



**RAMCO INSTITUTE OF TECHNOLOGY**

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**+2 Board Examinations  
Multiple choice Questions  
with answers**

**Subject:  
Physics I and II**

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**UNIT I**  
**ELECTROSTATICS**

1. Electric force is greater than gravitational force by a factor of  
(a)  $10^{41}$                       (b)  $10^{21}$                       (c)  $10^{42}$                       (d)  $10^{24}$
2. Charging the objects through rubbing is called ----- charging.  
(a) Monoelectric    (b) Tetraboelectric    (c) Diboelectric    (d) triboelectric
3. Charges are neither created or nor destroyed but can only be transferred from one object to other is called  
(a) Conservation law              (b) Coulomb's law              (c) Benjamin Franklin law  
(d) Faraday's law
4. The e value of  $1.6 \times 10^{-19}$  C was founded by  
(a) Robert Hall                      (b) Robert Hook                      (c) Robert Millikan  
(d) Robert Boyle
5. When a glass rod is rubbed with silk cloth, the number of charges transferred is the order of  
(a)  $10^{-10}$                       (b)  $10^{10}$                       (c)  $10^{12}$                       (d)  $10^{-12}$
6. What type of charge is acquired by ebonite rod, when an ebonite rod is rubbed with wool?  
(a) Positive              (b) Negative              (c) Neutral              (d) Both (a) & (b)
7. In which year Coulomb deduced the expression for the force between two stationary point charges in vacuum or free space.  
(a) 1786                      (b) 1876                      (c) 1678                      (d) 1867
8. Coulomb's law has same structure of  
(a) Newton's laws of motion                      (b) Newtonian mechanics  
(c) Newton's law of gravitation                      (d) Newton's law of cooling
9. The gravitational constant and k value in (Coulomb's law) is  
(a)  $G = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$ ;  $k = 6.67 \times 10^{-11} \text{ Nm}^2\text{kg}^{-2}$   
(b)  $G = 9 \times 10^9 \text{ Nm}^2\text{kg}^{-2}$ ;  $k = 6.67 \times 10^{-11} \text{ Nm}^2\text{C}^{-2}$   
(c)  $G = 6.67 \times 10^{-11} \text{ Nm}^2\text{kg}^{-2}$ ;  $k = 9 \times 10^9 \text{ Nm}^2\text{C}^{-2}$   
(d)  $G = 6.67 \times 10^{-19} \text{ Nm}^2\text{kg}^{-2}$ ;  $k = 9 \times 10^{19} \text{ Nm}^2\text{C}^{-2}$
10. One kg of two masses are kept in air or inside water, the gravitational force between two masses are different.  
(a) True                      (b) False
11. The interaction between multiple charges are explained by the principle of  
(a) Superposition                      (b) Supercapacitor  
(c) Superconductor                      (d) Supercritical fluid

12. The second point charge is placed at some distance from the first point charge; it experiences either an attractive or repulsive force. This phenomenon is called
- (a) Force at a distance                      (b) Action at a distance  
(c) Point at a distance                      (d) Charge at a distance
13. The SI unit of dipole moment and electric potential is
- (a) J/C; C m              (b) C m; J/C              (c) J/m; V              (d) m C; V
14. When the dipole is aligned anti-parallel to the external electric field then the potential energy is minimum.
- (a) True                      (b) False
15. Which device is used for cardiac arrest?
- (a) Heart defibrillator                      (b) Cardiac pacemakers  
(c) Cardiac ablation catheters              (d) Cardiovascular angioplasty
16. When the TV is switched off, do not touch the back side of the TV panel because
- (a) Charges are moving                      (b) High current is given  
(c) High voltage is given                      (d) Capacitor stores charges and energy
17. A capacitor of capacitance  $12 \mu\text{F}$  is fully charged by a  $100 \text{ V}$  supply. The energy stored in the capacitor is
- (a) 0.06                      (b) 0.6                      (c) 0.006                      (d) 6
18. ----- discharge reduces the total charge of the conductor near the sharp edge.
- (a) Force at a distance                      (b) Action at a distance  
(c) Corona                      (d) Point at a distance
19. What is the principle of Van de Graaff Generator?
- (a) Electrostatic shielding                      (b) Electrostatic induction  
(c) Electrostatic interaction                      (d) Electrostatic field

20. Match the following:

A. Alessandro Volta	1. Scalar
B. Electrostatics	2. Battery
C. Electric flux	3. No free electrons
D. Dielectric	4. Stationary

- (a) A-4, B-1, C-3, D-2                      (b) A-3, B-2, C-4, D-1  
(c) A-2, B-4, C-1, D-3                      (d) A-1, B-3, C-2, D-4

**Answers**

1) (c)	2) (d)	3) (a)	4) (c)	5) (b)
6) (b)	7) (a)	8) (c)	9) (c)	10) (b)
11) (a)	12) (b)	13) (b)	14) (a)	15) (a)
16) (d)	17) (a)	18) (c)	19) (b)	20) (c)

## UNIT – II

### CURRENT ELECTRICITY

1. Current flows from A to B, when.....
  - (a) A has lower potential than B
  - (b) B has lower potential than A
  - (c) Both A and B have same potential
  - (d) All are correct
2. Which one is correct statement?
  - (a) Current density is a scalar quantity and Current is a vector quantity
  - (b) Current density is a vector quantity and Current is a scalar quantity
  - (c) Both current density & current are vector quantity
  - (d) Both current density & current are scalar quantity
3. Which one is incorrect statement?
  - (a) Resistance of material directly proportional to the length of the conductor
  - (b) Resistance of material directly proportional to the resistivity of the conductor
  - (c) Resistance of material directly proportional to the area of the conductor
  - (d) Resistance of material inversely proportional to the area of the conductor
4. Water has ..... resistance compared to the skin has ..... resistance.
  - (a) Low, high
  - (b) High, low
  - (c) Both have equal
  - (d) None of the above
5. Drift velocity of electrons in the wire
  - (a)  $10^{-4} \text{ m.s}^{-1}$
  - (b)  $10^{-2} \text{ m.s}^{-1}$
  - (c)  $10^4 \text{ m.s}^{-1}$
  - (d)  $10^{-3} \text{ m.s}^{-1}$
6. Determine the number of electrons flowing per second through a conductor, when a current of 32 A flows through it
  - (a)  $200 \times 10^{17}$
  - (b)  $200 \times 10^{19}$
  - (c)  $200 \times 10^{18}$
  - (d)  $200 \times 10^{18}$
7. If the temperature of a conductor increases, the average kinetic energy of electrons in the conductor .....
  - (a) Increases
  - (b) Decreases
  - (c) Same
  - (d) All are correct
8. Resistance of superconductor materials become zero at
  - (a) Below the  $T_C$
  - (b) Above the  $T_C$
  - (c) Equal to  $T_C$
  - (d) None of the above

