JULY-2014
II P.U.C PHYSICS (33)

Time : 3 hrs 15 min.   **Max Marks : 70**

General instructions:
a) All parts are compulsory.
b) Answers without relevant diagram / figure / circuit wherever necessary will not carry any marks.
c) Direct answers to the Numerical problems without detailed solutions will not carry any marks.

PART – A

I Answer all the following   **10 × 1 = 10**
1. What is a capacitor?
2. Define drift velocity of electrons.
3. What is the nature of force between two parallel conductors carrying current in the same direction?
4. State Faraday's law of electromagnetic induction.
5. Which type of lens is used to correct myopia (short sightedness)?
6. What are Isotopes?
7. Mention any one application of Light Emitting Diode.
8. Write the circuit symbol of AND gate.
9. Give an expression for range of an antenna in terms of its height from ground.
10. What is amplification?

PART – B

II. Answer any FIVE of the following questions: **5×2 = 10**
11. Establish the relation between electric field and electric potential.
12. Give any two limitations of Ohm's law.
13. Write any two uses of Cyclotron.
14. State Ampere's circuital law and represent it mathematically.
15. Write any two properties of magnetic field lines.
16. What are eddy currents? Give one use of it.
17. Give any two uses of microwaves.
18. State the laws of refraction.

PART – C

III Answer any FIVE of the following Questions: **5×3 = 15**
19. Mention any three properties of electric charges.
20. Give an expression for force acting on a charge moving in magnetic field and explain the symbols. When does the force become maximum?
21. Derive an expression for electromotive force (motional EMF) induced in a rod moving perpendicular to the uniform magnetic field.
22. Derive an expression for resonant frequency of series circuit containing inductor, capacitor and resistor.
23. Write the expression for limit of resolution of (a) Microscope and (b) Telescope. Write one method of increasing the resolving power of microscope.
24. State any three features of nuclear force.
25. Define half-life period of a radioactive sample. Arrive at the relation between half-life and decay constant.
26. Give any three differences between n-type and p-type semiconductors.

PART – D

IV   Answer any TWO of the following Questions: **2×5 = 10**

27. Derive an expression for electric field at a point outside the uniformly charged spherical shell placed in vacuum using Gauss law.
28. Derive the condition for balance of Wheatstone's bridge using Kirchhoff's laws
29. Write any four properties of ferromagnetic materials and give an example for it.

**V   Answer any TWO of the following Questions:**   **2×5 = 10**

30. Derive an expression for total energy of an electron in stationary orbit of hydrogen atom.
31. Derive an expression for fringe width in case of Young's double slit experiment.
32. Explain the working of p-n junction diode as a full wave rectifier with circuit diagram. Give input and output wave forms.

VI   Answer any THREE of the following Questions: **3×5 = 15**

33. Two charges 3×10^{-8} C and 2×10^{-8} C are located 15 cm apart. At what point on the line joining the two charges is the electric potential zero? Take the potential at infinity to be zero.
34. A network of resistors is connected to 12V battery as shown in the figure. Calculate the equivalent resistance of the circuit. Obtain current in 12Ω and 6Ω resistors.

12Ω

6Ω

12V
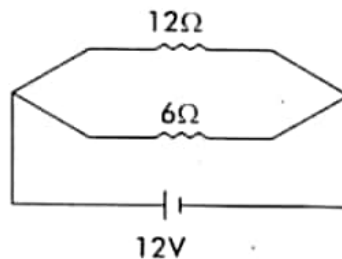
35. A pure inductor of 25mH is connected to a source of 220V and 50Hz. Find the inductive reactance, rms value of current and peal value of current in the circuit.

36. A prism of angle 60^0 produces angle of minimum deviation 40^0. What is its refractive index? Calculate the angle of incidence.

37. The work function of cesium metal is 2.14eV. When light of frequency 6×10^{14}Hz is incident on the metal surface photoemission of electrons occurs. Find:
(a) Energy of incident photons.
(b) Maximum kinetic energy of photoelectrons.
    Given Planks constant h = 6.63×10^{-34} Js.   1eV = 1.6×10^{-19}J

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