JAIN COLLEGE

463/465, 18th Main Road, SS Royal, 80 Feet Road, Rajarajeshwari Nagar,
Bangalore - 560 098

Date: 2019-2020 ***SUBJECT: PHYSICS***

II PUC
MOCK PAPER-II

Timings Allowed: 3Hrs ***Total Marks: 70***

General Instructions:

- All parts are compulsory.
- Answer without relevant diagram/figure wherever necessary will not carry any marks.
- Direct answers to numerical problems without detailed solutions will not carry any marks.

PART-A

I Answer **ALL** the following questions: 10x1=10

1. What is an equipotential surface?
2. Mention the principle of Kirchhoff's junction rule.
3. What is the resistance of an ideal ammeter?
4. When the force on a charge moving in a magnetic field is maximum?
5. Name the law which gives the polarity of induced emf.
6. Give the inconsistency of Ampere's circuital law.
7. Write the expression for magnifying power of a telescope in terms of focal length.
8. What type of wavefront is obtained if a light is coming from a very distant point source?
9. What is the SI unit of activity?
10. Mention one application of light emitting diode.

PART-B

II Answer any **FIVE** of the following questions: 5x2=10

11. Mention the methods to increase the capacitance of a parallel plate capacitor.
12. Write the expression for power loss in a conductor and explain the terms used.
13. Give the properties of a ferromagnetic material used for making electromagnets.
14. What are the values of magnetic dip at (i) pole (ii) equator?
15. State Faraday's laws of electromagnetic induction.
16. Write any two salient features of series LCR circuit at resonance.
17. Write any two uses of X-rays.
18. (i) How does orbital speed of an electron varies with the principal quantum number?
    (ii) Name the series of hydrogen spectrum that lies in UV region.

PART-C

III Answer any **FIVE** of the following questions: 5x3=15

19. Mention the basic properties of electric charge.
20. With a neat circuit diagram, explain how a moving coil galvanometer is converted into ammeter.
21. What is magnetic hysteresis? Draw a magnetic hysteresis curve.
22. Derive an expression for instantaneous emf in an AC generator.
23. Obtain a relation between focal length and radius of curvature of a concave mirror.
24. Deduce Snell's law of refraction using Huygen's wave theory of light.
25. Draw a labelled diagram of Geiger-Marsden α-particle scattering experiment and mention its conclusion.
26. Distinguish between intrinsic and extrinsic semiconductors.

PART-D

IV Answer any **TWO** of the following questions: 2x5=10

27. Derive an expression for electric field at a point due to a charged infinitely long conducting wire using Gauss's law.
28. (a) Define drift velocity of free electrons.
    (b) Derive an expression for drift velocity of free electrons in a conductor.
29. Derive an expression for the magnetic field at a point along the axis of a circular current loop.

V Answer any **TWO** of the following questions: 2x5=10

30. Give the theory of interference and hence arrive at the condition for constructive and destructive interference.
31. Derive the expression for the energy of an electron in n^{th} stationary orbit of a hydrogen atom, by assuming the expression for radius.
32. What is a p-n junction? Explain the formation of p-n junction.

PART-E

VI Answer any **THREE** of the following questions: 3x5=15

33. A point charge of 20μC is situated at a point O. A and B are points 0.05m and 0.15m away from this charge. Calculate the amount of work done to move an electron from B to A.
34. Two cells of emfs 4V and 2V and internal resistances 2Ω and 1Ω respectively are in parallel. A resistance of 10Ω is connected across the combination. Calculate the p.d. across 10Ω.
35. A $(\frac{1}{12\pi})$mF capacitor in series with 40Ω resistance is connected to a 110V-60Hz supply.
    (a) What is the maximum current in the circuit?
    (b) What is the phase difference between maximum current and maximum voltage?
36. A double convex lens made of glass of refractive index 1.56 has both radii of curvature of magnitude 20cm. If an object is placed at a distance of 10cm from this lens, find the position of image formed.
37. Calculate the change in stopping potential for photoelectrons emitted from a surface if the wavelength of the incident light is reduced from $5900A^0$ to $5000A^0$.

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