(c) Mutual induction (d) Faraday's Law

142. The core of transformer' is laminated so reduce: (1 Time)
(a) Magnetic loss (b) Hysteresis loss
(c) Eddy current loss (d) Electric loss

143. Transformer is used to change: (1 Time)
(a) Electric power (b) Magnetic field
(c) Alternating voltage (d) Phase of A.C

144. A real transformer does not change: (1 Time)
(a) Voltage level (b) Current level
(c) Frequency level (d) Power level

145. Efficiency of transformer does not effected by:
(a) Input voltage (b) Core of transformer
(c) Insulation between sheet (d) Resistance of coils

146. If a step-up transformer were 100% efficient, the primary and secondary winging would have the same:
(a) Current (b) power
(c) Voltage (d) Direction of winding

147. During each cycle A.C voltage reaches a peak value: (3 Time)
(a) Once (b) Thrice (c) Twice (d) Four time

148. The frequency of A.C sources used in Pakistan is: (1 Time)
(a) 50 Hz (b) 60 Hz (c) 45 Hz (d) 70 Hz

149. The most common source of an A.C voltage over a complete cycle is:
(a) Positive (b) Negative (c) Zero (d) Infinite

150. The most common source of an A.C voltage is: (1 Time)
(a) Motor (b) Cell (c) Generator (d) Thermocouple

151. The sum of positive and negative peak value is called: (2 Time)
(a) RMS value (b) P-P value (c) Peak value (d) Average value

152. Root mean square value of voltage is given by: (3 Time)
(a) $V_{rms} = 2V_o$ (b) $V_{rms} = \sqrt{2}V_o$ (c) $V_{rms} = \frac{V_o}{\sqrt{2}}$ (d) $V_{rms} = \frac{V_o}{2}$

153. The phase of A.C at positive peak from origin is: (1 Time)
(a) $\frac{3\pi}{2}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) π

154. The basic circuit element in A.C circuit which controls current: (1 Time)
(a) Resistor only (b) Capacitor only
(c) Inductor only (d) All of these

155. Direct current cannot flow through: (2 Time)
(a) Inductor (b) Resistor (c) Transistor (d) Capacitor

156. In case of capacitor the unit of reactance is: (2 Time)
(a) Ohm (b) Mho (c) Farad (d) Henry

157. At high frequency the value of reactance of capacitor in A.C circuit will be:
(a) Small (b) Zero (c) Large (d) Infinite

158. The device which allows the only continuous flow of A.C through it is:
(a) Capacitor (b) Inductor (c) Battery (d) Thermistor

159. In a pure inductive A.C circuit the current:
(a) Lags behind voltage by 90° (b) Leads the voltage by 90°
(c) In phase with voltage (d) Leads the voltage by 270°

160. An inductor of 1 Henry inductance has a reactance 500ohms, then the frequency required is approximately:
(a) 50 Hz (b) 100 Hz **(c)** 80 Hz (d) 120 Hz

161. The device which allows only the flow of D.C is:
(a) Capacitors (b) Transformer **(c)** Inductor (d) Generator

162. The combined effect of resistance and reactance is knows as:
(a) Inductance (b) Conductance (c) Resistance **(d)** Impedance

163. When 10V are applied to an A.C circuit, the current flowing in it is 100mA. It impedance is:
(a) 100Ω (b) 10Ω (c) 1000Ω (d) 1Ω

164. The phase angle of a series RLC circuit at resonant frequency is:
(a) $\frac{\pi}{2}$ **(b)** zero (c) $\frac{\pi}{4}$ (d) π

165. Power dissipated in a pure inductor is:
(a) Large (b) Small (c) Infinite **(d)** Zero

166. The power factor in A.C circuit is:
(a) $sin\theta$ **(b)** $cos\theta$ (c) $tan\theta$ (d) $cot\theta$

167. At resonance frequency, the impedance of RLC series circuit is:
(a) Maximum **(b)** Minimum (c) Zero (d) Infinite

168. Inductive reactance of an inductor is:
(a) $X_L = \pi fL$ (b) $X_L = 4\pi fL$ **(c)** $X_L = 2\pi fL$ (d) $X_L = 2\pi L$

169. In RLC series circuit, the current at resonance frequency is:
(a) Minimum **(b)** Maximum (c) Zero (d) Infinite

170. In RLC parallel circuit the resonance frequency is:
(a) $2\pi\sqrt{LC}$ (b) $\frac{2\pi}{\sqrt{LC}}$ (c) $\frac{\pi}{\sqrt{LC}}$ **(d)** $\frac{1}{2\pi\sqrt{LC}}$

171. The SI unit of $\sqrt{LC}$ is:
(a) Second (b) Ampere (c) Hertz (d) Farad

172. In three phase A.C generator the phase difference between each pair of coil is:
(a) 45° (b) 60° (c) 90° **(d)** 120°

173. In three phase voltage across any two lines is about: (1 Time)
(a) 220 V (b) 230 V **(c)** 400 V (d) 430 V

174. Metal detectors consists of:
(a) L-C circuit (b) R-L circuit (c) R-C circuit (d) RLC series circuit

175. Choke consumes extremely small.
(a) Current (b) Charge **(c)** Power (d) Potential

176. Resistance of Choke is:
(a) Zero **(b)** Large (c) Very Small (d) Infinite

177. The A.M transmission frequency range from:
(a) 540 kHz to 1000 kHz **(b)** 540 kHz to 1600 kHz
(c) 520 kHz to 1600 kHz (d) 520 kHz to 1400 kHz

178. High frequency radio wave is called as:
(a) Fluctuative **(b)** Carrier wave
(c) Matter wave (d) Mechanical wave

179. The amplitude modulated transmission waves have:

(a) 540 kHz to 1600 kHz (b) 88 kHz to 10.8 kHz
(c) 88 MHz to 108 mHz (d) 540 MHz to 1600 MHz

