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PHYSICS

UNIT WISE
PUBLIC ONE MARK QUESTIONS
WITH SOLUTION

MODEL QUESTION PAPER
&
MARCH 2006 TO JUNE 2012

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PUBLIC ONE MARK QUESTIONS
MARCH - 2006 ⇔ JUNE- 2012

LESSON - 1- ELECTROSTATICS**(4- questions)****MODEL QUESTION PAPER**

- A dipole is placed in a uniform electric field with its axis parallel to the field, it experiences
 - Only a net force
 - only a torque
 - both a net force and torque
 - neither a net force nor a torque
- The unit of permittivity
 - $\text{N C}^{-2}\text{m}^{-2}$
 - H m^{-1}
 - $\text{C}^2\text{N}^{-1}\text{m}^{-2}$
 - $\text{N m}^2\text{C}^{-2}$
- The number of lines of force that radiate outwards from one coulomb charge is
 - 1.13×10^{11}
 - 8.85×10^{-11}
 - 9×10^9
 - infinite
- On moving a charge of 20 C by 2 cm , 2 J of work is done, then the potential difference between the points is
 - 0.5 V
 - 0.1 V
 - 8 V
 - 2 V

MARCH - 2006

- The unit of electric flux
 - Nm^2C^{-1}
 - $\text{Nm}^{-2}\text{C}^{-1}$
 - Nm^2Cd
 - Nm^{-2}C
- A dipole is placed in a uniform electric field with its axis parallel to the field, it experiences
 - Only a net force
 - only a torque
 - Both a net force and torque
 - neither a net force nor a torque
- The work done in moving $4 \mu \text{ C}$ charge from one point to another in an electric field is 0.012 J . The potential difference between them is
 - 3000 V
 - 6000 V
 - 30 V
 - $48 \times 10^3 \text{ V}$
- The electric field outside the two oppositely charged plane sheets each of charge density σ is
 - $\sigma / 2\epsilon_0$
 - $-\sigma / 2\epsilon_0$
 - σ / ϵ_0
 - zero

JUNE - 2006

- Which of the following quantities is a scalar?
 - Electric force
 - electric field
 - dipole moment
 - electric potential
- Torque on dipole in a uniform electric field is maximum when the angle \vec{p} & \vec{E} is
 - 0°
 - 90°
 - 45°
 - 180°
- Potential energy of two equal negative point charges of magnitude $2\mu \text{ C}$ placed 1 m apart in air
 - 2 J
 - 0.36 J
 - 4 J
 - 0.036 J
- A hollow metallic spherical shell carrying an electric charge produces no electric field at points
 - On the surface of the sphere
 - inside the sphere
 - at infinite distance from the centre of the sphere
 - outside the sphere

OCTOBER - 2006

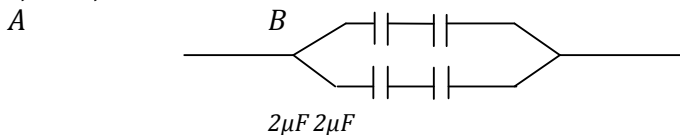
- The unit of electric field intensity is
 - NC^{-2}
 - NC
 - Vm^{-1}
 - Vm
- Four charges $+q, +q, -q$ and $-q$ respectively are placed at the corners A, B, C and D of a square of side a . The electric potential at the centre O of the square is
 - $\frac{1}{4\pi\epsilon_0} \frac{q}{a}$
 - $\frac{1}{4\pi\epsilon_0} \frac{2q}{a}$
 - $\frac{1}{4\pi\epsilon_0} \frac{4q}{a}$
 - zero
- The value of permittivity of free space is
 - $8.854 \times 10^{12} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
 - $9 \times 10^9 \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
 - $\frac{1}{9 \times 10^9} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
 - $\frac{1}{4\pi \times 9 \times 10^9} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
- The principle used in lightning conductors is
 - Corona discharge
 - mutual induction
 - self induction
 - electromagnetic induction

MARCH – 2007

17. A dipole is placed in a uniform electric field with its axis parallel to the field, it experiences
 a) Only a net force
 b) only a torque
 c) Neither a net force nor a torque
 d) both a net force and torque
18. The unit of electric dipole moment is
 a) Volt/metre (V/m)
 b) Coulomb/metre (C/m)
 c) Volt. metre (Vm)
 d) coulomb. metre (Cm)
19. Electric potential energy of an electric dipole in an electric field is given as
 a) $pE\sin\theta$ b) $-pE\sin\theta$ c) $-pE\cos\theta$ d) $pE\cos\theta$
20. Electric field is 400 V/m at a distance 2m from a point charge. It will be 100 V/m at a distance of
 a) 50 cm b) 4 cm c) 4 m d) 1.5 m

JULY – 2007

21. Which of the following is not a dielectric?
 a) Ebonite
 b) Mica
 c) Oil
 d) Gold
22. The work done in moving 500 μC charge between two points on equipotential surface is
 a) Zero
 b) finite positive
 c) finite negative
 d) infinite
23. In a given circuit, the effective capacitance between A and B will be
 $3\mu\text{F}$ $6\mu\text{F}$



- a) $3\mu\text{F}$ b) $\frac{36}{13}\mu\text{F}$ c) $13\mu\text{F}$ d) $7\mu\text{F}$
24. The direction of electric field at a point on the equatorial line due to an electric dipole is
 a) Along the equatorial line towards the dipole
 b) Along the equatorial line away from the dipole
 c) parallel to axis of the dipole and opposite to the direction of dipole moment
 d) parallel to the axis of the dipole and in the direction of dipole moment.

SEPTEMBER – 2007

25. The no. of electric lines of force originating from a charge of 1 microcoulomb is
 a) 1.129×10^5 b) 1.6×10^{-19} c) 6.25×10^{-19} d) 8.85×10^{-19}
26. The equivalent capacitance of two capacitors in series is $1.5\mu\text{F}$. The capacitance of one of them is $4\mu\text{F}$. The value of capacitance of the other is
 a) $2.4\mu\text{F}$ b) $0.24\mu\text{F}$ c) $0.417\mu\text{F}$ d) $4.17\mu\text{F}$
27. The law that governs the force between electric charges is
 a) ampere's law
 b) Faraday's law
 c) Coulomb's law
 d) Ohm's law
28. A dipole is placed in a uniform electric field with its axis parallel to the field, it experiences
 a) Only a net force
 b) only a torque
 c) Neither a net force nor a torque
 d) both a net force and torque

MARCH – 2008

29. The unit of permittivity
 a) $\text{NC}^{-2}\text{m}^{-2}$ b) Hm^{-1} c) $\text{C}^2\text{N}^{-1}\text{m}^{-2}$ d) Nm^2C^{-2}
30. The work done in moving 500 μC charge between two points on equipotential surface is
 a) Zero
 b) finite positive
 c) finite negative
 d) infinite
31. An electric dipole placed at an angle θ in a non uniform electric field experience
 a) Neither a net force nor a torque
 b) torque only
 c) Both force and torque
 d) force only
32. A capacitor of capacitance $6\mu\text{F}$ is connected to a 100 V battery. Energy stored in the capacitor
 a) 30 J
 b) 3 J
 c) 0.03 J
 d) 0.06 J

JUNE – 2008

33. Which of the following quantities is a scalar?
 a) Electric force
 b) electric field
 c) dipole moment
 d) electric potential
34. The unit of electric field intensity is
 a) Vm
 b) CN^{-1}
 c) VC^{-1}
 d) NC^{-1}

35. When an electric dipole of dipole moment \vec{P} is aligned parallel to the electric field \vec{E} then potential energy of the dipole is given as

- a) pE b) zero c) $-pE$ d) $\frac{pE}{\sqrt{2}}$

36. The capacitance of a parallel plate capacitor increases from $5 \mu F$ to $50 \mu F$ when a dielectric is filled between the plates. The dielectric constant of dielectric is

- a) 65 b) 55 c) 12 d) 10

OCTOBER - 2008

37. The unit of permittivity

- a) $C^2 N^{-1} m^{-2}$ b) $N m^2 C^{-2}$ c) $H m^{-1}$ d) $N C^{-2} m^{-2}$

38. Quantisation of electric charge is given by

- a) $q = ne$ b) $q = CV$ c) $q = e/n$ d) $q = C/V$

39. An example of conductor is

- a) Glass b) Human body c) dry wood d) ebonite

40. A dipole placed in a non uniform electric field with its axis at an angle θ with the field experience

- a) Only a net force b) only a torque
c) Both a net force and a torque d) neither a net force nor a torque

MARCH - 2009

41. Which of the following quantities is a scalar?

- a) Electric force b) electric field c) dipole moment d) electric potential

42. The unit of electric field intensity is

- a) NC b) NC^{-1} c) Vm d) NC^{-2}

43. The magnitude of the force acting on a charge of $2 \times 10^{-10} C$ placed in a uniform electric field of $10 V m^{-1}$ is

- a) $2 \times 10^{-9} N$ b) $4 \times 10^{-9} N$ c) $2 \times 10^{-10} N$ d) $4 \times 10^{-10} N$

44. Electric potential energy (U) of two point charges is

- a) $\frac{q_1 q_2}{4\pi\epsilon_0 r^2}$ b) $\frac{q_1 q_2}{4\pi\epsilon_0 r}$ c) $pE \cos\theta$ d) $pE \sin\theta$

JUNE - 2009

45. Torque experienced by a dipole placed in a uniform electric field (\vec{E}) at an angle θ with the field

- a) $pE \cos\theta$ b) $-pE \cos\theta$ c) $pE \sin\theta$ d) $2 pE \sin\theta$

46. The unit of electric flux is

- a) $C^2 N^{-1} m^2$ b) $N m^2 C^{-1}$ c) $C^2 N^{-1} m^{-2}$ d) $NC^{-1} m^{-2}$

47. The capacitance of a parallel plate capacitor increases from $5 \mu F$ to $50 \mu F$ when a dielectric is filled between the plates. The permittivity of the dielectric is

- a) $8.854 \times 10^{-12} C^2 N^{-1} m^{-2}$ b) $8.854 \times 10^{-11} C^2 N^{-1} m^{-2}$ c) 12 d) 10

48. The negative gradient of the potential is

- a) Electric force b) torque c) electric current d) electric field intensity.

OCTOBER - 2009

49. When a point charge of $6 \mu C$ is moved between two points in an electric field, the work done is $1.8 \times 10^{-5} J$. The potential between the two points is

- a) 1.08 V b) $1.08 \mu V$ c) 3 V d) 30 V

50. The electric field outside the two oppositely charged plane sheets each of charge density σ is

- a) $\sigma / 2\epsilon_0$ b) $-\sigma / 2\epsilon_0$ c) σ / ϵ_0 d) zero

51. Torque on dipole in a uniform electric field is maximum when the angle \vec{p} & \vec{E}

- a) 0° b) 90° c) 45° d) 180°

52. The equivalent capacitance of two capacitors in series is $1.5 \mu F$. The capacitance of one of them is $4 \mu F$. The value of capacitance of the other is

- a) $2.4 \mu F$ b) $2 \mu F$ c) $4 \mu F$ d) $6 \mu F$

MARCH - 2010

53. A hollow metallic spherical shell carrying an electric charge produces no electric field at points

- a) On the surface of the sphere b) inside the sphere
c) At infinite distance from the centre of the sphere d) outside the sphere

54. The work done in moving $500 \mu C$ charge between two points on equipotential surface is

- a) Zero b) finite positive c) finite negative d) infinite

55. Three capacitors of capacitances $1\mu F$, $2\mu F$, and $3\mu F$ are connected in series. The effective capacitance of the capacitors is
 a) $6\mu F$ b) $\frac{11}{6}\mu F$ c) $\frac{6}{11}\mu F$ d) $\frac{1}{6}\mu F$
56. An electric dipole moment \vec{p} is placed in a uniform electric field of intensity \vec{E} at an angle θ with respect to the field. The direction of the torque is
 a) Along the direction of \vec{p} b) opposite the direction of \vec{p}
 c) Along the direction of \vec{E} d) perpendicular to the plane containing \vec{p} and \vec{E}

JUNE - 2010

57. The electric field intensity at a distance r due to infinitely long straight charged wire is directly proportional to
 a) r b) $\frac{1}{r}$ c) r^2 d) $\frac{1}{r^2}$
58. The work done in moving $500\mu C$ charge between two points on equipotential surface is
 a) zero b) finite positive c) finite negative d) infinite
59. Electric potential energy (U) of two point charges is
 a) $\frac{q_1q_2}{4\pi\epsilon_0r^2}$ b) $\frac{q_1q_2}{4\pi\epsilon_0r}$ c) $p E \cos \theta$ d) $p E \sin \theta$
60. The ratio of electric potential at points 10 cm and 20 cm from the centre of an electric dipole along its axial line is
 a) $1 : 2$ b) $2 : 1$ c) $1 : 4$ d) $4 : 1$

OCTOBER - 2010

61. Which of the following quantities is scalar?
 a) Dipole moment b) electric force c) electric field d) electric potential
62. The capacitance of a parallel plate capacitor increases from $5\mu F$ to $60\mu F$ when a dielectric is filled between the plates. The dielectric constant of the dielectric is
 a) 65 b) 55 c) 12 d) 10
63. The intensity of electric field at a point is equal to
 a) the force experienced by a charge q
 b) the work done in bringing unit positive charge from infinity to that point
 c) the positive gradient of the potential d) the negative gradient of the potential
64. The capacitance of a capacitor is
 a) directly proportional to the charge q given to it
 b) inversely proportional to its potential V .
 c) directly proportional to the charge q and inversely proportional to the potential V
 d) independent of both the charge q and potential V

MARCH - 2011

65. The electric field outside the plates of two oppositely charge plane sheets of charge density σ is
 a) $\sigma / 2\epsilon_0$ b) $-\sigma / 2\epsilon_0$ c) σ / ϵ_0 d) zero
66. The intensity of the electric field that produces a force of 10^{-5} N on a charge of $5\mu C$ is
 a) $5 \times 10^{-11}\text{ N C}^{-1}$ b) 50 N C^{-1} c) 2 N C^{-1} d) 0.5 N C^{-1}
67. The unit of the number of electric lines of force passing through a given area is
 a) No unit b) N C^{-1} c) $\text{N m}^2\text{ C}^{-1}$ d) Nm
68. If a point lies at a distance x from the midpoint of the dipole, the electric potential at this point is proportional to
 a) $\frac{1}{x^2}$ b) $\frac{1}{x^3}$ c) $\frac{1}{x^4}$ d) $\frac{1}{x^{3/2}}$

JUNE - 2011

69. The electric field outside the plates of two oppositely charge plane sheets of charge density σ is
 a) $+\sigma / 2\epsilon_0$ b) $-\sigma / 2\epsilon_0$ c) σ / ϵ_0 d) zero
70. The unit of permittivity
 a) $\text{C}^2\text{N}^{-1}\text{m}^{-2}$ b) Nm^2C^{-2} c) Hm^{-1} d) $\text{NC}^{-2}\text{m}^{-2}$
71. A dielectric medium is placed in an electric field E_0 . The field inside the medium
 a) acts in the direction of the electric field E_0 b) acts opposite to E_0
 c) acts perpendicular to E_0 d) is zero

