JAIN COLLEGE

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SUBJECT: PHYSICS

II PUC
MOCK - II

Timings Allowed: 3 Hrs 15 Minutes ***Total 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 the following questions **1×10=10**

1. State coulomb's law of force between two electric charges.
2. Define mobility of conduction electrons.
3. How does the susceptibility of paramagnetic substance vary with absolute temperature?
4. What is the principle of AC generator?
5. Write the value of critical angle for a material of refractive index $\sqrt{2}$.
6. Mention one method of increasing the resolving power of microscope.
7. What is the significance of negative sign in expression for energy of an electron resolving in a nucleus of hydrogen atom?
8. What are extrinsic semiconductors?
9. At what temperature would an intrinsic semiconductor behave like a perfect insulator?
10. What is demodulation?

PART-B

II Answer any five of the following: - **5×2=10**

11. State and explain coulomb's law of electrostatics.
12. Name the device used to measure the internal resistance of cell. Why are wires of potentiometer made of constantan or manganin?
13. Draw V-I graph for Non-Ohmic materials and give one example.
14. Which type of magnetic material exhibits the property of hysteresis? Define coercivity.
15. Mention two sources of power loss in transformers.
16. Mention the expression for Ampere's –Maxwell law and explain the terms.
17. How many joules are there in 1Mev?
18. Write any two methods by which range of TV transmission can be increased?

PART-C

III. Answer any five of the following:- **5×3=15**

19. Obtain the relation between electric field and electric potential.
20. Derive the expression for equivalent resistance of parallel combination of two resistors.
21. Derive an expression for radius of circular path travelled by a charge in a uniform magnetic field.
22. Explain briefly the coil-magnet experiment to demonstrate the phenomenon of electromagnetic Induction.
23. With the help of circuit diagram derive an expression for current when an AC voltage is applied to a capacitor.

24. Derive the Snell's law of refraction of light on the basis of Huygens's wave theory, when light travels from rarer medium to denser medium.

25. State Bohr's postulates of hydrogen atom.
26. Write three differences between n-type and p-type semiconductor.

PART-D

IV Answer any two of the following:- 2×5=10

27. Derive an expression for electric field at any point on the equatorial line of an electric dipole.
28. Derive an expression for equivalent e.m.f and equivalent internal resistance, when two different cells are connected in series.
29. Derive an expression for magnetic dipole moment of a resolving electron in a hydrogen atom and also obtain the expression of Bohr magneton.

PART-E

V Answer any two of the following:- 2×5=10

30. Derive the expression for the refractive index of the material of a prism in terms of angle of the prism and minimum deviation.
31. Write Einstein's photo electric equation. Mention the experimental observations of the Einstein's photo electric equation.
32. Distinguish between nuclear fission and nuclear fusion.

PART-F

VI Answer any three of the following:- 3×5=15

33. Charges of +4μc, -4μc and +8μc are placed at A, B and C corners of a square of side 10m. calculate the intensity of the field at the corner D?
34. Two cells of e.m.f 6V and 4V having internal resistance of 3Ω & 2Ω respectively are connected in parallel so as to send a current through an external resistance of 8Ω in the same direction, find the current though the cells & the current through external resistance?
35. A coil of wire of 6000 turns & mean area $0.5m^2$ is rotated with uniform speed of 3000rpm in a space. where there is a magnetic flux density of $1X10^{-4}$ T, the axis of rotation being perpendicular to the field, calculate

a) Maximum value of e.m.f induced
b) Average value of e.m.f.
c) rms value of e.m.f.

36.A beam of light consisting of two wave lengths 650nm & 520nm is used to obtain interference fringes in young's double split experiment, given D=60cm & d=1mm.

a) Find the distance of 3rd bright fringe on the screen from central maximum for wavelength 650nm.
b) What is the least distance from central maximum were the bright fringes due to both the wavelength coincide?

37. Calculate the energy released in Mev by 1g of U^{235} in the following fission reaction.

$92U^{235}+{}_0n^1 \text{---}\rightarrow 56Ba^{141}+36Kr^{92}+3\ {}_0n^1$
Mass of U^{235}=235.04394 amu
Mass of Kr^{92}=91.88544 amu
Mass of Ba^{141}=140.91784 amu
Mass of neutron=1.00874 amu

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