180. Which one is not a crystalline solid?
(a) Zinc (b) Copper (c) Nylon (d) Zirconia

181. In glass, molecules are irregularly arranged so it is known as:
(a) Solid (b) Liquid (c) Solid liquid (d) Gas

182. The SI unit of stress is same as that of:
(a) Pressure (b) Force (c) Momentum (d) Work

183. The young's modulus of steel is:
(a) Zero (b) 1 (c) 2 (d) 3

184. Glass and high carbon steel are the example of:
(a) Ductile substance (b) Brittle substance
(c) Soft substance (d) Magnetic substance

185. If stress is increased beyond the elastic limit of material, it becomes permanently changed, this behavior of material is called: (2 Time)
(a) Strain (b) Stress (c) Elasticity (d) Plasticity

186. Substance which break just after the elastic limit is reached are called as:
(a) Brittle substance (b) Ductile substance
(c) Non magnetic substance (d) Magnetic substance

187. Conductors have conductivities of the order of:
(a) $10^3(\Omega m)^{-1}$ (b) $10^7(\Omega m)^{-1}$ (c) $10^5(\Omega m)^{-1}$ (d) $10^9(\Omega m)^{-1}$

188. The ratio of adding impurity in a semi conductor is:
(a) $1\ to\ 10^3$ (b) $1\ to\ 10^4$ (c) $1\ to\ 10^5$ (d) $1\ to\ 10^6$

189. In "N" type material, the minority charge carriers are:
(a) Free electrons (b) Holes
(c) Protons (d) Mesons

190. Which one is pentavanlent impurity?
(a) Boron (b) Gallium (c) Antimony (d) Indium

191. In p-type substances, the minority carriers are:
(a) Electrons (b) Protons (c) Holes (d) Neutrons

192. The critical temperature of Aluminum is:
(a) 3.72K (b) 1.18K (c) 7.2K (d) 8.2K

193. A single domain in ferromagnetic substance contains nearly:
(a) $10^8 \rightarrow 10^9$ (b) $10^{12} \rightarrow 10^{16}$ (c) $10^{15} \rightarrow 10^{20}$ (d) $10^{12} \rightarrow 10^{20}$

194. Curie temperature for iron is:
(a) 710°C (b) 730°C (c) 750°C (d) 780°C

195. A device used to detect very weak magnetic field produced by brain is named as:
(a) MRI (b) CAT scans (c) Squid (d) CRO

196. Potential difference across depletion region in case of silicon:
(a) 0.7V (b) 0.5V (c) 0.3V (d) 0.9V

197. Reverse current through a semi conductor is due to: (4 Time)
(a) Majority charge carries (b) Minority charge carries
(c) Electrons (d) Holes

198. Which factor does not affect the conductivity of Pn-junction diode?
(a) Doping (b) Temperature (c) Voltage (d) Pressure

199. A p-n-junction cannot be used as: (2 Time)
(a) Rectifier (b) Amplifier (c) Detector (d) LED

200. In full wave rectification, number of diodes required are equal to:
(a) 4 (b) 3 (c) 2 (d) 5

201. For rectification we use:
(a) Transformer **(b)** Diode (c) Choke (d) Generator

202. A device used for the conversion of A.C into D.C is called:
(a) An oscillator (b) Detector
(c) An amplifier **(d)** Rectifier

203. A light emitting diode (LED) emits light only when:
(a) Reverse biased **(b)** Forward biased
(c) Unbiased (d) None of these

204. A photo diode can turn its current ON and OFF in:
(a) Micro seconds (b) Mega seconds
(c) Nano seconds (d) Milli Seconds

205. The thickness of base in a transistor is of the order of:
(a) 10^{-9}m (b) 10^{-7}m (c) 10^{-8}m **(d)** 10^{-6}m

206. The central region of a transistor is called:
(a) Base (b) Emitter (c) Collector (d) Neutral

207. The SI unit of current gain is:
(a) Volt (b) Ampere (c) Coulomb **(d)** No unit

208. A sensor of light is:
(a) Transistor (b) LED
(c) Diode **(d)** Light dependent resistance

209. The gain of transistor amplifier depends upon:
(a) Resistance connected with collector
(b) Resistance connected with base voltage
(c) Input Voltage (d) Output Voltage

210. Greater concentration of impurity is added in:
(a) Base **(b)** Emitter (c) Collector (d) LED

211. The open loop gain of the amplifier is order of:
(a) 10^6 **(b)** 10^5 (c) 10^7 (d) 10^3

212. The input resistance of an op-amplifier is:
(a) Zero (b) Low
(c) High (d) Equal to output resistance

213. Find the gain of inverting amplifier of external resistance $R_1 = 10k\Omega$ and $R_2 = 100k\Omega$
(a) -5 **(b)** -10 (c) -1 (d) 50

214. The resistance between the inverting (-) and non-inverting inputs is called input resistance and is the order of:
(a) Ohms **(b)** Kilo ohms (c) Thounds ohms (d) Mega ohms

215. The gain of amplifier is given as:
(a) $1+\frac{R_2}{R_1}$ (b) $1+\frac{R_1}{R_2}$ (c) $-\frac{R_2}{R_1}$ (d) $-\frac{R_1}{R_2}$

216. For non-inverting amplifier if $R_1 = \infty$ ohm, $R_2 = 0$ ohm then gain of amplifier is:
(a) -1 (b) 0 **(c)** +1 (d) Infinite