9. .... is applicable for complex circuit &..... is applicable for simple circuit

- (a) Ohm's law & Kirchhoff's law
- (b) Kirchhoff's law & Ohm's law
- (c) Kirchhoff's law & Kirchhoff's law
- (d) Ohm's law & Ohm's law

10. Match the following

Column – I	Column – II
(1) Current rule	(i) measure the current and resistance
(2) Loop rule	(ii) Kirchhoff's first rule
(3) Potentiometer	(iii) Kirchhoff's second rule
(4) Wheatstone's bridge	(iv) measure the unknown resistance

- (a) (1)- (ii); (2)-(iii); (3)-(i); (4)-(iv)
- (b) (1)- (i); (2)-(iii); (3)-(ii); (4)-(iv)
- (c) (1)- (ii); (2)-(i); (3)-(iii); (4)-(iv)
- (d) (1)- (ii); (2)-(iv); (3)-(iii); (4)-(ii)

11. Find out the incorrect statement

- (a) Flow of current varies directly as the square of the current
- (b) Flow of current varies directly as the resistance of the circuit
- (c) Flow of current varies directly as the time of flow
- (d) Flow of current varies directly as the square root of the current

12. Thermocouple is a ....

- (a) Two same metals combined to produce the a two junctions
- (b) Two same metals combined to produce the a single junction
- (c) Two dissimilar metals combined to produce the a single junction
- (d) Two dissimilar metals combined to produce the a two junctions

13. If several resistances connected in series combination, resultant resistance is .....

- (a)  $R_S = (R_1 + R_2 + R_3 \dots\dots\dots)$
- (b)  $1/R_S = (1/R_1 + 1/R_2 + 1/R_3 \dots\dots\dots)$
- (c)  $R_S = (R_1 - R_2 - R_3 \dots\dots\dots)$
- (d)  $1/R_S = (1/R_1 - 1/R_2 - 1/R_3 \dots\dots\dots)$

14. Match the following

Column – I	Column – II
(1) Seebeck effect	(i) Temperature difference → Current
(2) Thermoelectric Effect	(ii) Temperature difference → Potential difference
(3) Peltier effect	(iii) Current → Temperature difference
(4) Thomson effect	(iv) Temperature difference → emf

- (a) (1)- (ii); (2)-(iii); (3)-(i); (4)-(iv)
- (b) (1)- (i); (2)-(iii); (3)-(ii); (4)-(iv)
- (c) (1)- (iv); (2)-(i); (3)-(iii); (4)-(ii)
- (d) (1)- (ii); (2)-(iv); (3)-(iii); (4)-(ii)

15. Find out the correct statement

- (a) Resistivity of conductor (wire) independent to the material
- (b) Resistivity of conductor (wire) depends on the material
- (c) Resistivity of conductor(wire) depends on the diameter
- (d) Resistivity of conductor (wire) depends on the length

16. The average time between successive collisions is called as .....

- (a) Drift velocity
- (b) Relaxation time
- (c) Free time
- (d) Mean free time

17. Semiconductor has resistivity ..... than conductor and ..... then insulator

- (a) Greater & Greater
- (b) Less & Less
- (c) Greater & Less
- (d) Less & Greater

18. Red color in the resistor is equivalent to the multiplier of

- (a)  $10^1$
- (b)  $10^3$
- (c)  $10^4$
- (d)  $10^2$

19. Multimeter used to measure the .....

- (a) Current only
- (b) Voltage only
- (c) Capacitance only
- (d) All the above

20. For dissipation of electrical power, current is doubled

- (a) Power will increase by two times
- (b) Power will increase by four times
- (c) Power will decrease by four times
- (d) Power will decrease by two times

**Answers**

1) (b)	2) (b)	3) (c)	4) (a)	5) (a)
6) (c)	7) (a)	8) (a)	9) (b)	10) (a)
11) (d)	12) (d)	13) (a)	14) (c)	15) (b)
16) (d)	17) (c)	18) (d)	19) (d)	20) (b)

## UNIT – III

### MAGNETISM AND MAGNETIC EFFECTS OF ELECTRIC CURRENT

1. The resistance of an ideal ammeter is
  - (a) Infinity
  - (b) Finite
  - (c) Zero
  - (d) None of the above
2. The equivalent of One tesla
  - (a) Weber/m
  - (b) Weber/ meter square
  - (c) A/m
  - (d) Am
3. The angle between geographical meridian and magnetic meridian is called
  - (a) Magnetic Inclination
  - (b) Vertical component of earth magnetic field
  - (c) Magnetic dip
  - (d) Declination
4. The magnetic dipole moment is defined as the
  - (a) pole strength x magnetic length
  - (b) Pole strength / magnetic Length
  - (c) Magnetic Length / Pole strength
  - (d)  $2 \times (\text{magnetic Length} / \text{Pole strength})$
5. The number of magnetic field lines crossing per unit area is called
  - (a) Magnetic field
  - (b) Magnetic dipole
  - (c) Magnetic current
  - (d) Magnetic Flux
6. The magnetic dipole moment of any current loop is equal to
  - (a) Area/Current
  - (b) Area  $\times$  Current
  - (c) Current / Area
  - (d) Current/ Length
7. Ampere's law is similar to
  - (a) Gauss's law in electro statics
  - (b) Lens law
  - (c) Fleming left hand rule
  - (d) None of the above
8. The length of the bar magnet is called
  - (a) Magnetic Length
  - (b) Geometrical length
  - (c) Pole length
  - (d) None of the above