72. Electric potential energy (U) of two point charges is

- a) $\frac{q_1 q_2}{4\pi\epsilon_0 r^2}$ b) $\frac{q_1 q_2}{4\pi\epsilon_0 r}$ c) $p E \cos \theta$ d) $p E \sin \theta$

OCTOBER - 2011

73. A non polar dielectric is placed in an electric field (E). Its induced dipole moment

- a) is zero b) acts in the direction of E
c) acts opposite the direction of E d) acts perpendicular to E

74. The work done in moving $500 \mu C$ charge between two points on equipotential surface is

- a) zero b) finite positive c) finite negative d) infinite

75. Which of the following quantities is a scalar?

- a) dipole moment b) Electric force c) electric field d) electric potential

76. n capacitors each of capacitance C are connected in series. The effective capacitance is

- a) n/C b) C/n c) nC d) C

MARCH - 2012

77. When the charge given to a capacitor is doubled, its capacitance

- a) increases twice b) decreases twice c) Increases four times d) does not change

78. The value of relative permittivity of air is

- a) $8.854 \times 10^{-12} C^2 N^{-1} m^{-2}$ b) $9 \times 10^9 C^2 N^{-1} m^{-2}$ c) 1 d) 8.854×10^{12}

79. The work done in moving $500 \mu C$ charge between two points on equipotential surface is

- a) zero b) finite positive c) finite negative d) infinite

80. A hollow metal ball carrying an electric charge produces no electric field at points

- a) outside the sphere b) on its surface
c) inside the sphere d) at a distance more than twice

JUNE - 2012

81. Electric field intensity is $400 V m^{-1}$ at a distance $2 m$ from a point charge. It will be $100 V m^{-1}$ at a distance

- a) 50 cm b) 4 cm c) 4 m d) 15 m

82. The work done in moving $50 \mu C$ charge between two points on equipotential surface is

- a) zero b) finite positive c) finite negative d) infinite

83. The unit of relative permittivity is

- a) $C^2 N^{-1} m^{-2}$ b) $N m^2 C^{-2}$ c) No unit d) $N C^{-2} m^{-2}$

84. The electric field intensity at a short distance r from uniformly charged infinite plane sheet of charge is

- a) proportional to r b) proportional to $1/r$
c) proportional to $1/r^2$ d) independent of r

LESSON - 2 - CURRENT ELECTRICITY (1 question)

MODEL QUESTION PAPER

1. In the case of insulators, as the temperature decreases, resistivity

- a) Increases b) decreases c) becomes zero d) remains constant

MARCH - 2006

2. Resistance of a metal wire of length $10 cm$ is 2Ω . If the wire is stretched uniformly to $50 cm$, the resistance is

- a) 25Ω b) 10Ω c) 5Ω d) 50Ω

JUNE - 2006

3. The colour code on a carbon resistor is red-red-black. The resistance of the resistor is

- a) 2.2Ω b) 22Ω c) 220Ω d) $2.2 k\Omega$

OCTOBER - 2006

4. A copper wire has a resistance R . on doubling its length, the specific resistance

- a) will be doubled b) will be halved c) will become four times d) will remain the same

MARCH- 2007

5. The brown ring at one end of a carbon resistor indicates a tolerance of
 a) 1% b) 2 % c) 5 % d) 10 %

JULY - 2007

6. The unit of conductivity is
 a) mho b) ohm c) ohm – m d) mho – m⁻¹

SEPTEMBER- 2007

7. The material through which electric charge can flow easily is
 a) Quartz b) mica c) germanium d) copper

MARCH - 2008

8. In the case of insulators, as the temperature decreases, resistivity
 a) Increases b) decreases c) becomes zero d) remains constant

JUNE - 2008

9. If the length of a copper wire has a certain resistance R , then on doubling the length, its specific resistance
 a) Will be doubled b) will become $1/4$ th
 c) will become four times d) will remain the same

OCTOBER - 2008

10. When two $2\ \Omega$ resistances are in parallel their effective resistance is
 a) $2\ \Omega$ b) $4\ \Omega$ c) $1\ \Omega$ d) $0.5\ \Omega$

MARCH - 2009

11. In the case of insulators, as the temperature decreases, resistivity
 a) decreases b) increases c) remains constant d) becomes zero

JUNE - 2009

12. The transition temperature of mercury is
 a) 4.2°C b) $4.2\ \text{K}$ c) 2.4°C d) $2.4\ \text{K}$

OCTOBER - 2009

13. If the length of a copper wire has a certain resistance R , then on doubling the length, its specific resistance
 a) Will be doubled b) will become $1/4$ th c) will become 4 times d) will remain the same

MARCH - 2010

14. If the length of a copper wire has a certain resistance R , then on doubling the length, its specific resistance
 a) Will be doubled b) will become $1/4$ th c) will become four times d) will remain the same

JUNE - 2010

15. A toaster operating at $240\ \text{V}$ has a resistance of $120\ \Omega$. The power is
 a) $400\ \text{W}$ b) $2\ \text{W}$ c) $480\ \text{W}$ d) $240\ \text{W}$

OCTOBER - 2010

16. The relation between current and drift velocity is
 a) $I = \frac{nAv_d}{e}$ b) $I = nAv_d e$ c) $I = \frac{nev_d}{A}$ d) $I = nAv_d E$

MARCH - 2011

17. If the length of the copper wire has a certain resistance R , then on doubling the length its specific resistance
 a) Will be doubled b) will become $\frac{1}{4}$ th c) will become 4 times d) will remain the same

JUNE - 2011

18. When two $2\ \Omega$ resistances are in parallel their effective resistance is
 a) $2\ \Omega$ b) $4\ \Omega$ c) $1\ \Omega$ d) $0.5\ \Omega$

OCTOBER- 2011

19. If the length of the copper wire has a certain resistance R , then on doubling the length its specific resistance
 a) Will be doubled b) will become $\frac{1}{4}$ th c) will become 4 times d) will remain the same

MARCH - 2012

20. When the diameter of a conductor is doubled, its resistance
- decreases twice
 - decreases four times
 - decreases sixteen times
 - increases four times

JUNE - 2012

21. A cell of emf 2.2 V sends a current of 0.2 A through a resistance of 10Ω . The internal resistance of the cell is
- 0.1Ω
 - 1Ω
 - 2Ω
 - 1.33Ω

LESSON - 3 - EFFECTS OF ELECTRIC CURRENT (2 questions)**MODEL QUESTION PAPER**

1. In a tangent galvanometer for a constant current the deflection is 30° . The plane of the coil is rotated through 90° . Now for the same current the deflection will be
- 0°
 - 30°
 - 60°
 - 90°
2. In a thermocouple, the temperature of the cold junction is 20°C , the temperature of inversion is 520°C , The neutral temperature is
- 500°C
 - 540°C
 - 270°C
 - 510°C

MARCH - 2006

3. The unit of reduction factor of tangent galvanometer is
- No unit
 - tesla
 - ampere
 - ampere/ degree
4. A galvanometer is converted into a voltmeter by connecting a
- Low resistance in series
 - high resistance in parallel
 - High resistance in series
 - low resistance in parallel

JUNE - 2006

5. Nichrome is used as heating element because it has
- Very low resistance
 - low melting point
 - high specific resistance
 - high conductivity
6. Of the following devices which has small resistance?
- Voltmeter
 - Ammeter of range of $0 - 10 \text{ A}$
 - Moving coil galvanometer
 - Ammeter of range $0 - 1 \text{ A}$

OCTOBER - 2006

7. In a thermocouple, the temperature of the cold junction is 20°C , the inversion temperature is 600°C , then the neutral temperature is -----
- 310°C
 - 320°C
 - 300°C
 - 315°C
8. In a tangent galvanometer a current 1 A , produces a deflection of 30° . The current required to produce a deflection of 60° is
- 3 A
 - 2 A
 - $\sqrt{3} \text{ A}$
 - $\frac{1}{\sqrt{3}} \text{ A}$

MARCH - 2007

9. Peltier effect is the converse of
- Joule effect
 - Raman Effect
 - Thomson effect
 - Seebeck effect
10. The torque experienced by a rectangular current loop placed perpendicular to the uniform magnetic field is
- Maximum
 - zero
 - finite maximum
 - infinity

JUNE - 2007

11. In a tangent galvanometer, for a constant current, the deflection is 30° . The plane of the coil is rotated through 90° . Now for the same current, the deflection will be
- 30°
 - 60°
 - 90°
 - 0°
12. In which of the following pairs of metals of a thermocouple the emf is maximum ?
- Fe - Cu
 - Cu - Zn
 - Pt - Ag
 - Sb - Bi

SEPTEMBER - 2007

13. Which of the following principles is used in a thermopile?
- Thomson effect
 - Peltier effect
 - Seebeck effect
 - Joule's effect

14. An ideal voltmeter has
 a) Zero resistance
 b) finite resistance between zero and G
 c) Resistance greater than G but less than infinity
 d) infinite resistance

MARCH - 2008

15. Joule's law of heating is
 a) $H = \frac{I^2}{R} t$
 b) $H = V^2 R t$
 c) $H = I R^2 t$
 d) $H = V I t$

16. Fuse wire is an alloy of
 a) Lead and Tin
 b) Tin and Copper
 c) Lead and Copper
 d) Lead and Iron

JUNE - 2008

17. Nichrome is used as heating element because it has
 a) very low resistance
 b) low melting point
 c) high specific resistance
 d) high conductivity
18. In a thermocouple, the temperature of the cold junction is 20°C, the neutral temperature is 270°C, The temperature of inversion is
 a) 520°C
 b) 540°C
 c) 500°C
 d) 510°C

OCTOBER - 2008

19. In a thermocouple, the temperature of the cold junction is 20°C, the neutral temperature is 270°C, the temperature of inversion is
 a) 520°C
 b) 540°C
 c) 500°C
 d) 510°C
20. Thermopile is used to
 a) Measure temperature
 b) measure current
 c) detect thermal radiation
 d) measure pressure

MARCH - 2009

21. Of the following devices, which has small resistance ?
 a) Voltmeter
 b) Moving coil galvanometer
 c) Ammeter range of 0 – 1 A
 d) Ammeter range of 0 – 10 A
22. The resistance of the filament of a 110 W, 220 V electric bulb is
 a) 440 Ω
 b) 220 Ω
 c) 484 Ω
 d) 848 Ω

JUNE - 2009

23. Peltier coefficient at a junction of a thermocouple depends on
 a) The current in the thermocouple
 b) the time for which current flows
 c) The temperature of the junction
 d) the change that passes through the thermocouple
24. The magnitude and direction of the magnitude Lorentz force is given by
 a) $\vec{F} = (\vec{v} \times \vec{B})$
 b) $\vec{F} = q/(\vec{v} \times \vec{B})$
 c) $\vec{F} = q(\vec{v} \times \vec{B})$
 d) $\vec{F} = v(\vec{q} \times \vec{B})$

OCTOBER - 2009

25. Phosphor - bronze wire is used for suspension in a moving coil galvanometer because it has
 a) High conductivity
 b) high resistivity
 c) Large couple per unit twist
 d) small couple per unit twist.
26. Unit of Peltier coefficient is
 a) ohm
 b) mho
 c) volt
 d) ampere

MARCH - 2010

27. Which of the following equations represents Biot - Savart law ?
 a) $d\vec{B} = \frac{\mu_0 I dl}{4\pi r^2}$
 b) $d\vec{B} = \frac{\mu_0 I dl \sin \theta}{4\pi r^2}$
 c) $d\vec{B} = \frac{\mu_0 I d\vec{l} \times \vec{r}}{4\pi r^2}$
 d) $d\vec{B} = \frac{\mu_0 I d\vec{l} \times \vec{r}}{4\pi r^3}$

28. In a thermocouple, the temperature of the cold junction is 20°C, the neutral temperature is 270°C, The temperature of inversion is
 a) 520°C
 b) 540°C
 c) 500°C
 d) 510°C

JUNE - 2010

29. For a given thermocouple the neutral temperature
 a) depends upon the temperature of the cold junction
 b) depends upon the temperature of hot junction
 c) is a constant
 d) depends upon the temperature upon the cold junction and the temperature of the hot junction.

30. An ideal voltmeter has
 a) Zero resistance
 b) finite resistance less than G but greater than zero
 c) resistance greater than G but less than infinity
 d) infinite resistance.

OCTOBER - 2010

31. Peltier coefficient at a junction of a thermocouple depends on
 a) The current in the thermocouple
 b) the time for which current flows
 c) The temperature of the junction
 d) the charge that passes through the thermocouple
32. When the number of turns (N) in a galvanometer is doubled current sensitivity
 a) remains constant
 b) decreases twice
 c) increases twice
 d) increases four times

MARCH - 2011

33. The period of revolution of a charged particle inside a cyclotron does not depend on
 a) The magnetic induction
 b) the charge of the particle
 c) the velocity of the particle
 d) the mass of the particle
34. An electron is moving with a velocity of $3 \times 10^6 \text{ m s}^{-1}$ perpendicular to a uniform magnetic field of induction 0.5 T . The force experienced by the electron is
 a) $2.4 \times 10^{-13} \text{ N}$
 b) $13.6 \times 10^{-27} \text{ N}$
 c) $13.6 \times 10^{-11} \text{ N}$
 d) zero

JUNE - 2011

35. An ideal voltmeter has
 a) Zero resistance
 b) finite resistance less than G but greater than zero
 c) resistance greater than G but less than infinity
 d) infinite resistance.
36. Magnetic induction due to an infinity long straight conductor placed in a medium of permeability $\mu_0 \mu_r$
 a) $\frac{\mu_0 I}{4\pi a}$
 b) $\frac{\mu_0 I}{2\pi a}$
 c) $\frac{\mu I}{4\pi a}$
 d) $\frac{\mu I}{2\pi a}$

OCTOBER - 2011

37. Fuse wire
 a) is an alloy of lead and copper
 b) has low resistance
 c) has high resistance
 d) has high melting point
38. In a thermocouple, the temperature of the cold junction is -30°C , the neutral temperature is 270°C , The temperature of inversion is
 a) 520°C
 b) 540°C
 c) 500°C
 d) 570°C

MARCH - 2012

39. Nichrome wire is used as heating element because it has
 a) low specific resistance
 b) low melting point
 c) high specific resistance
 d) high conductivity
40. Which of the following produces large Joule heating effect?
 a) 1 A current through 2Ω resistor for 3 second
 b) 1 A current through 3Ω resistor for 2 second
 c) 2 A current through 1Ω resistor for 2 second
 d) 3 A current through 1Ω resistor for 1 second

JUNE - 2012

41. Peltier coefficient at a junction of a thermocouple depends on the
 a) current in the thermocouple
 b) time for which current flows
 c) temperature of the junction
 d) charge that passes through the thermocouple
42. Of the following devices, which has small resistance ?
 a) Moving coil galvanometer
 b) range of $0 - 1 \text{ A}$ ammeter
 c) $0 - 10 \text{ A}$ ammeter
 d) Voltmeter

4. ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT (4 questions)**MODEL QUESTION PAPER**