217. Which is not a basic logic operation?
(a) NOT (b) AND (c) OR **(d)** NAND

218. Output of exclusive Or gate is X.
(a) $\overline{A.B}$ (b) $\bar{A}.B+\overline{A.\bar{B}}$ **(c)** $A.\bar{B}+\bar{A}.B$ (d) $\overline{A.B+B.A}$

219. The Boolean expression of Exclusive NOR gate is:

(a) $X = AB + BA$ (b) $X = A\bar{B} + \bar{B}A$

(c) $X = \overline{A\bar{B} + \bar{B}A}$ **(d)** $X = \overline{A\bar{B} + \bar{A}B}$

220. A diode characteristics curve is a plot between:

(a) Current and time (b) Voltage and time

(c) voltage and current (d) Current and time

221. The colour of light emitted by a LED depends on:

(a) Its forward biased (b) Its reverse biased

(c) Amount of forward current

(d) The type of semi conductor material used

222. Automatic function of street lights can be done by the use of:

(a) Inductor (b) Rectifier **(c)** Comparator(d) Emf

223. Using relativistic effects the location of an air craft after an hour fight can be predicated about:

(a) 20m **(b)** 50m (c) 760m (d) 780m

224. The length of a rod will becomes half at the speed:

(a) $\frac{1}{2}c$ (b) $\frac{3}{2}c$ (c) $\frac{1}{\sqrt{2}}c$ **(d)** $\frac{\sqrt{3}}{2}c$

225. Earth orbital speed is:

(a) 10 km /s (b) 20 km/s **(c)** 30 km/s (d) 40 km/s

226. The special theory of relativity based on:

(a) One postulate **(b)** Two postulate

(c) Three postulate (d) Four postulate

227. 1 kg mass will be equivalent to energy:

(a) $9 \times 10^8 J$ (b) $9 \times 10^{12} J$ **(c)** $9 \times 10^{16} J$ (d) $9 \times 10^{19} J$

228. By modern system of NAVSTAR, the speed anywhere on the earth can be determined to accuracy about:

(a) 20 ms^{-1} (b) 10 ms^{-1} **(c)** 2 cms^{-1} (d) 2 ms^{-1}

229. Platinum wire becomes yellow at a temperature of:

(a) 900°C **(b)** 1300°C (c) 1600°C (d) 500°C

230. When platinum is it becomes orange at:

(a) 500°C (b) 900°C **(c)** 1100°C (d) 900°C

231. A platinum wire becomes white at a temperature of:

(a) 1600°C (b) 1300°C (c) 1100°C (d) 900°C

232. When platinum wire is heated, it changes to cherry red at temperature:

(a) 500°C **(b)** 900oC (c) 1100°C (d) 1300°C

233. Momentum of moving photon is give by:

(a) $\frac{h}{\lambda}$ (b) $\frac{hc}{\lambda}$ (c) hf (d) $\frac{h\lambda}{c}$

234. Stefen-Boltzmann law is given by:

(a) $E = hf$ (b) $E = mc^2$ **(c)** $E = \sigma T^{-1}$ (d) $\lambda \times T = constant$

235. The value of Stefen's constant σ is given by:

(a) $6.67 \times 10^{-8} Wm^2 k^{-4}$ (b) $6.67 \times 10^{8} Wm^{-2} k^{-4}$

(c) $6.67 \times 10^{-18} Wm^{-2} k^{-4}$ **(d)** $5.67 \times 10^{-8} Wm^{-2} k^{-4}$

236. Joule-second is the unit of:

(a) Energy (b) Wein's constant

(c) Planck's constant (d) Boyle's law

237. The momentum of photon is given by the equation:

(a) $p = mv$ **(b)** $p = \frac{h}{\lambda}$ (c) $p = \frac{\lambda}{h}$ (d) $p = h\lambda$

238. Who explained the photo electric effect?

(a) Max Planck **(b)** Einstein (c) Henry (d) Rutherford

239. The energy of photon is given by:

(a) $\frac{mv^2}{2}$ **(b)** hf (c) $v_o e$ (d) $m_o c^2$

240. Albert Einstein was awarded Nobel prize in physics in:

(a) 1905 (b) 1911 (c) 1918 **(d)** 1921

241. Amount of energy released due to complete conversion of 1 kg mass into energy is:

(a) $9 \times 10^{16} J$ (b) $9 \times 10^{9} J$ (c) $9 \times 10^{20} J$ (d) $9 \times 10^{8} J$

242. The quantity/factor $\frac{h}{m_o c}$ has the dimension of:

(a) Length (b) Time (c) Mass (d) Energy

243. The Compton shift in wavelength will be maximum when angle of scattering is:

(a) 90^o (b) 45^o **(c)** 180^o (d) 30^o

244. Energy each position is given by:

(a) 2MeV (b) 1.02MeV **(c)** 0.51MeV (d) 5 MeV

245. The minimum energy required to create pair production is:

(a) 0.51MeV **(b)** 1.02MeV (c) 931 MeV (d) 2.10MeV

246. The rest mass of photon is:

(a) Zero (b) $1.67 \times 10^{-27} kg$

(c) $9.1 \times 10^{-31} kg$ (d) $1.67 \times 10^{-31} kg$

247. Wave nature of light appears in:

(a) Pair production (b) Compton effect

(c) Photo electric **(d)** Interference

248. If a particle of mass 'm' is moving with speed 'v' then de-Broglie wavelength λ associated with it will be:

(a) $\lambda = \frac{3h}{mv}$ (b) $\lambda = \frac{2h}{mv}$ **(c)** $\lambda = \frac{h}{mv}$ (d) $\lambda = \frac{h}{2mv}$

249. The life time of an electron in an excited state is about 10-8s. What is its uncertainty in energy during this time:

(a) $6.63 \times 10^{-34} J$ (b) $9.1 \times 10^{-31} J$

(c) $1.05 \times 10^{-26} J$ (d) $7.2 \times 10^{-15} J$

250. Ballmer series lies in region of electromagnetic spectrum:

(a) Infrared **(b)** Visible (c) Ultraviolet (d) Fra infrared

251. Ballmer series lies in:

(a) Visible green (b) Invisible region

(c) Ultraviolet region (d) Infrared region

252. Rydberg constant has value:

(a) $1.0974 \times 10^{7} m^{-1}$ (b) $6.02 \times 10^{-34} m^{-1}$

(c) $3 \times 10^{8} m^{-1}$ (d) $1.6 \times 10^{19} m^{-1}$

253. The shortest wavelength in Lyman series is equal to:

(a) R_H (b) $\frac{R_H}{2}$ **(c)** $\frac{1}{R_H}$ (d) $\frac{2}{3} R_H$

254. Which of the following series of hydrogen spectrum lies in ultra violet region?

(a) Lyman series (b) Ballmer series

(c) Paschen series (d) Bracket series

255. The longest wavelength of Paschen series is:

(a) 656nm (b) 1875nm (c) 2000 nm (d) 1094 nm

256. Earth orbital speed is:

(a) 10 km/s (b) 20 km/s (c) 30 km/s (d) 40 km/s

257. The value of radius of 1st Bohr's orbit is:

(a) 0.53 nm (b) 0.053 nm (c) 0.0053 nm (d) 0.00053 nm

258. The energy of the 4th orbit in hydrogen atom is:

(a) -2.51eV (b) -3.50eV (c) -13.60eV (d) -0.85eV

259. In an electronic transition atom cannot emit:

(a) Infrared radiations (b) Visible radiations

(c) Ultraviolet radiations (d) Gama radiations

260. Production of X-rays is reverse process of:

(a) Photo-electric effect (b) Compton effect

(c) Annihilation (d) Pair production

261. In metal stables state electron stays for:

(a) 10^{-3}s or more (b) 10^{-3}s or less

(c) 10^{-8}s or more (d) 10^{-8} or less

262. In Helium-Neon laser, discharge tube is filled with Neon gas:

(a) 10% (b) 15% (c) 85% (d) 90%

263. The radius of 10th orbit in hydrogen atom is:

(a) 0.053 nm (b) 0.53 nm (c) 5.3 nm (d) 53 nm

264. The number of Neutron in $^{238}_{92}U$ is:

(a) 92 (b) 238 (c) 146 (d) 330

265. The number of neutrons $^{7}_{3}L$ in are:

(a) 3 (b) 7 (c) 4 (d) 2

266. The number of isotopes of cesium are:

(a) 4 (b) 32 (c) 22 (d) 36

267. What is different in isotopes?

(a) Number of protons (b) Number neutrons

(c) Number of electrons (d) Charge Number

268. The binding energy per nucleon is maximum for:

(a) Helium (b) Iron (c) Polonium (d) Radium

269. Energy released by conversation of 1 amu is:

(a) $1.6 \times 10^{-19} eV$ (b) $1.6 \times 10^{-19} MeV$

(c) 200MeV (d) 931MeV

270. There is no change in A and Z of any radioactive element by the emission of:

(a) α- partical (b) β-partical (c) γ-partical (d) X-rays

271. The unit of decay constant:

(a) Second (b) $(\text{Second})^{-1}$ (c) m^{-1} (d) mk

272. The charge on β-partical is:

(a) +e (b) -e (c) -2e (d) None of these

273. γ- rays emitted from radioactive element have speed:

(a) 1×10^{7} ms^{-1} (b) 1×10^{18} ms^{-1} (c) 3×10^{8} ms^{-1} (d) 4×10^{19} ms^{-1}

274. A device that shows the visible path ionize particle is called:

(a) GM counter (b) Solid state detector (c) Scalar (d) Wilson cloud chamber

275. The dead time of Geiger-Muller Counter is of the order of:

(a) Micro second (b) Millisecond (c) More than **millisecond (d) Nanosecond**

276. Energy needed to produce an electron hole in solid state detector is:

(a) 1 to 2eV (b) 3 to 4eV (c) 6 to 7eV (d) 8 to 9eV

277. Fission chain reaction is controlled by:

(a) Cadmium rods (b) Iron rods

(c) Platinum rods (d) Steel rods

278. Hydrogen bomb is an example of:

(a) Nuclear fission (b) Nuclear fusion

(c) Chain reaction (d) Chemical reaction

279. The particles equal in mass but greater than proton are:

(a) Mesons (b) Baryons (c) Leptons (d) Hadrons

280. A proton consists of quarks which are:

(a) Two up, one down (b) One up, two down

(c) All up (d) All down

281. The building blocks of protons and neutrons are called:

(a) Muons (b) Mesons (c) Protons (d) Neutrons

282. Which pair belongs to hadrons?

(a) Protons and Neutrons (b) Neutrons and electrons

(c) Photons and electrons (d) Positrons and electrons

(SUBJECTIVE PART)

SECTION-I

SHORT QUESTIONS (SQs)

1. Define Coulomb's law, write its mathematical formula?
2. Describe five/four properties of electric field lines.
3. Define xerography and photoconductor?
4. Distinguish between conductor and photo conductor.
5. Define electric flux, Gaussian surface.
6. State and write formula of Gauss's law.
7. Define Gaussian surface and electric lines of force.
8. Show that 1N/C=1V/m
9. Define potential gradient. Give its unit.
10. What is meant by EEG and ERG?
11. Define electric potential with unit.
12. Differentiate between electric potential difference and electric potential at a point.
13. Convert 1 joule electron volt.
14. Write two similarities and dissimilarities among electric force and gravitational force?
15. Define Capacitor and Farad.
16. Define capacitance and electric polarization.
17. What is the effect of polarization on the capacitance of a capacitor?
18. What is time constant of a capacitor resistance circuit and prove that R.C=time constant.