9. The angular momentum of an electron moving in a stationary orbit is
- (a) Continuous (b) Equally separated  
(c) Not defined (d) Quantized
10. Magnetic field due to the current carrying wire of infinite length is
- (a) Inversely proportional to distance  
(b) Proportional to distance  
(c) Inversely proportional to current  
(d) None of the above
11. If the charge ( $e$ ) is moving in both the electric and magnetic fields, the force is
- (a)  $F = qE(v \cdot A)$  (b)  $F = qE(v \cdot B)$   
(c)  $F = qE(v \times B)$  (d)  $F = qE(B \times v)$
12. The strength of the magnetic field is measured in
- (a) Tesla (b) Gauss  
(c) Weber (d) Volt
13. The period of cyclotron is inversely proportional to
- (a) Magnetic field  
(b) Mass  
(c) Acceleration  
(d) None of the above
14. If the current carrying conductor is placed perpendicular to the magnetic field
- (a)  $F = 0$  (b)  $F = ILB$   
(c)  $F = IL$  (d) None of the Above
15. The value of horizontal component of earth's magnetic field in equator is
- (a) Minimum  
(b) Zero  
(c) Finite  
(d) Maximum
16. The force between two parallel wire carrying current in same direction is
- (a) Repulsive  
(b) Attractive  
(c) Neutral  
(d) Not defined

17. The cyclotron cannot accelerate
- (a) Proton
  - (b) Electron
  - (c) Deuteron
  - (d) Alpha particle
18. An ideal voltmeter has
- (a) Zero resistance
  - (b) Finite resistance
  - (c) Infinite resistance
  - (d) None of the above
19. Two coulomb charged particle is moving in 1000 v/m. the Lorentz force is
- (a) 2000 N
  - (b) 1000 N
  - (c) 500 N
  - (d) 100 N
20. The length of a conductor is 3m. It is planed perpendicular to a uniform magnetic field of 0.6 T. If a current od 2A flows through the conductor then, the force acting will be
- (a) 3.6 N
  - (b) 1.8 N
  - (c) 1 N
  - (d) 5.2 N

**Answers**

1) (c)	2) (b)	3) (d)	4) (a)	5) (d)
6) (b)	7) (a)	8) (b)	9) (d)	10) (a)
11) (c)	12) (a)	13) (a)	14) (b)	15) (d)
16) (b)	17) (b)	18) (c)	19) (a)	20) (a)

## UNIT – IV

### ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT

1. In Fleming's right hand rule the middle finger indicates
  - (a) Direction of magnetic field
  - (b) Direction of motion of conductor
  - (c) Direction of induced current
  - (d) None of the above
2. The dimensional formula for inductance
  - (a)  $ML^2T^{-2}A^{-2}$
  - (b)  $ML^1T^{-1}A^{-2}$
  - (c)  $ML^2T^{-1}A^{-1}$
  - (d)  $ML^1T^{-2}A^{-1}$
3. Pick out the correct expression for mutual inductance between two long-coaxial solenoids if the dielectric medium is present inside;
  - i)  $M = \mu_0 n_1 n_2 A_2 l$
  - ii)  $M = \mu_0 \mu_r n_1 n_2 A_2 l$
  - iii)  $\mu n_1 n_2 A_2 l$
  - iv)  $M = \mu \mu_r n_1 n_2 A_2 l$
  - (a) i), ii) are true
  - (b) ii), iii) are true
  - (c) i), ii), iii) are true
  - (d) None of the above
4. Which one is not the energy source for producing emf
  - (a) Oscillators
  - (b) Thermoelectric devices
  - (c) Solar cells
  - (d) Electric generators
5. When the rectangular coil kept in a uniform magnetic field and the alternating voltage is given to the circuit, the current flows,
  - (a) Radially
  - (b) Tangentially
  - (c) Sinusoidally
  - (d) None of the above
6. If the output voltage is less than input voltage then it is called
  - (a) Step-up transformer
  - (b) Step-down transformer
  - (c) Power transformer
  - (d) Single Phase transformer
7. Consider the following assertions and choose the correct answer.

Energy loss in a transformer is due to i) Hysteresis loss ii) Copper loss iii) Flux leakage

  - (a) i), ii) are true
  - (b) ii), iii) are true
  - (c) i), iii) are true
  - (d) All are true
8. The self-inductance of a straight conductor is
  - (a) Infinity
  - (b) Finite
  - (c) Zero
  - (d) None of the above
9. The rms value of AC voltage with peak value of 311 V is
  - (a) 110 V
  - (b) 440 V
  - (c) 220 V
  - (d) 70.7 V
10. An ideal inductor of ----- resistance to steady DC current
  - (a) Maximum resistance
  - (b) Minimum resistance
  - (c) Zero resistance
  - (d) None of the above

