SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **II PUC Mock Paper - 1**	**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 following questions **15 x 1 = 15**

1. A body can be charged by
   A) conduction B) induction C) friction D) all of these
2. Potential energy of an electric dipole in a uniform electric field is maximum when angle between $\vec{E}$ and $\vec{P}$ is equal to
   A) 180° B) 90° C) 45° D) 0°
3. Which of the following is SI unit of capacitance?
   A) farad B) newton C) henry D) ampere
4. Area of cross section of a metallic wire is doubled. Then its resistivity becomes
   A) half the initial value B) double the initial value
   C) four times the initial value D) remains the same
5. If the number of turns of the coil is doubled, then the voltage sensitivity of the galvanometer will be
   A) doubled B) unchanged C) halved D) four times
6. Angle between the total magnetic field and the horizontal drawn in the magnetic meridian at a given place is
   A) magnetic declination B) magnetic inclination
   C) brewster's angle D) critical angle
7. Which law gives the polarity of induced emf in electromagnetic induction?
   A) Gauss law in magnetism B) Ampere's circutal law
   C) Faraday's law D) Lenz's law
8. Frequency of AC in India is
   A) 60 Hz B) 100 Hz C) 50 Hz D) 220 Hz
9. N_P and N_S are the number of turns in primary and secondary of a transformer. Then for a step-up transformer
   A) $N_S > N_P$ B) $N_S < N_P$ C) $N_S = N_P$ D) $N_S \leq N_P$
10. Which gas in atmosphere absorbs ultraviolet radiations?
    A) Oxygen B) Nitrogen C) Ozone D) Carbon dioxide
11. The geometrical centre of a spherical mirror is termed as
    A) optical centre B) centre of curvature
    C) pole D) principal focus
12. Wave front is the locus of on points, where the particles of the medium vibrate with the same.
    A) amplitude B) phase C) frequency D) period

13. By suitably heating, sufficient thermal energy can be given to the electrons to enable them to come out of the metal. This process is called
    A) thermionic emission B) photo electric emission
    C) field emission D) secondary emission
14. Pick out the wrong statement regarding the characteristics of nuclear force in the following
    A) Nuclear force is strongest force in nature
    B) Nuclear force is charge independent
    C) Nuclear force is long range force
    D) Nuclear force has the property of saturation
15. The truth table of a logic gate is given below. The logic gate is

Input (A)	Output (Y)
0	1
1	0

A) OR B) AND C) NOT D) NAND

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

(selective absorption, helium, retentivity, trivalent, negative charge)

16. Electric field lines start at positive charge and end at _____.
17. The value of B at H = 0 in a B - H loop is _____.
18. Plane polarized light can be obtained by_____using polaroid sheet.
19. A nuclear process is represented as $^{238}U_{92} \rightarrow {}^{234}Th_{90} + X$. Unknown element X is_____.
20. P – type semiconductor is obtained by doping germanium with _____impurity.

PART – B

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

21. What is an equipotential surface? Give an example.
22. Write the expression for the force experienced by a charge moving in a uniform magnetic field and explain the terms.
23. State and explain Curie's law for para magnetism.
24. What are eddy currents? Mention one of its uses.
25. On what factors does the coefficient of self – induction of a solenoid depend?
26. Mention any two characteristics of electromagnetic waves.
27. Define wavefront. Show the refraction of a plane wave front by a thin prism.
28. What is impact parameter? Write its expression.
29. What is mass defect? How it is related to binding energy?

PART – C

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

30. Mention three properties of electric field lines.
31. Derive the expression for conductivity of a material.
32. Define the terms (i) magnetic intensity (ii) magnetic permeability and (iii) magnetic susceptibility.
33. Explain how a galvanometer can be converted into ammeter, with necessary diagram.
34. Obtain the expression for induced emf in AC generator.

35. Draw a ray diagram for image formation in case of a simple microscope. Write the expression for magnification produced by it when the image formed at near point.
36. Arrive at the expression for total energy of electron in n^{th} orbit of hydrogen atom.
37. Calculate the half – life of radium – 226 of activity 1Ci. Given the mass of radium – 226 is 2 gram and Avogadro number, $N_A = 6.023 \times 10^{23}$.
38. Explain the working of p – n junction diode in reverse bias.

PART – D

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

39. Derive the expression for electric field of an electric dipole at point on the equatorial line
40. Deduce the relation for equivalent emf and equivalent internal resistance, when two cells are connected in parallel.
41. Arrive at the expression for the force per unit length between two infinitely long straight parallel current carrying conductors. Hence define ampere.
42. Derive the expression for refractive index of the material of a prism in terms of angle of the prism and angle of minimum deviation.
43. i. What is the rest mass of photon? 1
    ii. Write Einstein's photoelectric equation and explain the terms. 2
    iii. Write the expression for de-Broglie wavelength of an electron and explain the terms **2**
44. i. What is biasing? 1
    ii. Explain semiconductors on the basis of energy bands. 2
    iii. Mention any two applications of LED. **2**

VI. Answer any TWO of the following questions **2 x 5 = 10**

45. A point charge of 20 μC is situated at the point O. A and B are the points 0.05 m and 0.15 m away from this charge. Calculate the work done to move a point charge of 1.6×10^{-19}C from B to A.
46. Three resistors of resistances 2 Ω, 3 Ω and 4 Ω are combined in series. A cell of emf 10 V and internal resistance 1 Ω is connected across the combination.
    a) What is the total resistance of the combination?
    b) Determine the current in the circuit.
    c) Calculate voltage across 2 Ω and 3 Ω resistors.
47. An AC source of 220 V, 50 Hz is connected in series with a 50 Ω resistor, 15 μF capacitor and 2200 μH inductor in series. Calculate
    a) impedance of the circuit.
    b) current through the circuit.
    c) power factor.
48. In Young's double slit experiment the slits are separated by 0. 25 mm and screen is placed1.2 m away from the slits. The distance of central bright fringe and the fifth bright fringe is measured to be 1.25 cm. Calculate the wavelength of the light used. Also find the fringe width if the screen is moved towards the slits by 0.4 m.

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