19. Define time constant for RC circuit also draw (q-t) graph for charging capacitor in RC circuit.
20. The potential is constant throughout a given region of space. Is the electric field zero or non-zero in this region? Explain.
21. How can you identify that which plate of a capacitor is positively charged?
22. Electric lines of force never cross. Why?
23. Is E necessarily zero inside a charged rubber if balloon is spherical? Assume that charge is distributed uniformly over the surface? Explain.
24. Do electrons tend to go to region of high potential or of low potential?
25. A particle carrying a charge of 2e falls through a potential difference of 3.0V. Calculate the energy acquired by it.
26. Define Tesla. Write its mathematical formula.
27. Define magnetic flux and its units.
28. Distinguish between magnetic flux and magnetic flux density. Write their SI units.
29. State Ampere's law and write it in mathematical form.
30. Why is $\bar{B}$ non-zero outside a solenoid?
31. Write two uses of CRO (cathode ray oscilloscope).
32. What is cathode ray oscilloscope and galvanometer?
33. What is function of Sweep generator in cathode ray oscilloscope?
34. How can you explain the wave form of various voltage formed in CRO?
35. What is the function of grid in a cathode ray oscilloscope?
36. A current rectangular coil is rotating in a magnetic field. What factor does the torque of coil depend?
37. Define galvanometer. Write its principle.
38. Define current sensitivity of a galvanometer.
39. Distinguish between sensitive and dead beat galvanometers.
40. What modifications are required convert a galvanometer into ammeter?
41. How can you convert a galvanometer into voltmeter?
42. Define AVO meter and Ohm meter.
43. What is digital multi meter? Give its two advantages over AVO meter.
44. Suppose that a charge "q" is moving a uniform magnetic field with a velocity "v". Why is there no work done by the magnetic force that acts on the charge "q"?
45. If a charged particle moves in a straight line through some region of space can you say that magnetic field in the region is zero or non zero?
46. Why does the picture on a T.V screen become distorted when a magnet is brought near the screen?
47. Is it possible to orient a current loop in a uniform magnetic fi9eld such that the loop will not tend to rotate? Explain.
48. How can a current loop be used to determine the presence of a magnetic field in a given region of space?
49. How can you use a magnetic field to separate isotopes of chemical element?
50. Why the resistance of an ammeter should be very low?
51. Why a voltmeter should have very high resistance.
52. Differentiate between mass defect and binding energy.
53. Define decay constant and write its unit.
54. Define radioactivity and half life.
55. Why Geiger counter is not suitable for fast counting?

56. Define fission and fusion reaction.
57. Differentiate between controlled and un-controlled chain reaction.
58. State the advantages and disadvantages of fusion power from the point of safety pollution and resources.
59. What is meant by absorbed does, also write down the units of absorbed does?
60. Write a short note on basic forces of nature.
61. What are baryons and mesons? How they are formed?
62. What are Hadrons and Leptons. Explain with examples.
63. Why are heavy nuclei unstable? Explain.
64. If a nuclei has life of 1 year, does this mean that it will completely decay after 2 years? Explain.
65. What fraction of radioactive sample decays after two half lives has elapsed?
66. A particle which produces more ionization is less penetrating. Why?
67. What information is revealed by the length and shape of the tracks of an incident particle in Wilson could chamber?
68. What do you mean by the term critical mass?
69. What factors make a fusion reaction difficult to achieve?
70. What do you understand background radiations? State two sources.
71. If someone accidentally swallows an alpha source and Beta source. Which would be the more dangerous to him? Explain why?
72. What is radioactive trace? Describe one application in each case of medicine and agriculture.

SECTION-II

SHORT QUESTIONS (SQs)

1. Define conventional current and electronic current.
2. How the heating effect produced when current flows through the conductor.
3. Define Ohm's Law. Also define ohmic and non ohmic devices.
4. A wire of length 10m has resistance 100Ω. If the wire is stretched to increase its length three times what will be its new resistance.
5. Define temperature coefficient of resistance. Give its units.
6. Differentiate between resistance and resistivity.
7. What is meant by tolerance? Find the resistance of a resistor with red, green, orange and fourth and gold respectively band.
8. What are thermistor? How are they made?
9. How is rheostat used as potential divider?
10. Under what conditions emf of a cell and terminal potential difference become equal?
11. State Kirchhoff's rule.
12. A potential difference is applied across the ends of a copper wire. What is the effect on the drift velocity of free electrons by:
   a) increasing the potential difference
   b) Decreasing the length and temperature of the wire?
13. Why does the resistance of a conductor rise with temperature?
14. Is the filament resistance lower or higher in a 500W, 220V light bulb than in 100W, 220V bulb?
15. Explain why the terminal potential difference of battery decreases when the current drawn from it is increased?

16. What is Wheatstone bridge? How can it be used to determine an unknown resistance?
17. Define peak value and peak to peak value of A.C voltage?
18. What do you mean by phase lag and phase lead?
19. What is difference between A.C circuit and V.C circuit?
20. What is meant by inductive and capacitive reactance?
21. Define impedance and write the impedance expression for R-L series circuit.
22. In R-C series circuit will the current lag or lead the voltage. Illustrate your answer with diagram.
23. Explain power factor.
24. Write two properties of R-L-C series circuit.
25. Write two/four properties of parallel resonance circuit.
26. Write some/main advantages of three phase A.C supply.
27. Define A.C and choke.
28. Write down advantages and disadvantages of A.M and F.M.
29. Define modulation and write names of its types.
30. How many times per second will an incandescent lamp reach maximum brilliance when connected to a 50 Hz source?
31. How does doubling the frequency affect the reactance.
(a) an inductor (b) a capacitor
32. In R-L circuit, will the current larger lead the voltage? Illustrate your answer by a vector diagram.