11. In an inductive circuit (AC circuit containing an inductor) the current lags behind the applied voltage by  
 (a)  $\pi/2$                       (b) 2                      (c)  $\pi$                       (d)  $2\pi/3$
12. When a current of 2A is flowing through a coil of 1000 turns produces a magnetic flux of 2 m wb. Calculate the self-inductance of the coil.  
 (a) 1 H                      (b) 2 H                      (c) 1.5 H                      (d) 2.2 H
13. The magnification of voltage at series RLC resonance is termed as  
 (a) Q-factor                      (b) Power                      (c) Phase angle                      (d) None of the above
14. Pick out the statement which is not correct  
 i) The generation AC is costly    ii) AC transmission losses are small compared to DC transmission  
 iii) AC cannot be easily converted into DC  
 (a) i), ii) are incorrect                      (b) i), iii) are incorrect  
 (c) ii),iii) are incorrect                      (d) All the above
15. In capacitors energy is stored in the form of  
 (a) Electric field                      (b) Magnetic field  
 (c) Both                      (d) None of the above
16. Power loss can be tackled by reducing  
 (a) Voltage or resistance                      (b) Current or resistance                      (c) both                      (d) None
17. Calculate the RMS value of current if the capacitive reactance is  $1000 \Omega$  and  $V_{RMS}$  is 220 V  
 (a) 2.2 A                      (b) 1.1 A                      (c) 0.22 A                      (d) 3.3 A
18. According to Kirchhoff's loop rule, the algebraic sum of potential differences in a Closed circuit is  
 (a) 1                      (b) 0                      (c)  $\infty$                       (d) None of the above
19. Induced emf can be produced by  
 (a) Changing electric field                      (b) Changing magnetic field  
 (c) Both                      (d) None of the above
20. An ideal transformer has 460 and 30,000 turns in the primary and secondary coils. Find the voltage developed per turn of the secondary if the transformer is connected to 230 V AC mains  
 (a) 20000 V                      (b) 10000 V                      (c) 25000 V                      (d) 15000 V

**Answer**

1) (c)	2) (a)	3) (b)	4) (a)	5) (c)
6) (b)	7) (d)	8) (c)	9) (c)	10) (c)
11) (a)	12) (a)	13) (a)	14) (b)	15) (a)
16) (b)	17) (c)	18) (b)	19) (b)	20) (d)

## UNIT – V

### ELECTROMAGNETIC INDUCTION AND ALTERNATING CURRENT

1. In Maxwell's prediction, light is an ----- wave which moves with the speed of -----  
(a) Transverse, 330 m/s                      (b) Transverse,  $3 \times 10^8$  m/s  
(c) Electromagnetic,  $3 \times 10^8$  m/s        (d) Electromagnetic, 330 m/s
2. Our modern technological revolution is due to ----- laws of electromagnetic induction  
(a) Faraday                      (b) Gauss                      (c) Maxwell                      (d) Ampere
3. **Statement 1:** Faraday's law of electromagnetic induction states that the change in magnetic field produces an electric field.  
**Statement 2:** Maxwell showed that the change in electric field also produces a magnetic field  
(a) Only Statement 1 is correct    (b) Only Statement 2 is correct  
(c) Both statements are wrong    (d) Both statements are correct
4. ----- equations completely explain the behaviour of charges, currents and properties of electric and magnetic fields  
(a) Maxwell's                      (b) Hertz                      (c) Ampere                      (d) Fraunhofer
5. Which law can be used to find the magnetic field produced around the current carrying wire?  
(a) Maxwell's law    (b) Gauss law    (c) Ampere's circuital law    (d) Faraday's law
6. Maxwell's displacement current is  
(a)  $D = \frac{dc}{dt}$                       (b)  $i_d = \frac{dq}{dt}$                       (c)  $D = \frac{di}{dt}$                       (d)  $i_d = \frac{dc}{dt}$
7.  $\oint \mathbf{B} \cdot d\mathbf{l} = \mu_0 i_c + \mu_0 \epsilon_0 \frac{d\phi_E}{dt}$  is named as  
(a) Ampere – Faraday law                      (b) Faraday – Maxwell law  
(c) Gauss – Maxwell law                      (d) Ampere – Maxwell law
8. Which Maxwell's equation is called Faraday's law of electromagnetic induction?  
(a) First                      (b) Second                      (c) Third                      (d) Fourth
9. Maxwell's Fourth equation is also known as  
(a) Ampere– Faraday law                      (b) Faraday – Maxwell law  
(c) Gauss –Maxwell law                      (d) Ampere – Maxwell law
10. Who was experimentally confirmed the Maxwell's production of electromagnetic waves?  
(a) Heinrich Rudolf Hertz                      (b) Ampere  
(c) Maxwell                      (d) Faraday

11. In which frequency range exhibits photo-electric effect?  
 (a)  $10^{17}$  Hz to  $10^{19}$  Hz                      (b)  $10^{11}$  Hz to  $4 \times 10^{14}$  Hz  
 (c)  $4 \times 10^{14}$  Hz to  $8 \times 10^{14}$  Hz              (d)  $8 \times 10^{14}$  Hz to  $10^{17}$  Hz
12. ----- rays are used to detect the invisible writing  
 (a) Ultraviolet radiation              (b) Visible              (c) Infrared                      (d) Radio waves
13. Gamma rays have has ----- charge but -----to human body  
 (a) Positive, Strength                      (b) Negative, harmful  
 (c) no, harmful                              (d) Positive, Harmful
14. Electromagnetic waves do not require any medium for propagation  
 (a) True                                      (b) False
15. ----- are also known as discontinuous spectra.  
 (a) Continuous spectra              (b) Line spectra              (c) band spectra              (d) Fraunhofer lines
16. Which wave is used for communication purpose?  
 (a) Ultraviolet                      (b) Visible                      (c) Infrared                      (d) Radio
17. The relative magnetic permeability of the medium is 1.5 and the relative electrical permittivity of the medium is 1.25. Compute the refractive index of the medium.  
 (a) 1.37                                      (b) 2.37                                      (c) 1.73                                      (d) 2.73
18. The beam of white light is passing through the prism; it is split into its seven constituent colours. This phenomenon is called  
 (a) Dispersion                      (b) Scattering                      (c) Reflection                      (d) Interference
19. When the spectrum obtained from the Sun is examined, it consists of a large number of dark lines. These dark lines are known as -----  
 (a) Continuous line                      (b) Discontinuous line  
 (c) Band line                              (d) Fraunhofer lines
20. The conduction current is zero for between the plates, while the displacement current is  
 (a) Zero                                      (b) Large                                      (c) Small                                      (d) Non-zero

**Answers**

1) (c)	2) (a)	3) (d)	4) (a)	5) (c)
6) (b)	7) (d)	8) (c)	9) (d)	10) (a)
11) (c)	12) (a)	13) (c)	14) (a)	15) (b)
16) (d)	17) (a)	18) (a)	19) (d)	20) (d)

