SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **II PUC Mock Paper - 2**	**Course:**	II PUC
	Subject:	**Physics**
	Max. Marks:	70
	Duration:	3:00 Hrs 15 Mins

General Instructions:

(i) All parts are compulsory.

(ii) Part – A questions have to be answered in the first two pages of the answer – booklet.For Part – A questions, first written – answer will be considered for awarding marks.

(iii) Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.

(iv) Direct answers to Numerical problems without detailed solutions will not carry any marks.

PART – A

I. Pick the correct option among the four given options for ALL of the followingquestions **15 × 1 = 15**

1. The force per unit charge is known as
   A) electric flux B) electric field
   C) electric potential D) electric current
2. The electric potential of an electric dipole vary with distance r as
   A) $\frac{1}{r}$ B) $\frac{1}{r^2}$ C) $\frac{1}{r^3}$ D) none of these
3. Charge on a capacitor is doubled. Its capacity becomes 'k' times, where
   A) k = 2 B) k = 1 C) k = 1/2 D) k = 4
4. Two wires of copper have length L and 2L respectively. The ratio of their resistivity would be
   A) 1:2 B) 8:1 C) 1:8 D) 1:1
5. A current flows in a straight horizontal conductor from east to west. The direction of the magnetic field at a point above the conductor is
   A) towards east B) towards west C) towards north D) towards south
6. The material of a permanent magnet has
   A) high retentivity and low coercivity B) low retentivity and high coercivity
   C) high retentivity and high coercivity D) low retentivity and low coercivity
7. The primary of an ideal transformer has 1000 turns and the secondary has 2000 turns.For any input voltage, the power in the secondary is
   A) double that in primary B) equal to that in primary
   C) half of that in primary D) one fourth of that in primary
8. The self inductance L of the solenoid of length l and area of cross section A, with a fixed number of turns N increases as
   A) l and A increase B) l decreases and A increases
   C) l increases and A decreases D) both l and A decrease
9. The Si unit of reactance is
   A) farad B) mho C) ohm D) volt
10. UV radiations can be detected by
    A) photocell B) bolometer C) LED D) the eye
11. S I Unit of power of a lens is
    A) centi metre B) newton C) dioptre D) metre
12. An air bubble under water shines brightly because of
    A) interference B) total internal reflection C) diffraction. D) polarisation

13. Momentum of photon of wavelength λ is given by

(a) $\frac{h\lambda}{c}$ B) $\frac{h\lambda}{c^2}$ C) zero D) $\frac{h}{\lambda}$

14. ${}^{2}_{1}H$ and ${}^{3}_{1}H$ are nuclides the examples for

A) isobars B) isotopes C) mirror nuclei D) isotones

15. AND gate is one whose output will be in 1 state, if the inputs are in

A) 0, 0 states B) 1, 0 states C) 1, 1 states D) 0, 1 states

II. Fill in the blanks by choosing appropriate answer given in the brackets for ALL thefollowing questions **5 × 1 = 5**

(doping, magnetic equator, transverse, electric, nuclear density)

16. The frictional forces are _____in origin.
17. At _____magnetic dip is zero on earth's surface.
18. Phenomenon of polarisation shows that light waves are_____electromagnetic waves.
19. All nuclei have same_____.
20. Process of adding impurity to pure semiconductor is called_____.

PART – B

III. Answer any FIVE of the following questions **5 × 2 = 10**

21. Draw equipotential surfaces for (a) dipole (b) two identical positive charges, with a small separation.
22. What is meant by velocity selector? Give its importance.
23. What is a toroid? Mention an expression for a magnetic field at a point inside a torid.
24. What emf will be induced in a 10 H inductor in which current changes from 10 A to 7 A in 0.09 s?
25. What is resonant frequency? Write the expression for it.
26. Write any two properties of electromagnetic waves.
27. Write the expression for resolving power of microscope and explain the terms.
28. Draw a neat labelled diagram of α-scattering experimental arrangement.
29. Give differences of controlled and uncontrolled nuclear chain reactions.

PART – C

IV. Answer any FIVE of the following questions **5 × 3 = 15**

30. Derive an expression for the torque experienced by an electric dipole placed in a uniform electric field.
31. Derive $I = nAeV_d$ where the symbols have their usual meaning.
32. State and explain Biot – Savart's law.
33. Mention any three differences between diamagnetic and paramagnetic materials.
34. Derive an expression for motional emf in a conducting rod moving in uniform magneticfield.
35. Define critical angle and write two conditions for total internal reflection.
36. Explain the postulates of Bohr's atomic model.
37. A radioactive substance has a half life period of 30 days. Calculate the decay constant.
38. Write any three differences between p - type and n - type semiconductors.

PART – D

V. Answer any THREE of the following questions **3 × 5 = 15**

39. Derive an expression for electric field at a point near thin uniformly charged sheet using Gauss's law.
40. What is meant by equivalent resistance? Derive an expression for equivalent resistanceof three resistors connected in series.
41. Derive an expression for magnetic field strength at any point on the axis of circular current loop, using Biot-Savart's law.

42. Derive lens maker's formula for double convex lens.
43. (i) Who postulated the dual nature of matter? 3
    (ii) What are matter waves?
    (iii) Write any 3 characteristics of photon. 2
44. (i) What is a full wave rectifier? 1
    (ii) With neat circuit diagram, explain the working of full wave rectifier. 3
    (iii) Also draw its input and output waveforms. 1

VI. Answer any TWO of the following questions **$2 \times 5 = 10$**

45. Charges +2 nC, +4 nC and +8 nC are placed at the corners A, B, C respectively of a square of side 0.2m. Calculate the work done to calculate a charge of +2 nC from the corner D to the centre of the square.
46. The current flowing through a conductor having electron density $6 \times 10^{26} m^{-3}$ is 5A. Calculate the time taken by an electron to drift from one end to other end of 10 m length of it. Area of cross section of the wire $= 2 \times 10^{-6}\ m^2$, charge of electron $1.6 \times 10^{-19}\ C$.
47. An LCR series circuit with 10 Ω resistor, 200 mH inductor and a capacitor is connected to 220 V, 50 Hz AC source. Calculate the capacitance C of the capacitor if the power factor of the circuit is unity and also calculate the Q factor of the circuit.
48. In Young's double slit experiment the distance between the slits is 0.5 mm. The screen is placed 1m away from the slits. It is found that the 5th bright fringe is at a distance of 4.13 mm from the 2nd dark fringe. Find the wavelength of light used.

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