1. Electromagnetic induction is not used in
 a) Transformer
 b) room heater
 c) AC generator
 d) choke coil
2. Which of the following devices does not allow d.c. to pass through?
 a) Resistor
 b) capacitor
 c) inductor
 d) all the above
3. The unit of henry can also be written as
 a) $\text{VA}^{-1} \text{ s}$
 b) $\Omega \text{ s}$
 c) wbA^{-1}
 d) all

4. In an AC circuit, the current $I = I_0 \sin\left(\omega t - \frac{\pi}{2}\right)$ lags behind the emf $e = E_0 \sin\left(\omega t + \frac{\pi}{2}\right)$ by

- a) 0 b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) π

MARCH - 2006

5. The existence power consumed over one cycle in an AC circuit is

- a) $E_{\text{rms}} I_{\text{rms}}$ b) $E_{\text{rms}} I_{\text{rms}} \cos \phi$ c) $E_{\text{rms}} I_{\text{rms}} \sin \phi$ d) $E_0 I_0 \cos \phi$

6. Electromagnetic induction is not used in

- a) transformer b) room heater c) AC generator d) choke coil

7. An angle between the area vector \vec{A} and the plane of the area A is

- a) π b) 2π c) $\frac{\pi}{2}$ d) zero

8. If the flux associated with a coil varies at the rate of 1wb/ minute then the induced *e.m.f.* is

- a) 1 V b) $\frac{1}{60}$ V c) 60 V d) 0.60 V

JUNE - 2006

9. In LCR series a.c circuit, the phase difference between current and voltage is 30° . The reactance of the circuit is 17.32Ω . The value of resistance is

- a) 30Ω b) 10Ω c) 17.32Ω d) 1.732Ω

10. An emf of 12 V is induced when the current in the coil changes from 2 A to 6 A in 0.5 s. The coefficient of self - induction of the coil is

- a) 1.5 H b) 6 H c) 0.3 H d) 30 H

11. In an a.c. circuit with an inductor

- a) voltage lags current by $\frac{\pi}{2}$ b) voltage and current are in phase
c) voltage leads current by π d) current lags voltage by $\frac{\pi}{2}$

12. The unit of henry can also be written as

- a) VA s^{-1} b) $\text{wb}^{-1} \text{A}$ c) Ωs d) all of these

OCTOBER - 2006

13. In a step up transformer the input voltage is 220 V and the output voltage is 11 kV. The ratio of number of turns of primary to secondary is

- a) 50 : 1 b) 1 : 50 c) 25 : 1 d) 1 : 25

14. The generator rule is

- a) Fleming's left hand rule b) Fleming's right hand rule
c) Maxwell's right hand cork screw rule d) right hand palm rule

15. The power loss is less in transmission line when

- a) Voltage is less but current is more b) both voltage and current are more
c) voltage is more and current is less d) both voltage and current is less

16. In an AC circuit, the current $I = I_0 \sin\left(\omega t - \frac{\pi}{2}\right)$ lags behind the emf $e = E_0 \sin\left(\omega t + \frac{\pi}{2}\right)$ by

- a) 0 b) $\frac{\pi}{4}$ c) $\frac{\pi}{2}$ d) π

MARCH - 2007

17. Transformer works on

- a) both AC and DC b) AC more effectively than DC c) AC only d) DC only

18. Lenz's law is in accordance with the law of

- a) conservation of energy b) conservation of charge
c) conservation of momentum d) conservation of angular momentum

19. The self inductance of a straight conductor is

- a) zero b) infinity c) very large d) very small

20. In LCR circuit when $X_L = X_C$, the current

- a) is zero b) is in phase with the voltage c) leads the voltage d) lags behind the voltage

JUNE - 2007

21. The generator rule is

- a) Fleming's left hand rule b) Fleming's right hand rule
c) Maxwell's right hand cork screw rule d) Ampere's swimming rule

22. In an AC circuit with capacitor only, if the frequency of the signal is zero, then the capacitive reactance is
 a) infinity b) zero c) finite maximum d) finite minimum
23. Electromagnetic induction is not used in
 a) Transformer b) room heater c) AC generator d) choke coil
24. In a step up transformer the output voltage is $11kV$ input voltage is $220V$. The ratio of number of turns of secondary to primary is
 a) 20 : 1 b) 22 : 1 c) 50 : 1 d) 1 : 50

SEPTEMBER - 2007

25. Transformer works on
 a) both AC and DC b) AC more effectively than DC c) AC only d) DC only
26. The reactance offered by $300mH$ inductor to an AC supply of frequency $50Hz$ is
 a) 1046Ω b) 94.2Ω c) 9420Ω d) 104.6Ω
27. The r.m.s. value of an AC voltage with a peak value of $311V$ is
 a) $110V$ b) $220V$ c) $50V$ d) $70.7V$
28. The core used in audio frequency chokes is
 a) iron b) carbon c) lead d) steel

MARCH - 2008

29. Electromagnetic induction is not used in
 a) Transformer b) room heater c) AC generator d) choke coil
30. Lenz's law is in accordance with the law of
 a) conservation of energy b) conservation of charge
 c) conservation of momentum d) conservation of angular momentum
31. In a transformer, eddy current loss is minimized by using
 a) Laminated core made of Mumetal b) laminated core made of stelloy
 c) Shell type core d) thick copper wires
32. A power of $11,000W$ is transmitted at $220V$, the current through line wires is
 a) $50A$ b) $5A$ c) $500A$ d) $0.5A$

JUNE - 2008

33. Electromagnetic induction is not used in
 a) Transformer b) room heater c) AC generator d) choke coil
34. Which of the following cannot stepped up in a transformer?
 a) Input current b) input voltage c) Input power d) all of these
35. For a d.c. circuit, the value of capacitive reactance (X_c) is
 a) zero b) infinity c) $\pi/2$ d) π
36. The Q - factor (quality factor) of an a.c. circuit containing a resistance R , inductance L and capacitor C is
 a) $Q = \frac{1}{\sqrt{LC}}$ b) $Q = \frac{1}{R} \sqrt{\frac{C}{L}}$ c) $Q = \frac{1}{R} \sqrt{\frac{L}{C}}$ d) $Q = \frac{1}{\sqrt{LR}}$

OCTOBER - 2008

37. In a three phase AC generator the three coils are fastened rigidly together and are displaced from each other by an angle
 a) 90° b) 180° c) 120° d) 360°
38. A DC of $5A$ produces the same heating effect of an AC of
 a) $50A$ rms current b) $5A$ peak current c) $5Arms$ current d) $5\sqrt{2}A$ peak current
39. Electromagnetic induction is not used in
 a) Transformer b) room heater c) AC generator d) choke coil
40. InRLC series, at resonance
 a) current is minimum b) impedance is maximum
 c) current is purely inductive d) current is in phase with the voltage

MARCH - 2009

41. The self inductance of a straight conductor is
 a) Zero b) infinity c) very large d) very small
42. A DC (direct current) of $5A$ produces the same heating effect of as an AC (alternating current) of
 a) $50Arms$ current b) $5A$ peak current c) $15Arms$ current d) noneofthese

43. The Q - factor of a series resonance circuit

- a) $Q = \frac{1}{L} \sqrt{\frac{R}{C}}$ b) $Q = \frac{1}{R} \sqrt{\frac{L}{C}}$ c) $Q = \frac{1}{R} \sqrt{\frac{C}{L}}$ d) $Q = \frac{1}{C} \sqrt{\frac{L}{R}}$

44. In an AC circuit

- a) The average value of current is zero b) the average value of square of current is zero
c) The average power dissipation is zero d) the rms current is $\sqrt{2}$ times of peak current

JUNE - 2009

45. An angle between the area vector \vec{A} and the plane of the area A is

- a) $\frac{\pi}{2}$ b) π c) 2π d) zero

46. Which of the following devices does not allow the direct current (DC) to pass through?

- a) Capacitor b) inductor c) Resistor d) all the above

47. Electromagnetic induction is not used in

- a) Transformer b) room heater c) choke coil d) AC generator

48. A coil of area of cross section $0.5m^2$ with 10 turns is in a plane which is perpendicular to a uniform magnetic field of $0.2 \text{ wb}/m^2$. The magnetic flux through the coil is

- a) 100 wb b) 10 wb c) 1 wb d) zero

OCTOBER - 2009

49. In LCR series circuit, at resonance

- a) impedance (z) is maximum b) current is minimum
c) impedance (z) is equal to R d) $v_o = \frac{1}{\sqrt{LC}}$

50. An *e.m.f.* of 12 V is induced when the current in the coil changes at the rate of 40 A s^{-1} . The coefficient of self induction of the coil is

- a) 0.3 H b) 0.003 H c) 30 H d) 4.8 H

51. Which of the following cannot stepped up in a transformer?

- a) Input current b) input voltage c) Input power d) all of these

52. The core used in audio frequency chokes is

- a) Iron b) carbon c) lead d) air

MARCH - 2010

53. A coil of area of cross section $0.5m^2$ with 10 turns is in a plane which is parallel to a uniform magnetic field of $0.2 \text{ wb}/m^2$. The magnetic flux through the coil is

- a) 100 wb b) 10 wb c) 1 wb d) zero

54. Which of the following devices does not allow the direct current (d.c.) to pass through?

- a) Resistor b) capacitor c) inductor d) all the above

55. The part of the A.C. generator that passes the current from the coil to the external circuit is

- a) Field magnet b) split rings c) slip rings d) brushes

56. The *r.m.s.* value of the alternating current (AC) flowing through a resistor is 5 A. Its peak value is

- a) 3.536 A b) 70.7 A c) 7.07 A d) 7 A

JUNE - 2010

57. The self inductance of a straight conductor is

- a) Zero b) infinity c) very large d) very small

58. Transformer works on

- a) AC only b) DC only c) both AC and DC d) AC more effectively than DC

59. The effective value of alternating current is

- a) $\frac{I_o}{2}$ b) $\frac{I_o}{\sqrt{2}}$ c) $I_o \sqrt{2}$ d) $2 I_o$

60. In an A.C. circuit average power consumed is 200 W and the apparent power is 300 W. The power factor is

- a) 1.5 b) 0.66 c) 0.33 d) 1

OCTOBER - 2010

61. An emf of 12 V is induced when the current in the coil changes at the rate of 40 A s^{-1} . The coefficient of self induction of the coil is

- a) 0.3 H b) 0.003 H c) 30 H d) 4.8 H

62. A rectangular coil is uniformly rotated in a uniform magnetic field such that the axis of rotation is perpendicular to the direction of the magnetic field. When the plane of the coil is perpendicular to the magnetic field
- a) (i) magnetic flux is zero (ii) induced emf is zero
 b) (i) magnetic flux is maximum (ii) induced emf is maximum
 c) (i) magnetic flux is maximum (ii) induced emf is zero
 d) (i) magnetic flux is zero (ii) induced emf is maximum
63. Which of the following devices does not allow d.c to pass through?
 a) resistor b) capacitor c) inductor d) all the above
64. In a series LCR circuit, at resonance
 a) $X_L = X_C$ b) $X_L > X_C$ c) $X_L < X_C$ d) $\omega = 1/LC$
- MARCH - 2011**
65. Lenz's law is in accordance with the law of
 a) Conservation of charges b) conservation of flux
 c) conservation of momentum d) conservation of energy.
66. Transformer works on
 a) AC only b) DC only c) both AC and DC d) AC more effectively than DC
67. In an AC circuit the voltage leads the current by a phase of $\pi/2$, then the circuit has
 a) Only an inductor (L) b) Only a capacitor (C)
 c) Only a resistor (R) d) L, C, and R in series
68. An emf of 12 V is induced when the current in the coil changes at the rate of 40As^{-1} . The coefficient of self induction of the coil is
 a) 30 H b) 0.003H c) 4.8 H d) 0.3 H
- JUNE - 2011**
69. The unit of henry can also be written as
 a) VA^{-1}s b) Ωs c) wbA^{-1} d) all
70. Which of the following devices does not allow d.c to pass through?
 a) resistor b) capacitor c) inductor d) all the above
71. The resonant frequency of RLC circuit is ν_0 . The inductance is doubled. The capacitance is also doubled. Now the resonant frequency of the circuit is
 a) $2\nu_0$ b) $\nu_0/2$ c) $\nu_0/4$ d) $\nu_0/\sqrt{2}$
72. When the frequency of an a.c. circuit increases, the capacitive reactance offered by capacitor connected in the circuit
 a) increases b) decreases c) remains the same d) becomes zero
- OCTOBER - 2011**
73. Electromagnetic induction is not used in
 a) Transformer b) room heater c) choke coil d) AC generator
74. The unit of henry can also be written as
 a) Vs A^{-1} b) wbA^{-1} c) Ωs d) all of these
75. In an ac circuit
 a) the average value of current is zero
 b) the average value of square of current is zero
 c) the average power dissipation is zero
 d) therms current is $\sqrt{2}$ time of peak current.
76. The self inductance of a straight conductor is
 a) zero b) infinity c) very large d) very small
- MARCH - 2012**
77. Lenz's law is in accordance with the law of
 a) Conservation of charges b) conservation of flux
 c) conservation of momentum d) conservation of energy.
78. The r.m.s. value of an AC voltage with a peak of 311 V is
 a) 220 V b) 311 V c) 180 V d) 320 V
79. Which of the following devices does not allow d.c to pass through?
 a) resistor b) capacitor c) inductor d) all the above

80. Electromagnetic induction is not used in
 a) Transformer b) room heater c) AC generator d) choke coil
- JUNE - 2012**
81. Electromagnetic induction is not used in
 a) Transformer b) room heater c) AC generator d) choke coil
82. The self inductance of a straight conductor is
 a) zero b) infinity c) very large d) very small
83. Which of the following devices does not allow D.C to pass through?
 a) resistor b) inductor c) capacitor d) all the above
84. Lenz's law is in accordance with the law of
 a) Conservation of charges b) conservation of flux
 c) conservation of momentum d) conservation of energy.