## UNIT – VI

### OPTICS

1. A ray of light gives information about .....  
(a) Direction of light            (b) Intensity            (c) Colour            (d) All are correct
2. According to law of reflection, angle of incidence is ..... the angle of reflection.  
(a) Greater than            (b) Less than            (c) Equal            (d) Two times
3. Find out the incorrect statement.  
(a) The image formed by a plane mirror is virtual, erect, and laterally inverted  
(b) The size of the image is not equal to the size of the object.  
(c) The image distance far behind the mirror is equal to the object distance in front of it.  
The size of the image is equal to the size of the object.
4. Concave mirror is ..... reflective and convex mirror is .....reflective.  
(a) Outer & Inner            (b) Inner & Inner            (c) Outer & Outer            (d) Inner & Outer
5. Find out the correct statement  
(a) The rays travelling far away from the principal axis and make small angles with it are called paraxial rays.  
(b) The rays travelling very close to the principal axis and make large angles with it are called paraxial rays  
(c) The rays travelling far away from the principal axis and fall on the mirror far away from the pole are called as marginal rays  
(d) The rays travelling very close to the principal axis and fall on the mirror far away from the pole are called as marginal rays
6. The mirror equation establishes a relation between ..... for a spherical mirror  
(a) Object point, Image distance and Focal length  
(b) Object distance, Image distance and Focal length  
(c) Object distance, Image point and Focal length  
(d) Object distance, Image distance and Focal point
7. Fizeau's method can be used to determine  
(a) Velocity of light            (b) Speed of light  
(c) Velocity of sound            (d) Speed of sound
8. Match the following

<b>Media</b>	<b>Refractive index</b>
(A) Pure water	(i) 1.52
(B) Glass	(ii) 2.42
(C) Diamond	(iii) 1.00
(D) Vacuum	(iv) 1.33

- (a) (A)-(i); (B)-(ii); (C)-(iii); (D)-(iv)
- (b) (A)-(iv); (B)-(i); (C)-(ii); (D)-(iii)
- (c) (A)-(iv); (B)-(ii); (C)-(iii); (D)-(i)
- (d) (A)-(iv); (B)-(iii); (C)-(ii); (D)-(i)

9. Find out the incorrect statement

- (a) When light passes from rarer medium to denser medium, it deviates towards normal in the denser medium
- (b) When light passes from denser medium to rarer medium, it deviates away from normal in the rarer medium
- (c) In any refracting surface there will also be some reflection taking place
- (d) In any refracting surface, some reflection cannot be taking place

10. For normal incidence of light on a surface, the angle of incidence is ....

- (a) Maximum
- (b) Minimum
- (c) Equal to one
- (d) Equal to zero

11. Light travel from the transparent oil to glass of refractive index 1.5. If the refractive index of glass with respect to the oil is 1.5, what is the refractive index of the oil?

- (a) 1.2
- (b) 1.5
- (c) 1.0
- (d) 3.0

12. Give the correct answer;: The conditions for total internal reflection are (i) light must travel from denser to rarer medium, (ii) angle of incidence in the denser medium must be greater than critical angle.

- (a) Statement (i) is correct & statement (ii) is incorrect
- (b) Statement (i) is incorrect & statement (ii) is correct
- (c) Statement (i) is incorrect & statement (ii) is incorrect
- (d) Statement (i) is correct & statement (ii) is correct

13. Crown Glass has the value of refractive index is .... and critical angle is .....

- (a) 1.458 & 40.5°
- (b) 1.541 & 40.5°
- (c) 1.458 & 43.3°
- (d) 1.541 & 43.3°

14. A plane surface has its center of curvature at infinity, and its radius of curvature is .....

- (a) Zero
- (b) One
- (c) Infinity
- (d) All are correct

15. Pick the correct expression of lens maker's formula,

- (a)  $\frac{1}{f} = (n + 1) \left( \frac{1}{R_1} + \frac{1}{R_2} \right)$
- (b)  $\frac{1}{f} = (n - 1) \left( \frac{1}{R_1} + \frac{1}{R_2} \right)$
- (c)  $\frac{1}{f} = (n - 1) \left( \frac{1}{R_1} - \frac{1}{R_2} \right)$
- (d)  $\frac{1}{f} = (n - 1) \left( \frac{1}{R_2} - \frac{1}{R_1} \right)$



16. If the focal length is 1.5 m for a glass lens, what is the power of the lens?

- (a) 0.67                      (b) 1.67                      (c) 1.0                      (d) -0.67

17. Find out the correct statement.

- (a) Angle of deviation depends on the angle of incidence.  
(b) Angle of deviation depends on the angle of the prism.  
(c) Angle of deviation depends on the wavelength of the light.  
(d) All are correct.

18. Angular dispersion is defined as the angular separation between the .....

- (a) Red & Violet colour                      (b) Violet & Yellow colour  
(c) Green & Black colour                      (d) Red & Black colour

19. Rainbow is an example of .....

- (a) Refraction                      (b) Scattering                      (c) Dispersion                      (d) Reflection

20. Intensity of Rayleigh's scattering is .....

- (a) Inversely proportional to fourth power of frequency  
(b) Directly proportional to fourth power of wavelength  
(c) Directly proportional to fourth power of frequency  
(d) Inversely proportional to fourth power of wavelength

**Answers**

1) (a)	2) (c)	3) (b)	4) (d)	5) (c)
6) (b)	7) (b)	8) (b)	9) (d)	10) (d)
11) (c)	12) (d)	13) (b)	14) (c)	15) (c)
16) (a)	17) (d)	18) (a)	19) (c)	20) (d)

