SRI BHAGAWAN MAHAVEER JAIN COLLEGE Vishweshwarapuram, Bangalore. **Mock Question Paper 2** – January 2020	**Course:** II year PUC **Subject:** Physics **Max. Marks:** 70 **Duration:** 3:15hrs.

PART-A

I **Answer ALL the following questions:** **10 x 1 = 10**

1 Two point charges q_1, q_2 such that $q_1 q_2 < 0$. What is the nature of force between the charges?
2 Define drift velocity of an electron in a conductor.
3 Give the S.I unit of magnetic dipole moment.
4 What is motional emf?
5 If the peak value of current is 1.41.A, then what is the value of root mean square current?
6 What is the power factor of an AC circuit containing only pure resistor?
7 Three lenses of power +1D, -1D and +2D are kept in contact. What is the effective power of the combination?
8 In which type of β-decay antineutrino is emitted?
9 At what position an object should be placed infront of a concave mirror so that image can be of same size as that of object?
10 Who proposed plum pudding model for an atom?

PART-B

II **Answer any FIVE of the following questions:** **5 x 2 = 10**

11 Draw equipotential surfaces for a point charge.
12 Mention two uses of potentiometer.
13 When is the force acting on a current carrying conductor placed in uniform magnetic field
(i) Maximum? (ii) Minimum?
14 State and explain Curie's law in magnetism.
15 Give any two properties of magnetic field lines.
16 Write an expression for the instantaneous emf induced in a coil rotating in a uniform magnetic field and explain the terms.
17 Brewster's angle for a certain medium is 52°. Find the refractive index of the medium.
18 Draw a ray diagram for the image formation by a simple microscope.

PART-C

III **Answer any FIVE of the following questions:** **5 x 3 = 15**

19 Describe how two metal spheres can be oppositely charged by the method of induction.
20 Obtain the expression for radius of circular path described by a charged particle in a uniform magnetic field.
21 State and explain Biot-Savart's law. Write its vector form.
22 Write any three properties of diamagnetic materials.
23 Deduce the expression for self inductance of a coil.
24 What is the wavelength range of electromagnetic spectrum? Mention any two uses of IR waves.
25 Briefly explain the polorisation by reflection with the help of a diagram.
26 Mention the three optoelectronic junction devices.

PART-D

IV **Answer any TWO of the following questions:** **2 x 5 = 10**

27 Derive the expression for electric field at a point on the equatorial line of an electric dipole.
28 Assuming the expression for current in terms of drift velocity, deduce Ohm's law.
29 Arrive at the expression for impedance of a series LCR circuit using phasor diagram and hence write the expression for current.

V **Answer any TWO of the following questions:** **2 x 5 = 10**

30 Derive the lens maker's formula.
31 With relevant graphs explain the experimental results of photoelectric effect.
32 Explain the working of a semiconductor diode in the forward bias mode. Draw the current and voltage characteristics for both forward bias and reverse bias of a semiconductor diode.

VI Answer any THREE of the following questions: 3 x 5 = 15

33 In a parallel plate capacitor with air between the plates, each plate has an area $8 \times 10^{-3} m^2$ and distance between the plates is 2mm. Calculate the capacitance of the capacitor. If this capacitor is connected to a 50V supply, what is the charge on each plate of the capacitor? Also calculate the energy stored in the capacitor. Given $\in_0 = 8.854 \times 10^{-12} Fm^{-1}$.

34 Three resistors 3Ω, 4Ω and 6Ω are connected in parallel. The combination is connected in series with a resistance of 1Ω and cell of emf 2V and internal resistance of 1Ω. Find the current through each resistor and total current drawn from the cell.

35 In Young's double slit experiment, fringes of certain width are produced on the screen, kept at a certain distance from the slits. When the screen is moved away from the slits by 0.1m, fringe width increases by $6 \times 10^{-5} m$. The separation between the slit is 1mm. Calculate the wavelength of light used.

36 Calculate the longest and shortest wavelengths of Balmer series of hydrogen atom. Given Rydberg constant = $1.097 \times 10^7 m^{-1}$.

37 Determine the mass of Na^{22} which has an activity of 5mCi. Half life of Na^{22} is 2.6 years. Avagadro number = 6.023×10^{23} atoms.

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