KARNATAKA BOARD 2ND PUC MODEL PAPER – SET 1
PHYSICS

Time : 3:15 Hrs. **Max Marks:70**

Instructions:

1) **All parts are compulsory.**
2) **Answer without relevant diagram / figure/circuit, where ever necessary will not carry any marks.**
3) **Direct answers to the numerical problems without the relevant formulae and detailed solutions will not carry any marks.**

PART – A

I Answer All the questions: **10 x 1 = 10**

1) Define electric potential at a point due to a point charge.
2) Mention any one application of potentiometer.
3) An aluminum piece is subjected to varying temperature. What is the effect of temperature on its susceptibility?
4) How much emf is induced in a coil of self-inductance 2H if the current in it is changing at the rate of $2As^{-1}$?
5) What is meant by power factor of an ac circuit?
6) Define polarizing angle for a material.
7) What are matter waves?
8) State Heisenberg's uncertainty principle.
9) Give an example for β^+ decay process.
10) What is a transducer in communication?

PART – B

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

11) Distinguish between polar and non-polar molecules.
12) Define mobility of electrons. How is mobility of electrons in a conductor related to relaxation time?

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13) Give the expression for gyromagnetic ratio of an electron revolving round the nucleus and explain the terms.
14) State and explain Faraday's law of electromagnetic induction.
15) Write the relation between the magnitude of electric and magnetic fields in an electromagnetic wave with speed of light and hence find the magnitude of the electric field at a point in space and time if the magnetic field at that place is 2×10^{-8} T.
16) What is Doppler Effect in light? Write the expression for Doppler shift.
17) Define the terms input resistance and current amplification factor of a transistor in CE mode.
18) Draw the block diagram of AM receiver in communication.

PART – C

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

19) Mention any three properties of electric charges.
20) Derive the expression for magnetic force on a conductor carrying current kept in a magnetic field.
21) What are eddy currents? Mention any two applications of eddy currents.
22) Obtain the expression for the current in an AC circuit containing pure capacitor.
23) What is a transformer? On what principle it works? Mention one power loss in a transformer.
24) Draw the ray diagram for the formation of image by a compound microscope. What is meant by tube length of a compound microscope?
25) Mention the three types of electron emission.
26) What is a NAND gate? Write its circuit symbol and truth table for two inputs.

PART – D

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

27) Derive the expression for the capacitance of a parallel plate capacitor. And hence write the expression for the capacitance when a dielectric medium is inserted between its plates.
28) Obtain the expression for the conductivity of a conductor in terms of its relaxation time. **Or** Deduce $\sigma = \frac{ne^2\tau}{m}$ where the symbols have their usual meaning.
29) Show that a bar magnet behaves as an equivalent current carrying solenoid.

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

30) Obtain the expression for the fringe width of interference fringes in Young's double slit experiment.
31) State the law of radioactive decay. Show that $N = N_o e^{-\lambda t}$ for a radioactive element.
32) What is a rectifier? Explain the working of semi-conductor diode as a full wave rectifier with a necessary circuit diagram. Also give the input and output wave forms for the same

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

33) Two pith balls of mass 10mg each are suspended by two threads from the same support are charged identically. They move apart by 0.08m and threads make an angle 60^0 with each other. Find the charge on each pith ball

34) Two cells of 6 V and 4 V having internal resistance of 3 Ω and 2 Ω respectively are connected in parallel so as to send a current through an external resistance 8 Ω in the same direction. Find the current through the cells and the current through the external resistance.

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 parallel beam of light is incident on a face of a prism of refracting angle 60°. Find the refractive index of the prism if the angle of minimum deviation is 40^0. What is the new angle of minimum deviation if the prism is immersed in water of refractive index 1.33?

37) Calculate the value of Rydberg constant if the wavelength of the first member of Balmer series in the hydrogen spectrum is 6563 Å. Also find the wavelength of the first member of Lyman series in the same spectrum.

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