## UNIT – VII

### DUAL NATURE OF RADIATION AND MATTER

1. The minimum energy needed for an electron to escape from the metal surface is called
  - (a) Work function
  - (b) Thermionic emission
  - (c) Electron emission
  - (d) None of the above
2. The potential barrier which prevents free electrons from leaving the metallic surface is called
  - (a) Volume barrier
  - (b) Surface barrier
  - (c) Atomic barrier
  - (d) Nucleus barrier
3. The liberation of electrons from any surface of a substance is called
  - (a) Electron absorption
  - (b) Electron affinity
  - (c) Electron emission.
  - (d) None of the above
4. The ejection of electrons from a metal plate when illuminated by light is
  - (a) Photoelectric effect
  - (b) Compton effect
  - (c) Photovoltaic effect
  - (d) Photodiode effect
5. The variation of photocurrent with respect to
  - (a) Intensity of incident light
  - (b) The potential difference between the electrodes
  - (c) the nature of the material
  - (d) All of the above
6. Maximum kinetic energy of the photo electrons from a given metal is directly proportional to the
  - (a) Frequency of incident light
  - (b) Wavelength of the light
  - (c) Intensity of light
  - (d) None of the above
7. Photo electric cell or photo cell is a device which converts
  - (a) Light energy into electrical energy.
  - (b) Electrical energy into light energy
  - (c) Chemical energy into electrical energy.
  - (d) All of the above
8. At the threshold frequency, the velocity of electron is
  - (a) Zero
  - (b) Maximum
  - (c) Minimum
  - (d) Infinite
9. The Photoelectric emission is an
  - (a) Isothermal Processes
  - (b) Instantaneous processes
  - (c) Slow Processes
  - (d) Adiabatic Processes
10. The light quantum can behave as a particle is called
  - (a) Electron
  - (b) Proton
  - (c) Phonon
  - (d) Photon

11. This wavelength of the matter waves is known as  
 (a) De Broglie wavelength (b) Compton wavelength  
 (c) Einstein wavelength (d) None of the above
12. The wavelength of matter waves is independent of  
 (a) Charge (b) Mass (c) Velocity (d) Momentum
13. The de Broglie wavelength is inversely proportional to  
 (a) Velocity (b) Charge (c) Planck constant (d) None of the above
14. The rest mass of the photon  
 (a) 0 (b) Infinity (c) Between zero and one (d) Equal to electron
15. The de Broglie wavelength associated with an electron accelerated by a potential of 64 V is  
 (a) 0.258 nm (b) 0.153 nm (c) 0.610 nm (d) 0.415 nm
16. The direct application of wave nature of particles  
 (a) Light microscope (b) Electron microscope  
 (c) Spectrometer (d) None of the above
17. The cyclotron cannot accelerate  
 (a) Proton (b) Electron  
 (c) Deuteron (d) Alpha particle
18. The radiation produced from such decelerating electron is called  
 (a) Bremsstrahlung radiation (b) Light radiation  
 (c) Particle radiation (d) None of the above
19. The wavelength of de- Broglie wave is 2 micrometre and its momentum is  
 (a)  $3.31 \times 10^{-28}$  Kg m/s (b)  $4.13 \times 10^{-28}$  Kg m/s  
 (c)  $8.21 \times 10^{-28}$  Kg m/s (d)  $5.81 \times 10^{-28}$  Kg m/s
20. The work function of a metal is 4.2 eV, its threshold wavelength is  
 (a) 5000Å (b) 3500Å (c) 2500Å (d) 2945Å

**Answers**

1) (a)	2) (b)	3) (c)	4) (a)	5) (d)
6) (a)	7) (a)	8) (a)	9) (b)	10) (d)
11) (a)	12) (a)	13) (a)	14) (a)	15) (b)
16) (b)	17) (b)	18) (a)	19) (a)	20) (d)

## UNIT – VIII

### ATOMIC AND NUCLEAR PHYSICS

1. Gases at normal atmospheric pressure are
  - (a) Good conductors
  - (b) Poor conductors
  - (c) Semiconductors
  - (d) Not defined
2. The force acting on the charge (e) in the electric field (E)
  - (a)  $F = eE$
  - (b)  $F = e/E$
  - (c)  $F = E/e$
  - (d)  $F = E$
3. The force experienced by the electron in uniform magnetic field applied perpendicular to its path is
  - (a)  $F = Bv/e$
  - (b)  $F = eB/v$
  - (c)  $F = v/eB$
  - (d)  $F = evB$
4. A cathode rays are
  - (a) A Stream of electrons
  - (b) A stream of positive ions
  - (c) A stream of Uncharged particles
  - (d) None of the above
5. The ratio between e/m is
  - (a) EBR
  - (b)  $E/B^2R$
  - (c)  $E^2/BR$
  - (d)  $E/BR^2$
6. The minimum distance between the centre of the nucleus and the alpha particle just before it gets reflected back through  $180^\circ$  is defined as
  - (a) Distance of closest approach
  - (b) Distance of Nuclear radius
  - (c) Distance of longest approach
  - (d) None of the above
7. The perpendicular distance between the centre of the gold nucleus and the direction of velocity vector of alpha particle
  - (a) Scattering parameter
  - (b) Collision parameter
  - (c) Impact parameter
  - (d) All of the above
8. Electrons in an atom revolve around the nucleus only in certain discrete orbits called
  - (a) Moving orbits
  - (b) Stationary orbits
  - (c) Elliptical orbit
  - (d) Circular orbit
9. The angular momentum of the electron in these stationary orbits is
  - (a) Quantized
  - (b) Continuous
  - (c) Quantized and Continuous
  - (d) None of the above
10. The relation between Angular momentum (L) and Linear velocity (v)
  - (a)  $L = mvr$
  - (b)  $L = mv/r$
  - (c)  $L = m/vr$
  - (d)  $L = v/mr$
11. The relation between the bohr radius and quantum number
  - (a)  $r_n = a_0^2 n^2$
  - (b)  $r_n = 2a_0^2 n$
  - (c)  $r_n = a_0 n^2$
  - (d)  $r_n = a_0^2 n$
12. The relation between nth energy state and quantum number is
  - (a)  $E_n = - 13.6 \text{ eV}/n^2$
  - (b)  $E_n = 13.6 \text{ eV}/n^2$
  - (c)  $E_n = - 3.4 \text{ eV}/n^2$
  - (d)  $E_n = 3.4 \text{ eV}/n^2$