5. ELECTROMAGNETIC WAVES AND WAVE OPTICS (4 questions)

MODEL QUESTION PAPER

1. In an electromagnetic wave the phase difference between electric field \vec{E} and magnetic field \vec{B} is
 a) $\pi / 4$ b) $\pi / 2$ c) π d) zero
2. Of the following, which one is a biaxial crystal?
 a) Tourmaline b) Ice c) Calcite d) Mica
3. If the wavelength of the light is reduced to one fourth, then the amount of scattering is
 a) Increased by 16 times b) decreased by 16 times
 c) increased by 256 times d) decreased by 256 times
4. A Nicol prism is based on the principle of
 a) refraction b) Reflection c) double refraction d) diffraction

MARCH - 2006

5. The existence of electromagnetic waves was confirmed by
 a) Hertz b) Maxwell c) Huygens d) Plank
6. When a drop of water is introduced between the glass plate and Plano convex lens in Newton's rings system, the ring system
 a) contracts b) expands c) remains same d) first expands, then contracts
7. When a ray of light is incident on a glass surface at polarising angle of 57.5° , the angle between the incident ray and the reflected ray is
 a) 57.5° b) 32.5° c) 115° d) 90°
8. Unpolarised light passes through a tourmaline crystal. The emergent light is analysed by an analyser. When the analyser is rotated through 90° , the intensity of light
 a) remains uniformly bright b) remains uniformly dark
 c) varies between maximum to minimum d) varies between maximum to zero

JUNE - 2006

9. In an electromagnetic wave the phase difference between electric field \vec{E} and magnetic field \vec{B} is
 a) $\pi / 4$ b) $\pi / 2$ c) π d) zero
10. Velocity of the electromagnetic waves through vacuum is
 a) $\sqrt{\mu_0 \epsilon_0}$ b) $\frac{1}{\sqrt{\mu_0 \epsilon_0}}$ c) $\sqrt{\frac{\mu_0}{\epsilon_0}}$ d) $\sqrt{\frac{\epsilon_0}{\mu_0}}$
11. In a plane transmission grating, the unit of grating element is
 a) no unit b) metre c) metre^{-1} d) degree
12. A ray of light is incident on a glass plate at its polarizing angle. The angle between the incident ray and the reflected ray is
 a) 57.5° b) 32.5° c) 90° d) 115°

OCTOBER - 2006

13. Which one of the following is not an electromagnetic wave?
 a) X - rays b) γ - rays c) UV - rays d) β - rays

14. If C is the velocity of light in vacuum, the velocity of light in a medium with refractive index μ is
 a) μC b) $\frac{\mu}{C}$ c) $\frac{C}{\mu}$ d) $\frac{1}{\mu C}$
15. A ray of light passes from a denser medium into a rarer medium. For an angle of incidence of 45° , the refracted ray grazes the surface of separation of the two media. The refractive index of the denser medium is
 a) $\frac{3}{2}$ b) $\frac{1}{\sqrt{2}}$ c) $\sqrt{2}$ d) 2
16. Of the following, which one is a uniaxial crystal?
 a) Mica b) Aragonite c) Topaz d) Quartz
- MARCH - 2007**
17. The radiations used in physiotherapy are
 a) Ultra violet b) infra red c) radio waves d) microwaves
18. In Newton's rings experiment, light of wavelength 5890 \AA is used. The order of the dark ring produced where the thickness of the air film is $0.589 \mu\text{m}$ is
 a) 2 b) 3 c) 4 d) 5
19. Atomic spectrum should be
 a) Pure line spectrum b) emission band spectrum
 c) Absorption line spectrum d) absorption band spectrum
20. Of the following, optically active material is
 a) Sodium chloride b) calcium chloride c) sodium d) chlorine
- JUNE - 2007**
21. A diffraction pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light?
 a) Band disappears b) No change
 c) Diffraction pattern becomes narrower and crowded together
 d) Diffraction pattern becomes broader and farther apart
22. When a drop of water is introduced between the glass plate and Plano convex lens in Newton's rings system, the ring system
 a) contracts b) expands c) remains same d) first expands, then contracts
23. Electric filament lamp gives rise to
 a) Linespectrum b) continuous spectrum c) band spectrum d) line absorption spectrum
24. In Young's double slit experiment, the separation between the slits is halved, and the distance between the slits and the screen is doubled. Then the fringes width is
 a) Unchanged b) halved c) doubled d) quadrupled
- SEPTEMBER - 2007**
25. The phenomenon of light used in the formation of Newton's rings is
 a) Diffraction b) interference c) refraction d) polarisation
26. An example for uniaxial crystal is
 a) Tourmaline b) Mica c) Topaz d) Selenite
27. In Raman effect, the spectral line with lower frequency than the incident frequency is
 a) Fraunhofer line b) Rayleigh line c) Stokes' line d) Anti stokes' line
28. The optical rotation does not depend on
 a) Concentration of the solution b) frequency of the light used
 c) the temperature of the solution d) intensity of the light used
- MARCH - 2008**
29. Which of the following gives rise to continuous emission spectrum ?
 a) Electric filament lamp b) sodium vapour lamp
 c) gases in the discharge tube d) calcium salt in Bunsen flame
30. When a drop of water is introduced between the glass plate and Plano convex lens in Newton's rings system, the ring system
 a) contracts b) expands c) remains same d) first expands, then contracts

31. A light of wave length 6000 \AA is incident normally on a grating 0.005 m wide with 2500 lines. Then the maximum order is
 a) 3 b) 2 c) 1 d) 4
32. The transverse nature of light waves is demonstrated by the phenomenon
 a) interference b) diffraction c) polarisation d) reflection

JUNE - 2008

33. In an electromagnetic wave the phase difference between electric field \vec{E} and magnetic field \vec{B} is
 a) $\pi / 4$ b) $\pi / 2$ c) π d) zero
34. If the velocity of light in a medium is $2.25 \times 10^8 \text{ ms}^{-1}$ then the refractive index of the medium will
 a) 1.5 b) 0.5 c) 1.33 d) 1.73
35. A diffraction pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light?
 a) Band disappears b) Diffraction pattern becomes narrower and crowded together
 c) no change d) Diffraction pattern becomes broader and farther apart
36. The polarising angle for water is $53^\circ 4'$ if the light is incident at the angle on the surface of water, the angle of refraction in water is
 a) $53^\circ 4'$ b) $26^\circ 30'$ c) $30^\circ 4'$ d) $36^\circ 56'$

OCTOBER - 2008

37. In an electromagnetic wave the phase difference between electric field \vec{E} and magnetic field \vec{B} is
 a) $\pi / 4$ b) $\pi / 2$ c) π d) zero
38. The refractive index of the medium for the polarizing angle 60° is
 a) 1.732 b) 1.414 c) 1.5 d) 1.468
39. In Raman effect, if the scattered photon gains energy, it gives rise to
 a) Stokes' line b) Anti stokes' line c) Stokes' and Anti stokes' line d) Rayleigh line
40. In case of Fraunhofer diffraction, the wave front undergoing diffraction is
 a) Spherical wave front b) Cylindrical wave front
 c) elliptical wave front d) Plane wave front

MARCH - 2009

41. In an electromagnetic wave the phase difference between electric field \vec{E} and magnetic field \vec{B} is
 a) $\pi / 4$ b) $\pi / 2$ c) π d) zero
42. A ray of light is incident on a glass surface such that the reflected ray completely plane polarised. The angle between the reflected ray and the refracted ray is
 a) 57.5° b) 32.5° c) 90° d) 115°
43. Soap bubbles exhibit brilliant colours in sunlight due to
 a) scattering of light b) diffraction of light c) polarization of light d) interference of light
44. The radii of Newton's rings are in the ratio
 a) 1:2:3 b) $\sqrt{1} : \sqrt{2} : \sqrt{3}$ c) $\sqrt{1} : \sqrt{3} : \sqrt{5}$ d) 1 : 4 : 9

JUNE - 2009

45. In an electromagnetic wave
 a) power is equally transferred along the electric and magnetic fields
 b) power is transmitted in a direction perpendicular to both the fields
 c) power is transmitted along electric field d) power is transmitted along magnetic field
46. In the grating formula $\sin \theta = Nm \lambda$, the unit of N is
 a) metre b) metre^{-1} c) No unit d) $(\text{metre})^2$
47. If the wavelength of the light is reduced to one fourth, then the amount of scattering is
 a) Increased by 16 times b) decreased by 16 times
 c) Increased by 256 times d) decreased by 256 times
48. The ratio of the radii of the 4th and 9th dark rings in Newton's rings experiment is
 a) 4 : 9 b) 2 : 3 c) 16 : 81 d) $\sqrt{2} : \sqrt{3}$

OCTOBER - 2009

49. Electromagnetic waves are
 a) Transverse b) longitudinal
 c) may be longitudinal or transverse d) neither longitudinal nor transverse

50. In Newton ring experiment the radii of the m^{th} and $(m + 4)^{\text{th}}$ dark rings are respectively $\sqrt{5}$ mm and $\sqrt{7}$ mm. What is the value of m ?
 a) 2 b) 4 c) 8 d) 10
51. Atomic spectrum should be
 a) Pure line spectrum b) emission band spectrum
 c) absorption line spectrum d) absorption band spectrum
52. Which of the following is not an optically active material?
 a) Quartz b) Sugar crystals c) Turpentine oil d) Calcium chloride

MARCH - 2010

53. If the wavelength of the light is reduced to one fourth, then the amount of scattering is
 a) Increased by 16 times b) decreased by 16 times
 c) increased by 256 times d) decreased by 256 times
54. The refractive index of the medium for the polarizing angle 60° is
 a) 1.732 b) 1.414 c) 1.5 d) 1.468
55. In Raman effect, the incident photon makes collision with an excited molecule of the substance. The scattered photon gives rise to
 a) Stokes' line b) Anti Stokes' line c) Rayleigh line d) Zeeman line
56. Refractive index of glass is 1.5. The velocity of light in glass is
 a) $2 \times 10^8 \text{ ms}^{-1}$ b) $4.5 \times 10^8 \text{ ms}^{-1}$ c) $3 \times 10^8 \text{ ms}^{-1}$ d) $1.33 \times 10^8 \text{ ms}^{-1}$

JUNE - 2010

57. In an electromagnetic wave the phase difference between electric field \vec{E} and magnetic field \vec{B} is
 a) $\pi/4$ b) $\pi/2$ c) π d) zero
58. When a drop of water is introduced between the glass plate and Plano convex lens in Newton's rings system, the ring system
 a) contracts b) expands c) remains same d) first expands, then contracts
59. In the grating formula $\sin \theta = Nm \lambda$, the unit of N is
 a) metre b) metre^{-1} c) No unit d) $(\text{metre})^2$
60. The transverse nature of light waves is demonstrated by the phenomenon of
 a) interference b) diffraction c) polarization d) reflection

OCTOBER - 2010

61. Electromagnetic waves are
 a) Transverse b) longitudinal
 c) may be longitudinal or transverse d) neither longitudinal nor transverse
62. The dark lines found in the solar spectrum are called
 a) Raman lines b) Fraunhofer lines c) Stokes lines d) anti - stokes lines
63. In Young's experiment the third bright band for wavelength of light 6000 \AA coincides with the fourth bright band for another source in the same arrangement. The wave length of the another source is
 a) 4500 \AA b) 6000 \AA c) 5000 \AA d) 4000 \AA
64. A ray of light travelling in a rarer medium and reflected at the surface of a denser medium automatically undergoes a
 a) Phase change $\pi/2$ b) phase change 2π c) λ path difference d) $\lambda/2$ path difference

MARCH - 2011

65. In an electromagnetic wave, the phase difference between electric field \vec{E} and the magnetic field \vec{B} is
 a) $\pi/4$ b) $\pi/2$ c) π d) zero
66. A diffraction pattern is obtained using a beam of red light, what happens if the red light is replaced by blue light?
 a) band disappear b) No change c) Diffraction pattern becomes narrower and crowded together d) Diffraction pattern becomes broader and farther apart.
67. Waves from two coherent sources interfere with each other. At a point where the trough of one wave superposes with the trough of the other wave, the intensity of light is
 a) maximum b) minimum c) zero d) no change

68. Refractive index of glass 1.5. Time taken for light to pass through a glass plate of thickness 10 cm is
 a) 2×10^{-8} s b) 2×10^{-10} s c) 5×10^{-8} s d) 5×10^{-10} s

JUNE - 2011

69. When a drop of water is introduced between the glass plate and Plano convex lens in Newton's rings system, the ring system

- a) contracts b) expands c) remains same d) first expands, then contracts

70. Nature of wave front corresponding to extraordinary ray inside a calcite crystal is

- a) plane b) spherical c) elliptical d) cylindrical

71. Electromagnetic waves are

- a) Transverse b) longitudinal
 c) may be longitudinal or transverse d) neither longitudinal nor transverse

72. A ray of light is incident on a plane glass surface at an angle of $57^\circ 30'$. The angle between the reflected ray and the refracted ray is

- a) $32^\circ 30'$ b) 90° c) 115° d) $57^\circ 30'$

OCTOBER - 2011

73. In a pile of plates arrangement, the angle between the incident light and the reflected plane polarized light is

- a) 32.5° b) 57.5° c) 90° d) 115°

74. A diffraction pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light?

- a) Band disappears b) No change
 c) Diffraction pattern becomes narrower and crowded together
 d) Diffraction pattern becomes broader and farther apart

75. The existence of electromagnetic waves was confirmed experimentally by

- a) Hertz b) James Clark c) Maxwell d) Huygens

76. An example of uniaxial crystal is

- a) Selenite b) Mica c) Topaz d) Calcite

MARCH - 2012

77. Angle between the electric component and magnetic component of an electromagnetic wave is

- a) 0 b) $\pi/4$ c) $\pi/2$ d) π

78. The path difference between two monochromatic light waves of wavelength 4000\AA is $2 \times 10^{-7}\text{m}$. The phase difference between them is

- a) π b) 2π c) $3\pi/2$ d) $\pi/2$

79. If i is the angle of incidence, the angle between the incident wavefront and the normal to the reflecting surface is

- a) i b) $90^\circ - i$ c) $90^\circ + i$ d) $i - 90^\circ$

80. A diffraction pattern is obtained using a beam of red light. What happens if the red light is replaced by blue light?

- a) Band disappears b) No change
 c) Diffraction pattern becomes narrower and crowded together
 d) Diffraction pattern becomes broader and farther apart

JUNE - 2012

81. Atomic spectrum should be

- a) band absorption spectrum b) band emission spectrum
 c) line absorption spectrum d) Pure line spectrum

82. When a drop of water is introduced between the glass plate and Plano convex lens in Newton's rings system, the ring system

- a) contracts b) expands c) remains same d) first expands, then contracts

83. Refractive index of a material for a polarizing angle of 55° is

- a) 1.4281 b) 1.7321 c) 1.4141 d) 1.5051

84. In a Nicol prism, the ordinary ray is prevented from coming out of Canada balsam by the phenomenon of

- a) reflection b) polarization c) diffraction d) total internal reflection

6. ATOMIC PHYSICS (4 questions)**MODEL QUESTION PAPER**

- The ratio of the radii of the first three Bohr orbit is
a) $1 : \frac{1}{2} : 1/3$ b) 1:2:3 c) 1:4: 9 d) 1: 8: 27
- In hydrogen atom , which of the following transition produce a spectral line of maximum frequency
a) $2 \longrightarrow 1$ b) $6 \longrightarrow 2$ c) $4 \longrightarrow 3$ d) $5 \longrightarrow 2$
- In Millikon's experiment an oil drop of mass 4.9×10^{-14} kg is balanced by applying a potential difference of 2 kV between the two plates which are 2mm apart. The charge of the drop is
a) 1.96×10^{-18} C b) 1.602×10^{-19} C c) 12C d) 4.9×10^{-19} C
- If the potential difference between the cathode and the target of Coolidge tube is 1.24×10^5 V, then the minimum wavelength of continuous X - Rays is
a) 10 \AA b) 1 \AA c) 0.1 \AA d) 0.01 \AA

MARCH - 2006

- The chromium ions doped in the ruby rod
a) Absorbs red light b) absorbs green light c) absorbs blue light d) emits green light.
- The wavelength of D_1 and D_2 lines emitted by sodium vapour lamp is
a) 589.6nm, 589 nm b) 589nm, 589.6nm c) 589.3nm, 589nm d) 589nm, 589.3 nm
- The minimum wavelength of X-rays produced in a Coolidge tube is 0.62 \AA , the operating potential is
a) 20 kV b) 0.2 kV c) 2 kV d) 10 kV
- Wave number is defined as the number of waves
a) produced in one second b) in a distance of 1 metre
c) in a distance of 3×10^8 metre d) in a distance of λ metre

JUNE - 2006

- The energy of the electron in the first orbit of hydrogen atom is -13.6 eV, its potential energy is
a) -13.6 eV b) 13.6 eV c) -27.2 eV d) 27.2 eV
- In hydrogen atom , which of the following transition produce a spectral line of maximum frequency
a) $2 \longrightarrow 1$ b) $6 \longrightarrow 2$ c) $4 \longrightarrow 3$ d) $5 \longrightarrow 2$
- In an X - ray tube, the intensity of the emitted X - ray beam is increased by
a) increasing the filament current b) decreasing the filament current
c) increasing the target potential d) decreasing the target potential
- The chromium ions doped in the ruby rod
a) Absorbs red light b) absorbs green light c) absorbs blue light d) emits green light.