33. Explain the condition under which electromagnetic waves are produced from a source.
34. How the reception of a particular radio station is selected on your radio set?
35. At what frequency will an inductor of inductance 1.0 Hz have a reactants of 500Ω?
36. Define unit cell and crystal lattice.
37. Define tensile stress and volumetric stress?
38. What is difference between ductile and brittle substance?
39. Explain briefly the insulator on the basis of energy band theory.
40. Define (a) Conduction band(b)Valence band
41. Describe energy band picture of semi-conductors.
42. Differentiate between insulators and conductors.
43. Distinguish between soft magnetic materials and hard magnetic materials.
44. Define saturation and Remanenece of Hysteresis loop.
45. Distinguish between crystalline, amorphous and polymeric solids.
46. Define modulus of elasticity. Show that units of modulus of elasticity and stress are the same. Also discuss its three types.
47. What is meant by strain energy? How can it be determined from the force-extension graph?
48. Distinguish between intrinsic and extrinsic semi-conductors?
49. What is meant by para, dia and ferromagnetic substances? Give example for each.
50. Define depletion region and potential barrier.
51. How will you obtain N-type and P-type material from pure silicon?
52. What is potential barrier of germanium and silicon? Also define potential barrier.
53. Define rectification. Draw a circuit diagram of half wave rectifier.
54. What is photodiode? Write down its any two applications?
55. What is LED? Write its operation.
56. What do you know about photo-voltaic cell?
57. Define "β" for transistor. Also write its fundamental current equation.

58. Define open loop gain of an operational amplifier. Also give its formula.
59. Name three basic characteristics of Op-Amp. Also give their approximately values.
60. Write briefly about operational amplifier.
61. Define digital system and logic gate.
62. What is the mathematical expression of And gate? Write its truth table.
63. What is OR-GATE? Write its relation.
64. Write down the logic expression and logic table for exclusive NOR gate.
65. Draw the symbol and truth table of NAND gate.
66. Give two applications of gates in control system.
67. How does the motion of an electron in a n-type differ from the motion of holes in a p-type substances?
68. What is net charge on N-type and P-type substances? Justify the answer.
69. The anode of a diode is 0.2V positive with respect to its cathode. Is it forward biased?
70. Why charge carries are not present in depletion region?
71. What is effect of forward and reverse biasing of a diode on the width of depletion region?
72. Why ordinary silicon diodes do not emit light?
73. Why a photo diode is operated in reverse biased state?
74. Why is the base current in a transistor very small?
75. What is the principle of virtual ground? Apply it to find the gain of an inverting amplifier.

SECTION-III

SHORT QUESTIONS (SQs)

1. Define induced emf and induced current:
2. Write down two methods for determining the induced emf in a loop.
3. How the induced current can be increased?
4. What is motional emf? State the factors it depend upon.
5. State Faraday's law of electromagnetic and write its mathematical expression.
6. Define write hand rule for determining the direction of the magnetic field.
7. Verify that an ohm times faraday is equivalent to second.
8. State Faraday's law of electromagnetic induction.
9. Define lenz s law does it agree with the law of conservation of energy?
10. Define mutual induction. On what factors does mutual inductance of the two coil depend?
11. Name the factors upon which the self –inductance of coil depends?
12. Define self induction and self inductance.
13. What is differences between motor and generator?
14. How fluctuations of the output can be reduced in D.C generator?
15. Write a note on back motor effect in generator?
16. Define back emf effect in motor. Also tell what happens when is over loaded?
17. Define step-up and step down transformers.
18. Give the two techniques to improve the efficiency of transformer.
19. How the power losses can be minimized in a transformer?

20. Does the induced emf in a circuit depend on the resistance of the circuit? Does the induced current depend as the resistance of the circuit?

21. Does the induced emf always act to decrease the magnetic flux through a circuit? Explain.

22. How would you position a flat loop of wire in a changing magnetic field so that there is no emf induced in the loop?

23. In a certain region the earth's magnetic field point vertically down, when a plane flies due to north, which wingtip is positive charged?

24. Show that emf ε and $\frac{\Delta\phi}{\Delta t}$ have the same units.

25. Can a D.C motor be turned into a DC generator?

26. Is it possible to change both the area of the loop and the magnetic field passing through the loop and still not have induced emf in the loop?

27. Four unmarked wires energy from a transformer. What steps would you to determine turn ratio?

28. Can a step-up transformer increase the power level? Explain/Comment.

29. In a transformer, there is no transfer of charge from the primary to the secondary. How is then the power transferred?

30. When the primary of a transformer is converted to A.C current in it.

31. Distinguish between inertial frame of reference and non-inertial frame of reference.

32. Write down the postulates of special theory of relativity.

33. Distinguish between general theory relativity and special theory of relativity?

34. Explain NAVSTAR Navigation system.

35. What are black body radiation? How can you get a black body?

36. Define stopping potential and threshold frequency.

37. Define Compton effect. Write the formula of Compton shift for scattering angle.

38. Define photoelectric effect and pair production.

39. What is wave particle duality? Give its one practical use?

40. State uncertainty principle. Give its two mathematical forms.

41. What are the measurements on which two observers in relative motion will always agree upon?

42. If the speed of light were infinite, what would be the equations of special theory of special theory of relativity reduce to?