13. The minimum energy required to remove an electron from an atom in the ground state is known as
- (a) Excitation energy                      (b) Binding energy  
(c) Electric energy                         (d) Work function
14. The energy required to excite an electron from lower energy state to any higher energy state is known as
- (a) Excitation energy                      (b) Binding energy  
(c) Electric energy                         (d) Work function
15. The number of protons in the nucleus is called the
- (a) Mass number                              (b) Atomic weight  
(c) Atomic number                         (d) Molecular weight
16. The total number of neutrons and protons in the nucleus is called
- (a) Mass number                              (b) Atomic weight  
(c) Atomic number                         (d) Molecular weight
17. The relation between nuclear radius and mass number
- (a)  $R = R_0 A^{2/3}$                       (b)  $R = R_0 A^{1/2}$                       (c)  $R = R_0 A^{1/3}$                       (d)  $R = R_0 A^{4/3}$
18. The minimum energy required to excite the atom from ground state of hydrogen atom
- (a) 13.6 eV                                  (b) 3.4 eV                                  (c) 10.2 eV                                  (d) 2.1 eV
19. The process of breaking up of the nucleus of a heavier atom into two smaller nuclei with the release of a large amount of energy is called
- (a) Nuclear fission                         (b) Nuclear fusion  
(c) Atomic fission                         (d) Atomic fusion
20. The moderator is a material used to convert.
- (a) fast protons into slow protons  
(b) fast electrons into slow electrons  
(c) fast neutrons into slow neutrons  
(d) Slow electrons converted into fast electrons

**Answers**

1) (b)	2) (a)	3) (d)	4) (a)	5) (b)
6) (a)	7) (c)	8) (b)	9) (a)	10) (a)
11) (c)	12) (a)	13) (b)	14) (a)	15) (c)
16) (a)	17) (c)	18) (c)	19) (a)	20) (c)

## UNIT – IX

### SEMICONDUCTOR ELECTRONICS

1. The forbidden energy gap is very large for  
(a) Conductors            (b) Semiconductors    (c) Insulators            (d) None of the above
2. Consider the following assertions and pick out the correct one.
  - i) In semiconductors electrons and holes are the charge carriers
  - ii) Number of electrons is not equal to number of holes in intrinsic semiconductors(a) i) is true            (b) ii) is true            (c) both are true            (d) None
3. P-type semiconductor is obtained by adding this impurity  
(a) Phosphorous            (b) Arsenic            (c) Boron            (d) Antimony
4. The width of the depletion layer of heavily doped p-n junction diode  
(a)  $<10^{-6}$ m            (b)  $>10^{-9}$ m            (c)  $<10^{-8}$ m            (d)  $>10^{-7}$ m
5. Determine the wavelength of light emitted from LED which is made up of GaAsP semiconductor whose forbidden energy gap is 2.8 eV ( $h = 6.6 \times 10^{-34}$ )  
(a)  $4419 \times 10^{-10}$  m    (b)  $52230 \times 10^{-10}$  m    (c)  $3986 \times 10^{-10}$  m    (d)  $6234 \times 10^{-10}$  m
6. The value of  $\alpha$  in transistor is  
(a)  $> 1$             (b)  $< 1$             (c)  $= 1$             (d) None
7. For sustained oscillations the loop phase shift must be ---- or integral multiples of -----  
(a)  $0^0$  &  $\pi$             (b)  $90^0$  &  $\pi$             (c)  $90^0$  &  $2\pi$             (d)  $0^0$  &  $2\pi$
8. Boolean equation for AND gate is  
(a)  $Y = A.B$             (b)  $Y = A+B$             (c)  $Y = A \times B$             (d)  $Y = A/B$
9. The resistivity value of semiconductors is from  
(a)  $10^{-3}$  to  $10^6 \Omega\text{m}$     (b)  $10^{-3}$  to  $10^{-6} \Omega\text{m}$     (c)  $10^{-5}$  to  $10^6 \Omega\text{m}$     (d)  $10^{-5}$  to  $10^5 \Omega\text{m}$
10. A n-type semiconductor is obtained by adding  
(a) Divalent impurity            (b) Trivalent impurity  
(c) Tetravalent impurity            (d) Pentavalent impurity
11. Which one is used in smoke detectors  
(a) Zener diode            (b) LED            (c) Photo diode            (d) Solar cell
12. In a PNP transistor, current enters from  
(a) Base to Emitter    (b) Collector to Base    (c) Emitter to Base    (d) None
13. The ratio of the change in the collector-emitter voltage to the corresponding change in the collector current is called  
(a) Knee voltage            (b) Input impedance    (c) Output impedance    (d) Current gain
14. In a positive logic system a binary 1 stands for ----- V and 0 stands for ----- V  
(a) 5V & 0V            (b) 1V & 5V            (c) 0V & 5V            (d) 5V & 1V

15. The output is high only when either of the two inputs is high. This belongs to  
 (a) AND Gate            (b) Ex-OR Gate            (c) OR Gate            (d) NOT Gate
16.  $A.0 =$   
 (a) 1                      (b) 0                      (c) A                      (d) None
17. Opto-electronic devices convert  
 (a) Light energy to Electrical energy            (b) Electrical energy to Mechanical energy  
 (c) Mechanical energy to Light energy            (d) Electrical energy to Light energy
18. Maximum value of  $\beta$  is  
 (a) 500                      (b) 1000                      (c) 700                      (d) None
19. Sinusoidal oscillations generate oscillations in the form of  
 (a) Square wave            (b) Triangular wave            (c) Sine wave            (d) Ramp wave
20. If the input to the NOT gate is  $A = 1101$ , its output is  
 (a) 1100                      (b) 0001                      (c) 1010                      (d) 0010