OCTOBER - 2006

- In Sommerfeld atom model, for a given value of n , the number of values l can take is
a) n b) $n + 1$ c) $n - 1$ d) $2n + 1$
- The ratio of areas enclosed by first three Bohr orbits of hydrogen atom is
a) $1 : 2 : 3$ b) $1 : 8 : 27$ c) $1 : 4 : 9$ d) $1 : 16 : 81$
- In hydrogen atom, which of the following transition produce a spectral line of maximum wavelength?
a) $2 \longrightarrow 1$ b) $4 \longrightarrow 1$ c) $6 \longrightarrow 5$ d) $5 \longrightarrow 4$
- In holography, which of the following is (are) recorded on the photographic film?
a) Frequency and amplitude b) Phase and frequency c) Phase and amplitude d) Frequency only

MARCH - 2007

- If a and b are semi - major and semi - minor axes of the ellipse respectively and l is the orbital quantum number, then the expression to find the possible elliptical orbits is
a) $\frac{b}{a} = \frac{l+1}{n}$ b) $\frac{b}{a} = \frac{l-1}{n}$ c) $\frac{a}{b} = \frac{l+1}{n}$ d) $\frac{a}{b} = \frac{l-1}{n}$

18. X - ray is
 a) phenomenon of conservation of kinetic energy into radiation
 b) Conservation of momentum
 c) conservation of energy into mass
 d) Principle of conservation of charge.
19. According to Bohr's postulates, which of the following quantities take discrete values?
 a) Kinetic energy b) potential energy c) angular momentum d) momentum
20. A crystal diffracts monochromatic X - Rays, If the angle of diffraction for the second order is 90° , then that for the first order will be
 a) 60° b) 45° c) 30° d) 15°

JULY - 2007

21. If R is Rydberg's constant, the minimum wavelength of hydrogen spectrum is
 a) $1/R$ b) $R/4$ c) $4/R$ d) R
22. According to Bohr's postulates, which of the following quantities take discrete values?
 a) Kinetic energy b) potential energy
 c) angular momentum d) momentum
23. The ratio of the radii of the first three Bohr orbit is
 a) $1 : \frac{1}{2} : 1/3$ b) 1:2:3 c) 1:4: 9 d) 1: 8: 27
24. In holography, which of the following is (are) recorded on the photographic film?
 a) Frequency and amplitude b) Phase and frequency
 c) Phase and amplitude d) Frequency only

SEPTEMBER - 2007

25. The unit of Rydberg's constant is
 a) m b) no unit c) m^{-2} d) m^{-1}
26. For the first order X - ray diffraction, the wavelength of the X - ray is equal to the lattice spacing at a glancing angle of
 a) 15° b) 60° c) 45° d) 30°
27. According to Bohr's postulates, which of the following quantities take discrete values?
 a) Kinetic energy b) potential energy c) angular momentum d) momentum
28. A Coolidge tube operates at 18600 V. The maximum frequency of X - radiation emitted from it is
 a) 4.5×10^{18} Hz b) 45×10^{18} Hz c) 4.05×10^{18} Hz d) 45.5×10^{18} Hz

MARCH - 2008

29. The ratio of the radii of the first three Bohr orbit is
 a) $1 : \frac{1}{2} : 1/3$ b) 1:2:3 c) 1:4: 9 d) 1: 8: 27
30. The first excitation potential energy or the minimum energy required to excite the atom from ground state of hydrogen atom is
 a) 13.6 eV b) 10.2 eV c) 3.4 eV d) 1.89 eV
31. In hydrogen atom, which of the following transition produce a spectral line of maximum wavelength?
 a) $2 \longrightarrow 1$ b) $4 \longrightarrow 1$ c) $6 \longrightarrow 5$ d) $5 \longrightarrow 2$
32. If the minimum wavelength of X - ray produced from a Coolidge tube is 0.062 nm , then the potential difference between the cathode and target material is
 a) 2000 V b) 20,000 V c) $2 \times 10^5 \text{ V}$ d) $6.2 \times 10^3 \text{ V}$

JUNE - 2008

33. The spectral series of hydrogen atom in UV region are called
 a) Balmer series b) Lyman series c) Paschen series d) Pfund series
34. The energy of a photon of characteristic X - ray from a Coolidge tube comes from
 a) The kinetic energy of free electrons of the target b) the kinetic energy of ions of the target
 c) The kinetic energy of the striking electron d) an atomic transition in the target.

35. The chromium ions doped in the ruby rod
 a) Absorbs red light b) absorbs green light c) absorbs blue light d) emits green light.
36. Maser materials are
 a) Diamagnetic ions b) paramagnetic ions c) ferromagnetic ions d) non – magnetic ions

OCTOBER – 2008

37. According to Bohr's postulates, which of the following quantities take discrete values?
 a) Kinetic energy b) potential energy c) angular momentum d) momentum
38. The chromium ions doped in the ruby rod
 a) Absorbs red light b) absorbs green light c) absorbs blue light d) emits green light.
39. Number of waves per unit length is known as
 a) Wavelength b) wave number c) bandwidth d) frequency
40. The three dimensional image of an object can be formed by
 a) Atomic spectroscopy b) holography c) molecular spectroscopy d) MASER

MARCH – 2009

41. The chromium ions doped in the ruby rod
 a) Absorbs red light b) absorbs green light c) absorbs blue light d) emits green light.
42. In a discharge tube, the source of positive rays (canalrays) is
 a) Cathode b) anode
 c) gas atoms present in the discharge tube d) fluorescent screen
43. The minimum wavelength of X – rays produced in an X – ray tube at 1000kV is
 a) 0.0124\AA b) 0.124\AA c) 1.24\AA d) 0.00124\AA
44. The ionisation potential of hydrogen atom is
 a) 13.6 eV b) – 13.6 eV c) 13.6 V d) – 13.6 V

JUNE – 2009

45. X – ray is
 a) phenomenon of conservation of kinetic energy into radiation
 b) Conservation of momentum
 c) conservation of energy into mass d) Principle of conservation of charge.
46. The value of Rydberg's constant is
 a) $1.094 \times 10^{-7} m^{-1}$ b) $1.094 \times 10^{-7} mc$ c) $1.094 \times 10^7 m^{-1}$ d) $1.094 \times 10^7 m$
47. When an electric field is applied to an atom each of the spectral lines split into several lines. This effect is known as
 a) Zeeman effect b) Stark effect c) Raman Effect d) Seebeck effect
48. A Coolidge tube operates at 24800 V. The minimum wavelength of X – ray radiation emitted from Coolidge tube is
 a) $6 \times 10^{18} m$ b) $3 \times 10^{18} m$ c) $0.6 \times 10^{-10} m$ d) $0.5 \times 10^{-10} m$

OCTOBER – 2009

49. In hydrogen atom, which of the following transition produce a spectral line of maximum wavelength
 a) $2 \longrightarrow 1$ b) $4 \longrightarrow 1$ c) $6 \longrightarrow 5$ d) $5 \longrightarrow 2$
50. According to Bohr's postulates, which of the following quantities take discrete values?
 a) Kinetic energy b) potential energy c) angular momentum d) momentum
51. In holography, which of the following is (are) recorded on the photographic film?
 a) Frequency and amplitude b) Phase and frequency
 c) Phase and amplitude d) Frequency only
52. The direction of viscous force in Millikon's oil drop experiment is
 a) always downwards b) always upwards
 c) opposite to the direction of motion of the oil drop d) either upwards or downwards

MARCH- 2010

53. The ratio of the radii of the first three Bohr orbit is
 a) $1: \frac{1}{2} : 1/3$ b) 1:2:3 c) 1:4: 9 d) 1: 8: 27
54. In Sommerfeld atom model, for principal quantum number $n = 3$, which of the following sub shells represents circular orbit?
 a) 3 s b) 3 p c) 3 d d) None of these
55. The chromium ions doped in the ruby rod
 a) Absorbs red light b) absorbs green light
 c) absorbs blue light d) emits green light.
56. X - ray is
 a) phenomenon of conservation of kinetic energy into radiation
 b) Conservation of momentum c) conservation of energy into mass
 d) Principle of conservation of charge.

JUNE- 2010

57. In Millikon's experiment, the plates are kept at a distance of 16 mm and are maintained at a potential difference of 10000 V. The electric intensity is
 a) $62.5V/m$ b) $6.25 \times 10^5V/m$ c) $6.25 \times 10^3V/m$ d) $1.6 \times 10^5V/m$
58. If R is Rydberg constant, the shortest wavelength of Paschen series is
 a) $R/9$ b) $9/R$ c) $16/R$ d) $25/R$
59. $\frac{e}{m}$ of cathode ray particle
 a) depends upon the nature of the cathode b) depends upon the nature of the anode
 c) depends upon the nature of the gas atoms present inside the discharge tube
 d) is independent of all these .
60. The chromium ions doped in the ruby rod
 a) Absorbs red light b) absorbs green light
 c) absorbs blue light d) emits green light.

OCTOBER - 2010

61. The first excitation potential energy or the minimum energy required to excite the atom from ground state of hydrogen atom is
 a) 13.6 eV b) 10.2 eV c) 3.4 eV d) 1.89 eV
62. If c is the velocity v the frequency and λ the wavelength of a radiation, then its frequency is defined as
 a) The number of waves in a distance of one metre
 b) The number of waves in a distance of λ c) The number of waves in a distance of c
 d) The number of waves produced in a period of T second
63. A Coolidge tube operates at 24800 V. the maximum frequency of X - radiation emitted from Coolidge tube is
 a) $6 \times 10^{18}Hz$ b) $3 \times 10^{18}Hz$ c) 6×10^8Hz d) 3×10^8Hz
64. The elliptical orbit of electron in the atom was proposed by
 a) J.J. Thomson b) Bohr c) Sommerfeld d) de Broglie

MARCH - 2011

65. In an X - ray tube, the intensity of the emitted X - ray beam is increased by
 a) increasing the filament current b) decreasing the filament current
 c) increasing the target potential d) decreasing the target potential
66. In Sommerfeld atom model, for a given value of n, the number of values l can take is
 a) n b) n + 1 c) n - 1 d) 2n + 1
67. The wave number of a spectral line of hydrogen atom is equal to Rydberg's constant. The line is
 a) first line of Lyman series b) series limit of Lyman series
 c) first line of Pfund series d) series limit of Pfund series

68. The cathode rays are
 a) a stream of electrons
 b) A stream of positive ions
 c) a stream of uncharged particles
 d) A stream of photons

JUNE - 2011

69. The ratio of the radii of the first three Bohr orbit is
 a) $1: \frac{1}{2} : \frac{1}{3}$
 b) 1:2:3
 c) 1:4: 9
 d) 1: 8: 27
70. X - ray is
 a) phenomenon of conservation of kinetic energy into radiation
 b) Conservation of momentum
 c) conservation of energy into mass
 d) Principle of conservation of charge.
71. In holography, which of the following is (are) recorded on the photographic film?
 a) Phase only
 b) amplitude only
 c) Phase and amplitude
 d) Frequency and amplitude
72. In Millikion's oil drop experiment charged oil drop is balanced between the two plates. Now the viscous force
 a) acts downwards
 b) acts upwards
 c) is zero
 d) acts either upwards or downwards

OCTOBER - 2011

73. According to Rutherford atom model the spectral lines emitted by an atom is
 a) Line spectrum
 b) continuous spectrum
 c) continuous absorption spectrum
 d) band spectrum
74. The ratio of the radii of the first three Bohr orbit is
 a) $1: \frac{1}{2} : \frac{1}{3}$
 b) 1:2:3
 c) 1:4: 9
 d) 1: 8: 27
75. If ν is the frequency of characteristic X - ray line emitted by a target element of atomic number Z, then Mosley's law is
 a) $\nu \propto Z$
 b) $\nu \propto \sqrt{Z}$
 c) $\nu \propto Z^2$
 d) $\nu \propto Z^3$
76. The Coolidge tube operates at 24800 V. the maximum frequency of X - radiation emitted from Coolidge tube is
 a) $6 \times 10^{18} \text{ Hz}$
 b) $3 \times 10^{18} \text{ Hz}$
 c) $6 \times 10^8 \text{ Hz}$
 d) $3 \times 10^8 \text{ Hz}$

MARCH - 2012

77. The chromium ions doped in the ruby rod
 a) Absorbs red light
 b) absorbs green light
 c) absorbs blue light
 d) emits green light
78. In hydrogen atom which of the following transitions produces spectral line of maximum wavelength ?
 a) $2 \longrightarrow 1$
 b) $4 \longrightarrow 1$
 c) $6 \longrightarrow 5$
 d) $5 \longrightarrow 2$
79. When an electron jumps from M shell to the K shell it gives
 a) K_{α}
 b) K_{β}
 c) L_{α}
 d) L_{β}
80. The elliptical orbits of electron in the atoms were proposed by
 a) J.J. Thomson
 b) Bohr
 c) Sommerfeld
 d) de Broglie

JUNE - 2012

81. According to Bohr's postulates, which of the following quantities take discrete values?
 a) Kinetic energy
 b) potential energy
 c) angular momentum
 d) momentum
82. X - ray is
 a) conservation of energy into mass
 b) phenomenon of conservation of kinetic energy into radiation
 c) Principle of conservation of charge.
 d) Conservation of momentum
83. In holography, which of the following is recorded in the photographic film?
 a) Frequency alone
 b) amplitude alone
 c) Phase alone
 d) Phase and amplitude
84. Arrange the spectral line H_{α} , H_{β} , H_{γ} , H_{δ} in the increasing order of their wavelength:
 a) H_{α} , H_{β} , H_{γ} , H_{δ}
 b) H_{δ} , H_{γ} , H_{β} , H_{α}
 c) H_{β} , H_{α} , H_{δ} , H_{γ}
 d) H_{α} , H_{β} , H_{δ} , H_{γ}

LESSON - 7 - DUAL NATURE OF RADIATION AND MATTER AND RELATIVITY**(2 questions)****Model question paper**

- Photo electric effect can be explained on the basis of
 - corpuscular theory
 - wave theory
 - electromagnetic theory
 - quantum theory
- The wavelength of the matter wave is independent of
 - Mass
 - velocity
 - momentum
 - charge

MARCH -2006

- The value of stopping potential when the frequency of light is equal to the threshold frequency is
 - maximum
 - zero
 - minimum
 - infinity
- If the radius of third Bohr orbit in hydrogen atom is r , then the de Broglie wavelength in this orbit is
 - $\frac{r}{3}$
 - $3rc$
 - $\frac{2\pi r}{3}$
 - $3(2\pi r)$