43. As a solid is heated, it begins to glow? Why does it first appear red?

44. What happens to total radiation from a black body if its absolute temperature is doubled?

45. Which photon red, green or blue carries the most

(a) Energy (b) Momentum

46. Which as the lower energy quanta? Radio waves or X-rays?

47. Will bright light eject more electrons from a metal surface than dimmer light of the same colour?

48. When light shines on a surface, is momentum transferred to the metal surface?

49. Why don't we observe a Compton effect with visible light?

50. Can pair production take place in vacuum? Explain.

51. Is it possible to create a single electron from energy? Explain.

52. If an electron and a proton have the same De-Broglie wavelength, which particle has greater speed?

53. We do not notice the de Broglie wavelength for a pitched cricket ball. Explain why?

54. When does light behave as a wave? When does it behave as a particle?

55. Define spectroscopy, holography.
56. Define Continuous spectra and line spectra.
57. State postulates of Bohr's model of hydrogen atom.
58. What do we mean when we say that the atom is excited?
59. Define excitation energy and ionization energy.
60. What is meant by CAT-Scanner?
61. Write two properties and two uses of X-rays.
62. What is meant by normal population and population inversion?
63. Write down four uses of laser.
64. Distinguish between stimulated emission and spontaneous emission.
65. What is meant by line spectrum. Example how line spectrum can be used for identification of elements?
66. Can an electron in the ground state of hydrogen atom absorb a photon of energy 13.6eV or greater than 13.6eV?
67. How can the spectrum of hydrogen contains many lines when hydrogen contains one electron?

68. Is energy conserved when a atom emits a photon of light? Explain.
69. Can X-ray be reflected, refracted, diffracted and polarized just like any other wave? Explain.

70. What are the advantages of laser over ordinary light?
71. Explain why laser action could not occur without population inversion between atomic levels?

LONG QUESTIONS

LONG QUESTION NO. 5

QUESTIONS

- State and explain Coulomb's Law.
- State Gauss's law. Find electric intensity due to an infinite sheet of charges.
- Derive the expression for energy stored in charged capacitor. Also calculate the energy and energy density stored in the electric field.
- Derive the relation for capacitance of parallel plate capacitor and hence define dielectric coefficient.
- Define electric potential. Derive the expression for electric potential at a certain point due to a point charge.
- Define capacitor and capacitance. Derive the formula for energy stored in a capacitor.
- State and explain ohm's law. Also explain the behavior of ohmic and non-ohmic devices with the help of graph.
- State Kirchhoff's Rules and explain the voltage rule.
- What is wheat stone bridge? Give its principle, construction and working. How it can be used to find unknown resistance of a write?
- What is potentiometer? Explain its principle and working.

NUMERICALS

- Two point charges $q_1 = 1.0 \times 10^6 C, q_2 = 4.0 \times 10^6 C$ are separated by distance of 3.0m. Find and justify the zero field location.
- Determine the electric field at the position $r = (4i + 3j)m$ caused by a point charge $q = 5.0 \times 10^{-6} C$ placed at origin.
- 0.75A current flows through an iron wire where battery of 1.5V is connected across its terminal (ends).
- A platinum wire has resistance of 10Ω at 0°C and 20Ω at 273°C. Find the value of temperature coefficient of resistance.
- The resistance of an iron wire at 0oC is $1 \times 10^{-4}\Omega$. what is the resistance at 500°C if temperature. Coefficient of resistance of iron $5.2 \times 10^{-3} K^1$
- The potential difference between the terminals of a battery in open circuit is 2.2V. When it is connected across a resistance of 5 Ω. The potential falls 1.8V. Calculate the current and the internal resistance of the battery.
- Find the electric field strength required to hold suspended a particle of a mass1.0×10^{-6} kg and charge $1.0\mu C$ between two plates 10.0cm apart.
- A particle having a charge of 20 electron on it falls through a potential difference of 100 volts. Calculate the energy acquired by it an electron volt.

LONG QUESTION NO. 6

QUESTIONS

- State Ampere's law and find magnetic field ($\bar{B}$) due to current carrying solenoid.
- How can you find e/m of an electron? Explain.
- Derive the expression for torque on current carrying coil in uniform magnetic.
- What is galvanometer? How it is converted in to:
  (a) An Ammeter (b) A Voltmeter
- State and drive Faraday's law of electromagnetic induction.
- Derive an expression for the energy stored in an inductor. Also define energy density.
- Define A.C. generator. Give its principle, construction and working derive an expression for induced emf.
- What is transformer, derive its equation. Also explain loses and power transmission in it.

NUMERICALS

- What should pass through a solenoid that is 0.5m long with 10,000 turns of copper wire so that it will have a magnetic field of 0.4T?
- An ideal step down transformer is connected to main supply of 240V. It is desired to operate a 12V, 30W lamp. Find current in the primary and the transformation ratio.
- A D.C motor operates at 240V and has a resistance of 0.5Ω when the motor is running at normal speed the armature is 15A. Find the back emf in the armature.
- A square coil of side 16cm has 200 turns and rotates in a uniform magnetic field of 0.05T. If the peak emf is 12V. What is the angular velocity of the coil.
- A coil of 10 turns and 35cm2 area is in a perpendicular magnetic field of 0.5T. The coil is pulled out of the field in 1.0sec. Find the induced emf in the coil as it is pulled out of the field.
- A metal rod of length 25cm is moving at a speed of 0.5ms^{-1} in a direction perpendicular to 0.25T magnetic field. Find the emf produced in the rod?

- A 20.0 cm wire charging a current of 10.0A is placed in a uniform magnetic field of 0.30T. If the wire makes an angle of 40^o with the direction of magnetic field. Find the magnitude of the force acting on the wire.
- How fast must a proton moves in a magnetic field of 2.50×10^{-3}T. Such that magnetic force is equal to its weight.
- Alpha particles ranging in speed from 1000 ms^{-1} to 2000ms^{-1} enter a velocity selector, where the electric intensity is 300Vm^{-1} and magnetic induction is 0.20T. Which particle will move un-deviated through the field.