**Answers**

1) (c)	2) (a)	3) (c)	4) (a)	5) (a)
6) (b)	7) (d)	8) (a)	9) (c)	10) (d)
11) (c)	12) (c)	13) (c)	14) (a)	15) (b)
16) (b)	17) (d)	18) (b)	19) (c)	20) (d)

UNIT – X

COMMUNICATION SYSTEMS

1. In communication system, the transducer converts the information into
  - (a) Light signal
  - (b) Electrical signal
  - (c) Noise
  - (d) None
2. In microphone ----- energy is converted into electrical energy
  - (a) Sound energy
  - (b) Light energy
  - (c) Kinetic energy
  - (d) Mechanical energy
3. Which one does not belong to output transducer
  - (a) Loud speaker
  - (b) Picture tube
  - (c) Computer monitor
  - (d) Antenna
4. In amplitude modulation the channel bandwidth is ----- the signal frequency.
  - (a) Twice
  - (b) Thrice
  - (c) Multiple
  - (d) None
5. The height of the antenna must be a multiple of
  - (a)  $\lambda$
  - (b)  $\lambda/2$
  - (c)  $\lambda/4$
  - (d)  $2\lambda$
6. The strength of electromagnetic wave ----- while travelling from transmitter to the receiver.
  - (a) Increases
  - (b) Decreases
  - (c) Zero
  - (d) None
7. The range 3 MHz to 30 MHz belong to
  - (a) Ground wave propagation
  - (b) Sky wave propagation
  - (c) Space wave propagation
  - (d) All the above
8. To determine the geographic location of ships ----- is used
  - (a) Navigation satellite
  - (b) Weather satellite
  - (c) Communication satellite
  - (d) None
9. The principle used for fibre optic communication
  - (a) Reflection
  - (b) Refraction
  - (c) Total internal reflection
  - (d) None
10. Consider the following assertions and identify the correct statement.
  - i) Fiber optic system is immune to electrical interference
  - ii) Copper cables are costlier than fiber optic cables
  - iii) Fiber cables are not more fragile when compared to copper wires
  - (a) i) , ii) are true
  - (b) i),iii) are true
  - (c) ii), iii) are true
  - (d) All are true



11. Radar uses ----- for communication  
 (a) Sound waves (b) Microwaves  
 (c) Electromagnetic waves (d) None
12. It is made possible to control various devices from a single device using  
 (a) Optical fiber (b) Radar  
 (c) Mobile (d) Internet of Things
13. A tool used to search for information on World Wide Wb  
 (a) E-Commerce (b) Communication  
 (c) Search engine (d) None
14. Expansion of GPS  
 (a) Global Positioning System (b) Global Pointing System  
 (c) Giga Positioning Satellite (d) Giga Pointing System
15. The frequency range----- has higher than microwave radio systems.  
 (a) 200 THz - 770 THz (b) 400 THz - 790 THz  
 (c) 500 THz - 790 THz (d) 200 THz - 790 THz
16. The loss of strength of a signal while propagating through a medium is known as  
 (a) Noise (b) Music  
 (c) Attenuation (d) All the above
17. Which one is the example for wireless communication  
 (a) Telephone (b) Intercom  
 (c) Cable TV (d) Satellite
18. The electrical equivalent of the original information is called  
 (a) Low signal (b) High signal  
 (c) Baseband signal (d) Band signal
19. Oscillator generates----- for long distance transmission  
 (a) Cosine wave (b) Sinusoidal wave  
 (c) Triangular wave (d) Saw-tooth wave
20. If  $v_1$  and  $v_2$  are the lower and upper-frequency limits of a signal, the bandwidth is  
 (a)  $BW = v_1 + v_2$  (b)  $BW = v_1 - v_2$   
 (c)  $BW = v_1 / v_2$  (d)  $BW = v_2 - v_1$

**Answers**

1) (b)	2) (a)	3) (d)	4) (a)	5) (c)
6) (b)	7) (b)	8) (a)	9) (c)	10) (a)
11) (c)	12) (d)	13) (c)	14) (a)	15) (b)
16) (c)	17) (d)	18) (c)	19) (b)	20) (d)



10. Brain of the robot is
- (a) Controller (b) Mechanical parts  
(c) Sensors (d) All the above
11. In which robot part consists of motors, pistons, grippers, wheels, and gears?
- (a) Controller (b) Mechanical parts  
(c) Sensors (d) None of these
12. In which part of the robot is helps to determine the sizes and shapes of the objects around it?
- (a) Controller (b) Mechanical parts  
(c) Sensors (d) None of these
13. Cartesian, SCARA, Cylindrical, Delta, Polar and Vertically articulated are the six main types of
- (a) Industrial robots (b) Axial robots  
(c) Outer space robots (d) Household robots
14. ----- robot is used to replicate the human activities
- (a) Artificial intelligence (b) Outer space  
(c) Household (d) Human
15. Muscle wires of the robot are made up of
- (a) Metallic glasses (b) shape memory alloys  
(c) Fibre (d) None of these
16. When the air is sucked inside then Pneumatic Air Muscles contract ----- percentage.
- (a) 40% (b) 60% (c) 14% (d) 16%
17. The aim of ----- is to bring in human like behaviour in robots
- (a) Human robot (b) Industrial robot  
(c) Artificial intelligence (d) Outer space robot
18. ----- works on providing response to player's actions in computer
- (a) Human robot (b) Industrial robot  
(c) Artificial intelligence (d) Outer space robot
19. Which metal is used to make robots?
- (a) Copper and Aluminium (b) Aluminium and steel  
(c) Nickel and Steel (d) Copper and Nickel

20. Match the following

1. Outer space robots	a. packing, transport
2. Household robots	b. Arc Welding
3. Industrial Robots	c. mineralogy of the rocks
4. Six-axis robots	d. floor cleaners

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

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

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

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

**Answers**

1) (a)	2) (d)	3) (b)	4) (b)	5) (d)
6) (c)	7) (b)	8) (d)	9) (c)	10) (a)
11) (b)	12) (c)	13) (a)	14) (d)	15) (b)
16) (a)	17) (c)	18) (c)	19) (b)	20) (a)