JUNE- 2006

- Two photons, each of energy 2.5 eV are simultaneously incident on the metal surface. if the work function of the metal is 4.5 eV then from the surface of the metal
 - one electron will emitted
 - two electrons will emitted
 - more than two electrons will be emitted
 - not a single electron will be emitted
- According to relativity, the length of a rod in motion
 - As same as its rest length
 - is more than its rest length
 - is less than its rest length
 - may be more or less than or equal to rest length depending on the speed of the rod

OCTOBER - 2006

- According to special theory of relativity the only constant in all frames is
 - mass
 - length
 - time
 - velocity of light
- At the threshold frequency, the velocity of the photoelectrons is
 - maximum
 - minimum
 - infinity
 - Zero

MARCH - 2007

- According to special theory of relativity the only constant in all frames of reference is
 - mass
 - length
 - time
 - velocity of light
- The work function of a metal is $6.626 \times 10^{-19} J$. The threshold frequency is
 - $1 \times 10^{15} Hz$
 - $10 \times 10^{-19} Hz$
 - $1 \times 10^{-15} Hz$
 - $10 \times 10^{19} Hz$

JULY - 2007

- According to relativity, the length of a rod in motion
 - As same as its rest length
 - is more than its rest length
 - is less than its rest length
 - may be more or less than or equal to rest length depending on the speed of the rod
- The momentum of the electron having wavelength 2 \AA is
 - $3.3 \times 10^{24} kgms^{-1}$
 - $6.6 \times 10^{24} kgms^{-1}$
 - $3.3 \times 10^{-24} kgms^{-1}$
 - $6.6 \times 10^{-24} kgms^{-1}$

SEPTEMBER - 2007

- When a material particle of rest mass ' m_0 ' attains the velocity of light its mass becomes
 - 0
 - $2m_0$
 - $4m_0$
 - ∞
- The photon of frequency ν is incident on a metal surface of threshold frequency ν_0 . The kinetic energy of the emitted photoelectron is
 - $h(\nu - \nu_0)$
 - $h\nu c$
 - $h\nu_0$
 - $h(\nu + \nu_0)$

MARCH - 2008

- The work function of the photoelectric material is 3.3 eV The threshold frequency will be equal to
 - $8 \times 10^{14} Hz$
 - $8 \times 10^{10} Hz$
 - $5 \times 10^{20} Hz$
 - $4 \times 10^{14} Hz$
- The particle which has zero mass but has energy is
 - electron
 - photon
 - proton
 - neutron

JUNE - 2008

- The wavelength of the matter wave is independent of
 - Mass
 - velocity
 - momentum
 - charge

18. Photon has

- a) energy but zero mass
b) mass but zero energy
c) zero mass and zero energy
d) infinite mass and energy

OCTOBER - 2008

19. The photon of frequency ν is incident on a metal surface of threshold frequency ν_0 . The kinetic energy of the emitted photoelectron is

- a) $h(\nu - \nu_0)$
b) $h\nu c$
c) $h\nu_0$
d) $h(\nu + \nu_0)$

20. An electron of mass m and charge e associated from rest through a potential of V volt, then its final velocity is

- a) $\sqrt{\frac{Ve}{m}}$
b) $\sqrt{\frac{Ve}{2m}}$
c) $\sqrt{\frac{2Ve}{m}}$
d) $\frac{2Ve}{m}$

MARCH - 2009

21. At the threshold frequency, the velocity of the electrons is

- a) Zero
b) maximum
c) minimum
d) infinite

22. According to special theory of relativity the only constant in all frames is

- a) mass
b) length
c) velocity of light
d) time

JUNE - 2009

23. Einstein's photoelectric equation is

- a) $W + h\nu = \frac{1}{2}mv_{max}^2$
b) $\frac{1}{2}mv_{max}^2 = W$
c) $h\nu + \frac{1}{2}mv_{max}^2 = W$
d) $W + \frac{1}{2}mv_{max}^2 = h\nu$

24. According to relativity, the length of a rod in motion

- a) As same as its rest length
b) is more than its rest length
c) is less than its rest length
d) may be more or less than or equal to rest length depending on the speed of the rod

OCTOBER - 2009

25. At the threshold frequency, the velocity of the electrons is

- a) Zero
b) maximum
c) minimum
d) infinite

26. The wavelength of the matter wave is independent of

- a) Mass
b) velocity
c) momentum
d) charge

MARCH - 2010

27. Electron microscope works on the principle of

- a) photoelectric effect
b) particle nature of electron
c) wave nature of moving electron
d) dual nature of matter

28. Photo electric effect can be explained on the basis of

- a) corpuscular theory
b) wave theory
c) electromagnetic theory
d) quantum theory

JUNE - 2010

29. Photo electric effect can be explained on the basis of

- a) corpuscular theory of light
b) wave theory of light
c) electromagnetic theory of light
d) quantum theory of light

30. According to relativity, the length of a rod in motion

- a) As same as its rest length
b) is more than its rest length
c) is less than its rest length
d) may be more or less than or equal to rest length depending on the speed of the rod

OCTOBER - 2010

31. If 1kg of a substance is fully converted into energy, then the energy produced is

- a) $9 \times 10^{16}\text{J}$
b) $9 \times 10^{24}\text{J}$
c) 1J
d) $3 \times 10^8\text{J}$

32. The de Broglie wavelength of electron accelerated with a potential V is

- a) $\lambda = \frac{h}{\sqrt{Vem}}$
b) $\lambda = \frac{h}{\sqrt{2Vem}}$
c) $\lambda = \frac{h}{m\sqrt{2Vem}}$
d) $\lambda = \frac{h}{m\sqrt{\frac{Ve}{m}}}$

MARCH - 2011

33. The wavelength of the matter wave is independent of

- a) Mass
b) velocity
c) momentum
d) charge

34. A graph is drawn taking frequency of incident radiation (ν) along the X – axis and its stopping potential (V_0) along the Y – axis . The nature of the graph is
 a) a straight line b) a parabola c) an ellipse d) a circle

JUNE – 2011

35. The work function of the photoelectric material is 3.3 eV . The threshold frequency will be equal to

a) $8 \times 10^{14}\text{ Hz}$ b) $8 \times 10^{10}\text{ Hz}$ c) $5 \times 10^{20}\text{ Hz}$ d) $4 \times 10^{14}\text{ Hz}$

36. A photon of energy $2E$ is incident on a photosensitive surface of photoelectric work function E . The maximum kinetic energy of photoelectron emitted is

a) E b) $2E$ c) $3E$ d) $4E$

OCTOBER – 2011

37. The de Broglie wavelength of electron accelerated with a potential V is

a) $\frac{h}{\sqrt{mV}}$ b) $\frac{h}{m\sqrt{2eV}}$ c) $\frac{h}{\sqrt{2eVm}}$ d) $\frac{h}{2eVm}$

38. If 1 kg of a substance is fully converted into energy, then the energy produced is

a) $9 \times 10^{16}\text{ J}$ b) $9 \times 10^{24}\text{ J}$ c) 1 J d) $3 \times 10^8\text{ J}$

MARCH – 2012

39. If the kinetic energy of the moving particle is E , then the de Broglie wavelength is

a) $\lambda = \frac{h}{\sqrt{2mE}}$ b) $\lambda = \frac{\sqrt{2mE}}{h}$ c) $\lambda = h\sqrt{2mE}$ d) $\lambda = \frac{h}{E\sqrt{2m}}$

40. In the photoelectric phenomenon if the ratio of the frequency of incident radiation incident on a photosensitive surface is $1 : 2 : 3$ the ratio of the photoelectric current is

a) $1 : 2 : 3$ b) $\sqrt{1} : \sqrt{2} : \sqrt{3}$ c) $1 : 4 : 9$ d) $1 : 1 : 1$

JUNE – 2012

41. At the threshold frequency, the velocity of the electrons is

a) Zero b) maximum c) minimum d) infinite

42. When the momentum of a particle increases its de Broglie wavelength

a) increases b) decreases c) does not change d) infinity

LESSON – 8 – NUCLEAR PHYSICS (4 questions)**MODEL QUESTION PAPER**

1. The time taken by the radioactive element to reduce to $1/e$ times is

a) Half life b) mean life c) half life / 2 d) twice the mean life

2. The ionization power is maximum for

a) Neutrons b) α - particles c) γ - particles d) β - particles

3. When ${}^5\text{B}^{10}$ is bombarded with neutron and α - particle is emitted, the residual nucleus is

a) ${}^3\text{Li}^7$ b) ${}^1\text{H}^2$ c) ${}^1\text{H}^3$ d) ${}^2\text{He}^4$

4. In a nuclear reactor cadmium rods are used to

a) Speed up neutrons b) slow down neutrons c) absorb neutrons d) remove heat

MARCH – 2006

5. The nuclear force is due to the continuous exchange of particles called

a) Leptons b) mesons c) hyperons d) photons

6. In the following nuclear reaction ${}^7\text{N}^{14} + {}^0\text{n}^1 \longrightarrow \text{X} + {}^1\text{H}^1$, the element X is

a) ${}^6\text{N}^{14}$ b) ${}^6\text{C}^{14}$ c) ${}^6\text{O}^{14}$ d) ${}^7\text{N}^{13}$

7. The time taken by the radioactive element to reduce to $1/e$ times is

a) Half life b) mean life c) half life / 2 d) twice the mean life

8. Which of the following particles is a lepton?

a) Electron b) Proton c) Neutron d) π - meson

JUNE – 2006

9. One amu is equal to

a) 931 eV b) mass of carbon atom c) $1.66 \times 10^{-27}\text{ kg}$ d) mass of oxygen atom

10. The time taken by the radioactive element to reduce to $e^{-1/2}$ times is

a) Half life period b) Half life period / 2 c) mean life period d) mean - life period / 2

11. The radio - isotope used in agriculture is

a) ${}^{31}\text{P}^{15}$ b) ${}^{32}\text{P}^{15}$ c) ${}^{23}\text{Na}^{11}$ d) ${}^{24}\text{Na}^{11}$

12. Based on quark model a neutron is represented as
 a) uud b) udd c) udd' d) u'du
- OCTOBER - 2006**
13. The value of 1 amu is
 a) 931 eV b) mass of carbon atom c) mass of one proton d) 1.66×10^{-27} kg
14. The penetrating power is maximum for
 a) α - particles b) β - particles c) γ - particles d) protons
15. In the following nuclear reaction ${}_{13}\text{Al}^{27} + {}_2\text{He}^4 \rightarrow X + {}_0\text{n}^1$, X - stands for
 a) ${}_{15}\text{Si}^{30}$ b) ${}_{15}\text{P}^{30}$ c) ${}_{15}\text{S}^{30}$ d) ${}_{15}\text{Si}^{29}$
16. Based on quark model a neutron is represented as
 a) uud b) udd c) udd' d) u'du
- MARCH - 2007**
17. Anaemia can be diagnosed by
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{26}\text{Fe}^{59}$ d) ${}_{11}\text{Na}^{24}$
18. The moderator used in nuclear reactor is
 a) Cadmium b) Boron carbide c) Heavy water d) Uranium (${}_{92}\text{U}^{235}$)
19. The number of α and β particles emitted when an isotope ${}_{92}\text{U}^{235}$ undergoes α and β decays to form ${}_{82}\text{Pb}^{206}$ are respectively
 a) 6, 8 b) 4, 3 c) 8, 6 d) 3, 4
20. The nuclei ${}_{13}\text{Al}^{27}$ and ${}_{14}\text{Si}^{28}$ are example of
 a) isotopes b) isobars c) isotones d) isomers
- JULY - 2007**
21. The particles which exchange between the nucleons and responsible for the origin of the nuclear force are
 a) photons b) leptons c) mesons d) baryons
22. Anaemia can be diagnosed by
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{26}\text{Fe}^{59}$ d) ${}_{11}\text{Na}^{24}$
23. Which of the following is not a moderator?
 a) Liquid sodium b) Ordinary water c) graphite d) Heavy water
24. An element ${}_Z\text{X}^A$ successively undergoes three α decays and four β - decays and gets converted to an element Y. the mass number and atomic number of the element Y are respectively
 a) $A-12, Z-2$ b) $A-12, Z+2$ c) $A-12, Z+4$ d) $A-8, Z+2$
- SEPTEMBER - 2007**
25. The nuclei ${}_{13}\text{Al}^{27}$ and ${}_{14}\text{Si}^{28}$ are example of
 a) isotopes b) isobars c) isotones d) isomers
26. The fuel used in Kamini reactor is
 a) ${}_{92}\text{U}^{235}$ b) ${}_{92}\text{U}^{233}$ c) ${}_{92}\text{U}^{239}$ d) low enriched uranium
27. The binding energy of ${}_{26}\text{Fe}^{56}$ nucleus is
 a) 8.8 MeV b) 88 MeV c) 493 MeV d) 41.3 MeV
28. The half period of a certain radioactive element with disintegration constant 0.0693 perday
 a) 10 days b) 14 days c) 140 days d) 1.4 days
- MARCH - 2008**
29. The nuclei ${}_{13}\text{Al}^{27}$ and ${}_{14}\text{Si}^{28}$ are example of
 a) isotopes b) isobars c) isotones d) isomers
30. The mean life (τ) and half life ($T_{1/2}$) of a radioactive element are related as
 a) $\tau = 2T_{1/2}$ b) $\tau = \frac{T_{1/2}}{0.6931}$ c) $\tau = 0.6931 T_{1/2}$ d) $\tau = \frac{T_{1/2}}{2}$
31. An element ${}_Z\text{X}^A$ successively undergoes three α particles and four β - particles is converted to an element Y represented as
 a) ${}_{Z-6}\text{Y}^{A-12}$ b) ${}_{Z+2}\text{Y}^{A-12}$ c) ${}_{Z-2}\text{Y}^{A-12}$ d) ${}_{Z-10}\text{Y}^{A-12}$
32. Which of the following is used to detect the presence of blocks in blood vessels?
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{26}\text{Fe}^{59}$ d) ${}_{11}\text{Na}^{24}$
- JUNE - 2008**
33. If the nuclear radius is $2.6 \times 10^{-15}\text{m}$, the mass number will be
 a) 2 b) 4 c) 8 d) 16

34. Slow neutrons having energies between
 a) 1000 eV to 2000 eV b) 2000 eV to 0.5 MeV
 c) 0 eV to 1000 eV d) 0.5 MeV to 10 MeV
35. In the nuclear reaction ${}_{80}\text{Hg}^{198} + X \longrightarrow {}_{79}\text{Au}^{198} + {}_1\text{H}^1$, X – stands for
 a) Proton b) electron c) neutron d) deuteron
36. The radio – isotope used in agriculture is
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{11}\text{Na}^{23}$ d) ${}_{11}\text{Na}^{24}$

OCTOBER – 2008

37. The half period of a certain radioactive element with disintegration constant 0.06931 per day
 a) 10 days b) 14 days c) 140 days d) 1.4 days
38. The radio – isotope used in agriculture is
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{11}\text{Na}^{23}$ d) ${}_{11}\text{Na}^{24}$
39. One amu is equal to
 a) 931 eV b) mass of carbon atom c) 1.66×10^{-27} kg d) mass of electron
40. Particle that has no charge and no rest mass but travels with velocity of light is
 a) baryon b) meson c) lepton d) Photon