LONG QUESTION NO. 7

QUESTIONS

- Discuss the behavior of an inductor in an A.C circuit and write expression for the inductive reactance.
- What is an inductor? Derive the relation for energy stored in an inductor.
- Define impedance. Derive expression for impedance and phase angle in R-C and R-L series circuit excited by A.C voltage.
- Describe RLC series circuit. Draw its impedance diagram derive the relation for its resonance frequency "f". Also write down its two properties.
- What are electromagnetic waves? Discuss principle of generation transmission and reception of electromagnetic waves.
- What is reflection? Explain half wave full wave rectification with diagram.
- How the transistor can be used as an amplifier? Explain in detail with circuit diagram and calculate gain.
- What is operational amplifier? Describe the use of op-amp as non-inverting amplifier?
- What is operational amplifier? Discuss the action of op-amp as inverting and non-inverting amplifier. Also calculate voltage gain in each case.

NUMERICALS

- An A.C voltmeter reads 250v. What is its peak and instantaneous values if the frequency of alternating voltage is 50 Hz?
- A 100μF capacitor is connected to an alternating voltage of 24V and frequency 50Hz calculate. (i) Reactance of Capacitor (ii) Current is circuit
- Find the value of current flowing through a capacitance 0.5 μF, when connected a source of 150V at 50 Hz.
- Find the value of current and inductive reactance when A.C voltage of 200 volts at 50 Hz is passed through an inductor of 10H.
- In a certain circuit the transistor has a collector current 10mA and has current of 40μA. What is the current again of the transistor?
- The current flowing into base of a transistor in 100μA. Fid its ratio $\frac{I_C}{I_E}$ if the value of current gain β is 100.
- What is the resonant frequency of a circuit which includes a coil of inductance 2.5H and a capacitance 40 μF?

LONG QUESTION NO. 8

- What is meant by strain energy? Draw force extension graph for a vertically suspended wire stretched by a variable weight at the lather end and by its graph derive a relation to calculate its value.
- What is meant by doping? Give the name of doped materials. How would you n-type and p-type material from pure silicon. Illustrate it by with their schematic diagram.
- What is energy band theory in solid? Distinguish between conductors insulators and semi conductors on the basis of this theory.
- Define extrinsic and intrinsic semi-conductors. How can obtain p-type and n-type substance?
- Write down the postulates of special theory of relativity and also describe the four results of special theory of relativity.
- Write a note on Compton effect.
- Discuss photoelectric effect on the basis of classical and quantum theory.
- Describe de-Broglie's hypothesis and explain its confirmation through Davission and Germer Experiment.
- State and explain uncertainty principle. Also give its two mathematical forms.

NUMERICALS

- A 1.25cm diameter cylinder is subjected to a load of 2500 kg. Calculate the stress on the bar in mega Pascal's.
- What stress would causes A. wire to increase in length by 0.01% if the young modulus of wire is $12 \times 10^{10} Pa$. What force would produce this stress if diameter of the wire is 0.56 mm.
- A 1.0 m long copper wire is subjected to stretching force and its length increases by 20 cm calculate The tensile strain and the percentage elongation which the wire under goes.
- The length of steel wire is 1.0m and its cross sectional area is $0.03 \times 10^{-4} m^2$. Calculate the work done in stretching the wire when a force of 100N is applied within the elastic region young's modulus of steel is $3.0 \times 10^{11} m^{-2}$
- What is mass of a 70 kg man in a space rocket travelling at 0.8c form us as measure form earth?
- A 90 keV X-rays photon is fired at a carbon target and Compton scattering occurs. Find the wavelength of the accidental photon and the wavelength of the scattered photon of scattering angle of 60^o.
- An electron is placed in box about the size of an atom that is about $1.0 \times 10^{-10} m$. What is the velocity of the electron?
- An electron is accelerated through a potential difference of 50V. Calculate its de-Broglie's wavelength.

LONG QUESTION NO. 9

- Calculate the longest wavelength of radiation for the paschen series?
- Compute the shortest and longest wavelength of radiation for the Lyman series?

- Give three postulates of Bohr's model and calculate the radius of first orbit of hydrogen atom.
- What is meant by inner shell transitions and characteristics X-rays? How ray are produced? Write down any two properties and uses of X-rays.
- Define isotopes. Describe Aston's mass spectrograph and how it can be used to separate the isotopes of an element.

- What is radioactivity? Discuss emission of alpha and beta and gamma radiations from radioactive nuclei.

- Define and explain the principle construction and working of a solid state detector.

- Describe the principle, construction and working of a Wilson Cloud Chamber.

NUMERICALS

- If $^{233}_{92}U$ decays twice by α −emission what is the resulting isotopes?
- The half life of $^{91}_{38}Sr$ is 9.70 hours. Find its decay constant.
- A sheet of lead 5.0 mm thick reduces the intensity of a beam of $\gamma - rays$ by a factor 0.4. Find half value thickness of lead sheet which will reduce the intensity to half of its initial value.
- A 75kg person receiver a whole body radiation dose of 24 m-rad, delivered by alpha particles for which RBE factor is 12. Calculate:
  (a) The absorbed energy is joules.
  (b) The equivalent dose in rem.
- Find the mass defect and binding energy of the deuteron nucleus, the experiment mass of deuteron is 3.3435×10^{-27} kg.
- Find the mass defect and the binding energy for Tritrium if the atomic mass of tritium is 3.016049μ.
- Electron in a X-ray tube are accelerated through a potential difference of 3000V. if these electrons were slow down in a target. What will be the minimum wavelength of the X-rays produced?
- A tungsten target is struck by electrons that have been accelerated from rest through 40kV potential difference. Find the shortest wave length of the bremsstrahlung radiation emitted.