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-I

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 a capacitor?
2. Define mobility.
3. What is wattles current?
4. State the principle on which transformer works.
5. What is displacement current?
6. When a double convex lens is immersed in water, what is the effect on the focal length?
7. What is diffraction of light?
8. Write the condition for destructive interference in terms of path difference between the two waves.
9. In the following nuclear reaction, identify the particle X.
   $p \rightarrow n + e^+ + X$
10. Draw the circuit symbol of AND gate.

PART-B

II Answer any **FIVE** of the following questions: 5x2=10
11. Distinguish between polar and non-polar molecules.
12. Find the current **I** in the following.
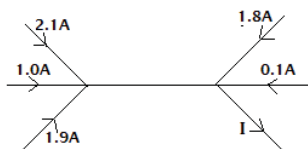
13. Mention the expression for magnetic dipole moment of a current loop. Give its SI unit.
14. Under what conditions will be torque on a magnetic dipole in a uniform magnetic field be
    (i) maximum (ii) minimum?
15. Mention any two practical applications of eddy currents.
16. Write any two properties of electromagnetic waves.
17. Give the expression for limit of resolution of a telescope and explain the terms.
18. Mention any two limitations of Bohr's atom model.

PART-C

III Answer any **FIVE** of the following questions: 5x3=15
19. State and explain Coulomb's law in electrostatics. Give its vector form.
20. Obtain an expression for radius of circular path traversed by a charge in a uniform magnetic field.

21. Obtain the expression for energy stored in a coil carrying current .
22. Show that voltage and current are in phase with each other when an AC voltage is applied across a resistor with a phasor diagram.
23. What is electrical resonance? Derive the expression for resonant frequency.
24. Derive the expression for equivalent focal length of two thin lenses in contact with each other.
25. (i)What is the significance of the negative sign in the expression of energy of an electron?
    (ii) What is the energy possessed by an electron for n=∞?
26. Explain the working of p-n junction when it is forward biased.

PART-D

IV Answer any **TWO** of the following questions: 2x5=10
27. Derive an expression for electrical potential at a point due to an isolated point charge.
28. Arrive at J = σ E, where the symbols have their usual meaning.
29. Show that a current carrying solenoid is equivalent to a bar magnet.

V Answer any **TWO** of the following questions: 2x5=10
30. Obtain an expression for the fringe width of interference fringes in a double slit experiment.
31. What are nuclear forces? Write any four characteristics of nuclear forces.
32. Describe with a circuit diagram, the working of a semiconductor diode as a half-wave rectifier. Draw input and output waveforms.

PART-E

VI Answer any **THREE** of the following questions: 3x5=15
33. Two point charges +1 X 10^{-8} C and +4X10^{-8} C are 0.06m apart in air. Find the location of the point between them at which resultant electric field is zero.
34. Two identical cells either in series or in parallel combination, gives the same current of 0.5A through external resistance of 4Ω. Find the emf and internal resistance of each cell.
35. A circular coil of radius 0.08m consisting of 100 turns is carrying a current of 0.4A. Calculate the magnitude of the magnetic field (i) at the center of the coil and (ii) at a point 0.2m from the center of the coil on its axis.
36. A prism of angle 60^0 produces angle of minimum deviation of 40^0. What is its refractive index? Calculate the angle of incidence.
37. Light of frequency 8.41 X 10^{14} Hz is incident on a metal surface. Electrons with their maximum speed of 7.5 X 10^5 ms^{-1} are ejected from the surface. Calculate the threshold frequency for photo emission of electrons. Also find the work function of the metal in electron volt (eV).
    Given: Planck's constant h = 6.625 x 10^{-34} Js and mass of electron 9.1 x 10^{-31} Kg.

****