MARCH – 2009

41. In β - decay
 a) Atomic number decreases by one b) mass number decreases by one
 c) proton number remains the same d) neutron number decreases by one.
42. In the nuclear reaction ${}_{80}\text{Hg}^{198} + X \longrightarrow {}_{79}\text{Au}^{198} + {}_1\text{H}^1$, X – stands for
 a) Proton b) electron c) neutron d) deuteron
43. The half life of a radioactive element is 300 days. The disintegration constant of the radioactive element is
 a) 0.00231 day b) 0.00231/ day c) 0.0231/ day d) 0.0231 day
44. The nuclear force is due to the continuous exchange of particles called
 a) leptons b) hyperons c) mesons d) photons

JUNE – 2009

45. The explosion of atom bomb is based on the principle of
 a) uncontrolled fission reaction b) controlled fission reaction
 c) fusion reaction d) thermonuclear reaction
46. Anaemia can be diagnosed by
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{26}\text{Fe}^{59}$ d) ${}_{11}\text{Na}^{24}$
47. The mean life of radon is 5.5 days. Its half life is
 a) 8 days b) 2.8 days c) 0.38 days d) 3.8 days
48. The energy equivalent to 1 amu is
 a) 931 MeV b) 931 meV c) 931 eV d) 913 MeV

OCTOBER – 2009

49. In β - decay
 a) Atomic number decreases by one b) mass number decreases by one
 c) proton number remains the same d) neutron number decreases by one.
50. The fuel used in Kamini(Kalpakkam mini reactor) is
 a) mixture of carbides of uranium and plutonium b) ${}_{92}\text{U}^{233}$
 c) mixture of oxides of plutonium and uranium d) ${}_{92}\text{U}^{235}$
51. The nuclear force existing between any two nucleons is due to the continuous exchange of particles called
 a) Leptons b) mesons c) hyperons d) photons
52. The radio – isotope used in agriculture is
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{11}\text{Na}^{23}$ d) ${}_{11}\text{Na}^{24}$

MARCH – 2010

53. The explosion of atom bomb is based on the principle of
 a) Uncontrolled fission reaction b) controlled fission reaction
 c) fusion reaction d) thermonuclear reaction
54. Anaemia can be diagnosed by
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{26}\text{Fe}^{59}$ d) ${}_{11}\text{Na}^{24}$

55. In the nuclear reaction ${}_4\text{Be}^9 + X \longrightarrow {}_6\text{C}^{12} + {}_0\text{n}^1$, X - stands for
 a) Proton b) α - particle c) electron d) deuteron
56. Which of the following belongs to Baryon group?
 a) photon b) electron c) Pion d) proton
- JUNE - 2010**
57. The ionization power is maximum for
 a) neutrons b) α - particles c) γ - particles d) β - particles
58. The explosion of atom bomb is based on the principle of
 a) uncontrolled fission reaction b) controlled fission reaction
 c) fusion reaction d) thermonuclear reaction
59. The binding energy of ${}_{26}\text{Fe}^{56}$ nucleus is
 a) 8.8 MeV b) 88 MeV c) 493 MeV d) 41.3 MeV
60. According to the law of disintegration $N = N_0 e^{-\lambda t}$, the number of radioactive atoms that have been decayed during a time of t is
 a) N_0 b) N c) $N_0 - N$ d) $N_0/2$

OCTOBER - 2010

61. Isotopes have
 a) Same mass number but different atomic number
 b) Same proton number and neutron number
 c) Same proton number but different neutron number
 d) Same neutron number but different proton number.
62. The ionization power is maximum for
 a) neutrons b) α - particles c) γ - particles d) β - particles
63. The half life period of ${}_{13}\text{N}$ is 10.1 minutes. Its life time is
 a) 5.05 minutes b) 20.2 minutes c) $10.1 / 0.6931$ minutes d) infinity
64. The coolant used in fast breeder reactor is
 a) ordinary water b) heavy water c) liquid sodium d) boron carbide
- MARCH - 2011**
65. Which of the following are isotones?
 a) ${}_{92}\text{U}^{235}$ and ${}_{92}\text{U}^{238}$ b) ${}_{8}\text{O}^{16}$ and ${}_{7}\text{N}^{14}$ c) ${}_{6}\text{C}^{14}$ and ${}_{7}\text{N}^{14}$ d) ${}_{7}\text{N}^{14}$ and ${}_{6}\text{C}^{13}$
66. Arrange α , β and γ rays in the increasing order of their ionizing power
 a) α , β , γ b) β , α , γ c) γ , β , α d) γ , α , β
67. The radio - isotope used in agriculture is
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{11}\text{Na}^{23}$ d) ${}_{11}\text{Na}^{24}$
68. The explosion of atom bomb is based on the principle of
 a) uncontrolled fission reaction b) controlled fission reaction
 c) fusion reaction d) thermonuclear reaction

JUNE - 2011

69. The binding energy of ${}_{26}\text{Fe}^{56}$ nucleus is
 a) 8.8 MeV b) 88 MeV c) 493 MeV d) 41.3 MeV
70. Anaemia can be diagnosed by
 a) ${}_{15}\text{P}^{31}$ b) ${}_{15}\text{P}^{32}$ c) ${}_{26}\text{Fe}^{59}$ d) ${}_{11}\text{Na}^{24}$
71. Nuclear fission can be explained by
 a) Shell model b) Liquid drop model c) Quark model d) Bohr atom model
72. When mass number increases, nuclear density
 a) increases b) decreases c) remains constant d) may increase (or) decrease

OCTOBER - 2011

73. The nuclear force between a proton and another proton inside the nucleus is
 a) zero b) short range c) repulsive d) long range
74. The cosmic ray intensity is maximum at a latitude of
 a) 0° b) 45° c) 90° d) 60°
75. The rays which have the greatest ionising power is
 a) neutrons b) α - particles c) γ - rays d) β - particles
76. Hydrogen bomb is based on the principle of
 a) nuclear fission b) nuclear fusion c) nuclear force d) carbon nitrogen cycle

MARCH - 2012

77. The unit of disintegration constant is
 a) no unit b) second c) second⁻¹ d) curie
78. The explosion of hydrogen bomb is based on the principle of
 a) uncontrolled fission reaction b) nuclear fusion reaction
 c) controlled fission reaction d) photoelectric effect
79. Positive rays of the same element produce two different traces in Bainbridge mass spectrometer. The positive ions have
 a) same mass with different velocities b) same mass with same velocity
 c) different masses with same velocity d) different masses with different velocities
80. The time taken by the radioactive element to reduce to 1/e time is
 a) half life b) mean life c) half life/2 d) twice the mean life

JUNE - 2012

81. The mass defect of certain nucleus is 0.03 amu. Then its binding energy is
 a) 27.93 eV b) 27.93 keV c) 27.93 GeV d) 27.93 MeV
82. The half period of a certain radioactive element with disintegration constant 0.06931/ day
 a) 10 days b) 14 days c) 100 days d) 1.4 days
83. The nucleons in a nucleus are attracted by
 a) gravitational force b) electrostatic force c) nuclear force d) magnetic force
84. Which of the following is massless and chargeless but carrier of energy and spin
 a) neutrino b) Muon c) Pion d) Kaon

LESSON - 9- SEMICONDUCTOR DEVICES AND THEIR APPLICATIONS (3 questions)**Model question paper**

1. In a Colpitt's oscillator circuit
 a) capacitance feedback is used b) tapped coil is used
 c) no tuned LC circuit is used d) no capacitor is used
2. An example of n - type semiconductor is
 a) pure germanium b) pure silicon
 c) silicon doped with phosphorus d) germanium doped with boron
3. What will be the input of A and B for the Boolean expression $(A+B) \cdot (A \cdot B) = 1$
 a) 0, 1 b) 1, 0 c) 0, 0 d) 1, 1

MARCH - 2006

4. The forbidden energy gap for germanium is of the order of
 a) 1.1 eV b) 0.7 eV c) 0.3 eV d) 10 eV
5. The Boolean expression \overline{ABC} can be expressed as
 a) $AB + C$ b) $A \cdot B \cdot C$ c) $AB + BC + CA$ d) $\overline{A} + \overline{B} + \overline{C}$
6. Condition for oscillator is
 a) $A\beta = 0$ b) $A = 1/\beta$ c) $A\beta = \infty$ d) $A + \beta = 0$

JUNE - 2006

7. The potential barrier of silicon PN junction diode is approximately
 a) 0.3 V b) 0.7 V c) 1.1 V d) 10 V
8. The colour of light emitted by a LED depends on
 a) Its reverse bias b) the amount of forward current c) its forward bias d) type of semiconductor material
9. The Boolean expression to represent NAND operation is
 a) $Y = A + B$ b) $Y = A - B$ c) $Y = \overline{A}$ d) $Y = A \cdot B$

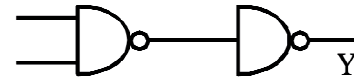
OCTOBER - 2006

10. The forbidden energy gap for silicon is the order of
 a) 0.7 eV b) 0.4 eV c) 1.1 eV d) 10 eV
11. In CE single stage amplifier, the voltage gain at mid - frequency is 10. The voltage gain at upper cut off frequency is
 a) 10 b) 14.14 c) 7.07 d) 20

12. The following arrangement perform the logic function of ____ gate

- a) AND b) OR c) NAND d) EXOR

MARCH - 2007

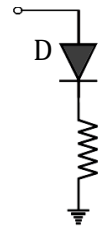


13. Barkhausen condition for maintenance of oscillation is

- a) $\beta = 1/A$ b) $A\beta = \infty$ c) $A = \beta$ d) $A\beta = 1/\sqrt{2}$

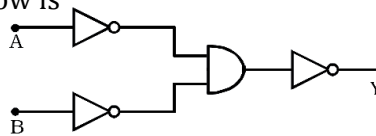
14. Find the voltage across the resistor as shown in the figure (silicon diode is used) + 2.7 V

- a) 2.4 V b) 2.0 V c) 1.8 V d) 0.7 V



15. The output (Y) of the logic circuit given below is

- a) $A+B$ b) $A.B$ c) $(\overline{A+B})$ d) $\overline{A} + \overline{B}$

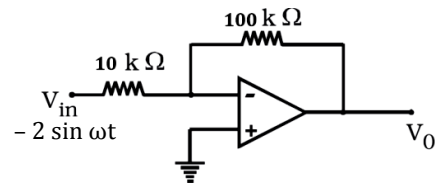


180Ω

JULY - 2007

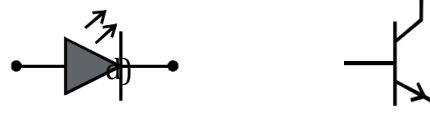
16. The output of the given operational amplifier is -----

- a) $-2 \sin \omega t$ b) $2 \sin \omega t$
c) $-2 \sin (\omega t + 10^\circ)$ d) $2 \sin (\omega t + 10^\circ)$



17. The symbol to represent LED is

- a) b) c)



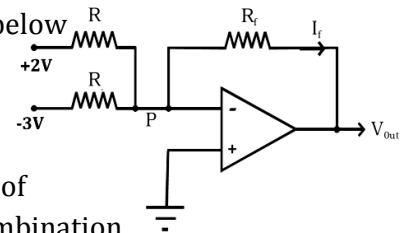
18. The logic gate for which there is 'low' output only when both the inputs are 'High' is -----

- a) AND b) NAND c) NOR d) EXOR

SEPTEMBER - 2007

19. The output voltage of the operational amplifier (op - amp) given below

- a) - 1 V b) + 1 V c) + 5 V d) - 5 V



20. Avalanche breakdown is primarily dependent on the phenomenon of

- a) collision b) ionisation c) doping d) recombination

21. In a junction transistor the emitter region is heavily doped since emitter has to supply to the base

- a) minority carriers b) majority carriers c) acceptor ions d) donor ions

22. A logic gate which has an output '1', when the inputs are complement to each other is

- a) AND b) NAND c) NOR d) EXOR

MARCH - 2008

23. The forbidden energy gap of silicon is of the order of

- a) 0.1 eV b) 0.3 eV c) 0.7 eV d) 1.1 eV

24. An oscillator is

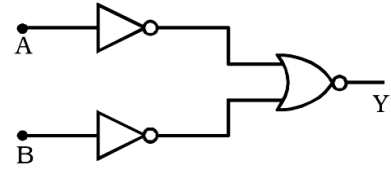
- a) An amplifier with feedback b) a convertor of ac to dc energy
c) nothing but an amplifier d) an amplifier without feed back

25. Of the following, the donor atoms are

- a) silicon and germanium b) aluminium and gallium

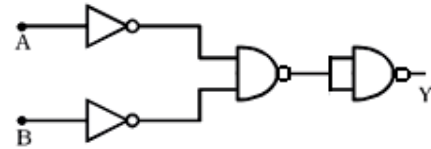
JUNE - 2008

26. In common emitter (CE) amplifiers, the phase reversal between input and output voltages is
 a) 0° b) 90° c) 270° d) 180°
27. In a Colpitt's oscillator circuit
 a) capacitance feedback is used b) tapped coil is used
 c) no tuned LC circuit is used d) no capacitor is used
28. The following arrangements performs the logic function of
 a) AND b) EXOR c) OR d) NAND



OCTOBER - 2008

29. In common emitter transistor circuit, the base current (I_B) of the transistor is $50\mu A$ and the collector current (I_C) is 25 mA. Then the current gain is
 a) 50 b) 500 c) 20 d) 200
30. The colour of light emitted by a LED depends on
 a) Its reverse bias b) the amount of forward current c) its forward bias d) type of semiconductor material
31. The following arrangement performs the logic function of
 a) AND b) NAND c) OR d) NOR

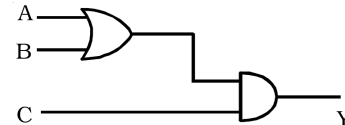


MARCH - 2009

32. The forbidden energy gap for silicon is of the order of
 a) 0.7 eV b) 1.1 eV c) 0.3 eV d) 10 eV
33. According to the laws of Boolean algebra, the expression ($A+AB$) is equal to
 a) A b) AB c) B d) \bar{A}
34. An example for non - sinusoidal oscillator is
 a) multivibrator b) RC oscillator c) Colpitts oscillator d) Crystal oscillator

JUNE - 2009

35. An oscillator is
 a) an amplifier with feedback b) a convertor of a.c. to d.c. energy
 c) nothing but an amplifier d) an amplifier without feedback
36. The reverse saturation current in a PN junction diode is only due to
 a) Minority carriers b) majority carriers c) acceptor ions d) donor ions
37. If output Y of the following circuit is one (1), the inputs ABC must be
 a) 010 b) 100 c) 101 d) 110

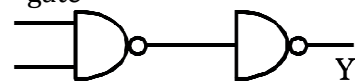


OCTOBER - 2009

38. The Boolean expression of represent NAND operation is
 a) $Y = A + B$ b) $Y = A . B$ c) $Y = \bar{A}$ d) $Y = \overline{A . B}$
39. In single stage CE amplifier, the voltage gain a mid frequency is 10. The voltage gain at upper cut - off frequency is
 a) 10 b) 10.1 c) 7.07 d) 14.14
40. Barkhausen condition for maintenance of oscillation in oscillator is
 a) $\beta = 1/A$ b) $A \beta = \infty$ c) $A = \beta$ d) $A \beta = 1/\sqrt{2}$

MARCH - 2010

41. The following arrangement performs the logic function of ----- gate
 a) AND b) OR c) NAND d) EXOR
42. In the pin configuration of IC 741, pin 3 represents
 a) inverting input b) non - inverting input c) - Vcc d) output
43. The forbidden energy gap for conductors is



JUNE - 2010

44. The colour of light emitted by a LED depends on
 a) Its reverse bias
 its forward bias
 b) the amount of forward current
 d) type of semiconductor material
 c)

45. An oscillator is
 a) an amplifier with feedback
 c) nothing but an amplifier
 b) a convertor of a.c. to d.c. energy
 d) an amplifier without feedback

46. The Boolean expression \overline{ABC} can be expressed as
 a) $AB + C$
 b) $A \cdot B \cdot C$
 c) $AB + BC + CA$
 d) $\overline{A} + \overline{B} + \overline{C}$

OCTOBER - 2010

47. The forbidden energy gap for silicon is of the order of
 a) 1 eV
 b) 1.2 eV
 c) 1.1 eV
 d) 2.1 eV
48. The colour of light emitted by a LED depends on
 a) Its reverse bias
 its forward bias
 b) the amount of forward current
 d) type of semiconductor material
 c)

49. An oscillator is
 a) an amplifier with feedback
 c) nothing but an amplifier
 b) a convertor of a.c. to d.c. energy
 d) an amplifier without feedback

MARCH - 2011

50. Avalanche breakdown is primarily dependent on the phenomenon of
 a) collision
 b) ionisation
 c) doping
 d) recombination

51. In a transistor, the value of $(\frac{1}{\alpha} - \frac{1}{\beta})$ is equal ?
 a) α
 b) β
 c) β/α
 d) 1

52. According to the laws of Boolean algebra, the expression $(A+AB)$ is equal to
 a) A
 b) AB
 c) B
 d) \overline{A}

JUNE - 2011

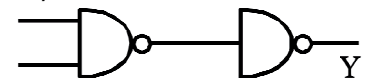
53. In the forward bias characteristic curve, a diode appears as
 a) a high resistance
 b) a capacitor
 c) an OFF switch
 d) an ON switch
54. The colour of light emitted by a LED depends on
 a) Its reverse bias
 its forward bias
 b) the amount of forward current
 d) type of semiconductor material
 c)

55. A logic gate for which there is an output only when both the inputs are zero is
 a) NAND
 b) NOR
 c) EXOR
 d) AND

OCTOBER - 2011

56. The reverse saturation current in a PN junction diode is only due to
 a) majority carriers
 b) Minority carriers
 c) acceptor ions
 d) donor ions
57. The phase reversal between the input and output voltages in single stage CE amplifier is
 a) $\pi/2$
 b) 2π
 c) π
 d) $3\pi/2$

58. The following arrangement perform the logic function of _____ gate
 a) AND
 b) OR
 c) NAND
 d) EXOR

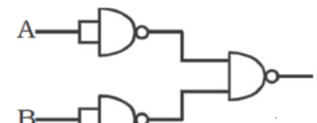


MARCH - 2012

59. Avalanche breakdown is primarily dependent on the phenomenon of
 a) collision
 b) ionisation
 c) doping
 d) recombination

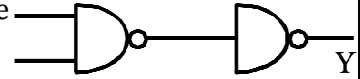
60. The colour of light emitted by a LED depends on
 a) Its reverse bias
 c) its forward bias
 b) the amount of forward current
 d) type of semiconductor material

61. The following arrangement performs the logic function of ----- gate
 a) AND
 b) OR
 c) NAND
 d) EXOR



JUNE - 2012

62. Avalanche breakdown is primarily dependent on the phenomenon of
 a) recombination b) doping c) ionisation d) collision
63. The following arrangement performs the logic function of ----- gate
 a) AND b) OR c) NAND d) EXOR
64. In a PN junction diode on the side of N but very close to the junction there are
 a) donor atoms b) acceptor atoms
 c) immovable positive ions d) immovable negative ions

**LESSON - 10 - COMMUNICATION SYSTEMS (2 questions)****MODEL QUESTION PAPER**

1. In TV transmission, the picture should not be scanned during the return journey of the scanning. This is done by -----
 a) blanking pulse b) saw tooth potential c) horizontal synchronising pulse d) vertical synchronising pulse
2. Through which mode of propagation, the radio waves can be sent from one place to another
 a) ground wave propagation b) sky wave propagation
 c) space wave propagation d) all the above

MARCH - 2006

3. High frequency waves follow
 a) the ground wave propagation b) the line of sight direction
 c) ionospheric propagation d) the curvature of the earth
4. In television, blanking pulse is applied to
 a) horizontal plates b) vertical plates c) control grid d) filament

JUNE - 2006

5. High frequency waves follow
 a) the ground wave propagation b) the line of sight direction
 c) ionospheric propagation d) the curvature of the earth
6. In a AM superheterodyne receiver, the local oscillator frequency is 1.245MHz. The tuned station frequency is -----
 a) 455 kHz b) 790 kHz c) 690 kHz d) 990 kHz

OCTOBER - 2006

7. The radio waves after refraction from different parts of ionosphere on reaching the earth are called as
 a) ground waves b) sky waves c) space waves d) microwaves
8. The principle used for transmission of light signals through optical fibre is
 a) refraction b) diffraction c) polarisation d) total internal reflection

MARCH - 2007

9. Digital signals are converted into analog signals using -----
 a) FAX b) modem c) cable d) coaxial cables
10. The RF channel in a radio transmitter produces
 a) audio signals b) high frequency carrier waves
 c) both audio and high frequency carrier waves d) low frequency carrier waves

JULY - 2007

11. In amplitude modulation, the band width is
 a) equal to the signal frequency b) twice the signal frequency
 c) Thrice the signal frequency d) four times the signal frequency

12. In interlaced scanning time taken to scan one line is

- a) 20 ms b) 64 μ s c) 50 ms d) 100 μ s

SEPTEMBER - 2007

13. The first man - made satellite is

- a) Aryabhata b) Sputnik c) Venera d) Rohini

MARCH - 2008

14. The audio frequency range is

- a) 20 Hz - 200000 Hz b) 20 Hz - 2000 Hz c) 20 Hz to 2000000 Hz d) 20 Hz to 20000 Hz

15. Printed document to be transmitted by fax are converted into electrical signals by the process of

- a) Reflection b) scanning c) modulation d) light variation.

JUNE - 2008

16. The purpose of dividing each frame into two fields so as to transmit 50 views of the picture per second is

- a) To avoid flicker in the picture b) The fact that handling of higher frequencies is easier
c) That 50 Hz is the power line frequency is easier d) To avoid unwanted noises in the signals.

17. Printed document to be transmitted by fax are converted into electrical signals by the process of

- a) Reflection b) scanning c) modulation d) light variation.

OCTOBER - 2008

18. Skip distance is the shortest distance between

- a) The point of transmission and the point of reception
b) The uplink station and the downlink station
c) The transmitter and the target d) The receiver and the target

19. Printed document to be transmitted by fax are converted into electrical signals by the process of

- a) Reflection b) scanning c) modulation d) light variation.

MARCH - 2009

20. The RF channel in a radio transmitter produces

- a) audio signals b) high frequency carrier waves
c) both audio and high frequency carrier waves d) low frequency carrier waves

21. An FM signal has a resting frequency of 105 MHz and highest frequency of 105.03 MHz, when modulated by a signal. Then the carrier swing is

- a) 0.03 MHz b) 0.06 MHz c) 0.03 kHz d) 60 MHz

JUNE - 2009

22. Printed document to be transmitted by fax are converted into electrical signals by the process of

- a) Reflection b) scanning c) modulation d) light variation.

23. In the AM superheterodyne receiver system the value of the intermediate frequency is equal to

- a) 445 kHz b) 455 kHz c) 485 kHz d) 465 kHz

OCTOBER - 2009

24. In television, blanking pulse is applied to

- a) horizontal deflector plates b) vertical deflector plates c) control grid d) filament

25. Digital signals are converted into analog signals using

- a) Fax b) modem c) cable d) co - axial cable

MARCH - 2010

26. The principle used for transmission of light signals through optical fibre is

- a) total internal reflection b) refraction c) diffraction d) polarisation

27. The RF channel in a radio transmitter produces

- a) audio signals b) high frequency carrier waves
c) both audio and high frequency carrier waves d) low frequency carrier waves

JUNE - 2010

28. Printed document to be transmitted by fax are converted into electrical signals by the process of

- a) Reflection b) scanning c) modulation d) light variation.

29. In an AM receiver, the local oscillator frequency is 2750kHz. The tuned station frequency is -----
 a) 2905 kHz b) 2295 kHz c) 3055 kHz d) 2250 kHz

OCTOBER - 2010

30. For FM receivers, the intermediate frequency is
 a) 455 kHz b) 455 MHz c) 10.7 kHz d) 10.7 MHz
31. Printed document to be transmitted by fax are converted into electrical signals by the process of
 a) Reflection b) scanning c) modulation d) light variation.

MARCH - 2011

32. Printed document to be transmitted by fax are converted into electrical signals by the process of
 a) Reflection b) scanning c) modulation d) light variation.
33. In television, blanking pulse is applied to
 a) cathode b) control grid c) filament d) Anode

JUNE - 2011

34. Printed document to be transmitted by fax are converted into electrical signals by the process of
 a) Reflection b) scanning c) modulation d) light variation.
35. The intermediate frequency of the superhetrodyne AM receiver is
 a) 455 kHz b) 10.7 MHz c) 455 Hz d) 455 MHz.

OCTOBER - 2011

36. Printed document to be transmitted by fax are converted into electrical signals by the process of
 a) Reflection b) scanning c) modulation d) light variation.
37. The RF channel in a radio transmitter produces
 a) audio signals b) high frequency carrier waves
 c) both audio and high frequency carrier waves d) low frequency carrier waves

MARCH - 2012

38. In amplitude modulation, the band width is
 a) equal to the signal frequency b) twice the signal frequency
 c) Thrice the signal frequency d) four times the signal frequency
39. The purpose of dividing each frame into two fields so as to transmit 50 views of the picture per second is
 a) To avoid flicker in the picture b) The fact that handling of higher frequencies is easier
 c) That 50 Hz is the power line frequency is easier d) To avoid unwanted noises in the signals

JUNE - 2012

40. Printed document to be transmitted by fax are converted into electrical signals by the process of
 a) Reflection b) scanning c) modulation d) light variation.
41. intermediate frequency in FM receivers
 a) 455 kHz b) 10.7 MHz c) 40 MHz d) 22 MHz

ANSWER KEY FOR PUBLIC ONE MARK QUESTIONS

QUE NO	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9	UNIT 10
1)	D	A	A	B	D	C	D	B	A	A
2)	C	D	C	B	D	A	D	B	C	D
3)	A	B	C	D	C	D	B	A	C	C
4)	B	D	C	D	D	C	C	C	B	C
5)	A	A	C	B	A	B	D	B	D	C
6)	B	D	B	B	A	A	C	B	B	B
7)	A	D	A	C	C	A	D	B	B	B
8)	D	A	A	B	D	B	D	A	D	D
9)	D	D	D	A	D	C	D	C	D	B
10)	B	C	B	A	B	A	A	D	C	B
11)	D	B	D	D	B	A	C	B	C	B
12)	B	B	D	C	D	B	C	*	A	B
13)	C	D	C	B	D	A	D	D	A	B
14)	D	D	D	B	C	D	A	C	B	D
15)	D	C	D	C	C	C	A	B	A	B
16)	A	B	A	D	D	C	B	*	A	A
17)	C	D	C	C	B	A	D	C	C	B
18)	D	C	A	A	A	A	A	C	B	A
19)	C	D	A	A	A	C	A	C	B	B
20)	C	B	C	B	A	C	C	C	A	B
21)	D	B	D	B	C	A	A	C	B	B
22)	A		A	A	A	C	C	C	D	B
23)	A		C	B	B	C	D	A	D	B
24)	C		C	C	D	C	C	A	A	C
25)	A		D	C	B	D	A	C	C	B
26)	A		C	B	A	D	D	B	D	A
27)	C		D	B	C	C	C	C	A	B
28)	D		A	A	D	A	D	A	A	B
29)	A		C	B	A	C	D	C	B	B
30)	A		D	A	A	B	C	B	D	D
31)	C		C	B	A	C	A	C	D	B
32)	C		C	A	C	B	B	D	B	B
33)	D		C	B	D	B	D	C	A	B
34)	D		A	C	C	D	A	C	A	B
35)	C		D	B	B	B	A	C	A	A
36)	C		D	C	D	B	A	B	A	B
37)	A		C	C	D	C	C	A	C	B
38)	A		D	C	A	B	A	B	D	B
39)	B		C	B	B	B	A	C	C	A
40)	C		D	D	D	B	D	D	A	B
41)	D		C	A	D	B	A	D	A	B
42)	B		C	D	C	C	B	C	B	
43)	A			B	D	A		B	C	
44)	B			A	B	C		C	D	
45)	C			A	A	A		A	A	
46)	B			A	B	C		C	D	
47)	B			A	C	B		D	C	
48)	D			C	B	D		A	D	
49)	C			C	A	C		D	A	
50)	D			A	D	C		B	A	

QUE NO	UNIT 1	UNIT 2	UNIT 3	UNIT 4	UNIT 5	UNIT 6	UNIT 7	UNIT 8	UNIT 9	UNIT 10
51)	B			C	A	C		B	D	
52)	A			A	D	C		B	A	
53)	B			D	C	C		A	D	
54)	A			B	A	C		C	D	
55)	C			D	B	B		B	B	
56)	D			C	A	A		D	B	
57)	B			A	D	B		A	C	
58)	A			A	A	B		A	A	
59)	B			B	B	D		C	A	
60)	D			B	C	B		C	D	
61)	D			A	A	B		C	B	
62)	C			C	B	C		B	D	
63)	D			C	A	A		D	A	
64)	D			A	D	C		C	C	
65)	D			D	D	A		D		
66)	C			A	C	A		C		
67)	C			A	A	B		B		
68)	A			D	D	A		A		
69)	D			D	A	C		C		
70)	A			B	C	A		C		
71)	B*			B	A	C		B		
72)	B			B	B	C		C		
73)	B			B	A	B		B		
74)	A			D	C	C		C		
75)	D			A	A	C		B		
76)	B			A	D	B		B		
77)	D			D	D	B		C		
78)	C			A	A	C		B		
79)	A			B	B	B		C		
80)	C			B	C	C		B		
81)	C			B	D	C		D		
82)	A			A	A	B		A		
83)	C			C	A	D		C		
84)	D			D	D	B		A		
85)										
86)										
87)										
88)										
89)										
90)										
91)										
92)										
93)										
94)										
95)										
96)										
97)										
98)										
99)										
100)										