Date: December 2017   *SUBJECT: PHYSICS*

II PUC
MOCK-II

Timings Allowed: 3 Hrs.   *Total Marks: 70*

General Instructions:
 a) All parts are compulsory.
 b) Answers without relevant diagram/figure/circuit wherever necessary will not carry any marks.
 c) Direct answers to the Numerical problems without detailed solutions will not carry any marks.

Part A
I Answer the following: **10x1=10**
1. Two point charges q_1 and q_2 are such that product $q_1q_2>0$. What is the nature of force between the charges?
2. The colour code of carbon resistor is brown-Red-Brown and Gold. What is its resistance?
3. What is Lorentz force?
4. The susceptibility of magnetic substance is 2500. Name the type of magnetic substance.
5. Name the law which gives the polarity of induced e.m.f.
6. State Malu's Law.
7. What do you mean by Q value of a nuclear reaction?
8. Define energy band gap in solids.
9. The output of OR gate is connected to input of Not gate. Name the equivalent logic gate.
10. What is a transducer in communication system?

Part B
II Answer any Five of the following questions: **5x2=10**
11. Define surface charge density at a point. Write its unit.
12. How does the resistivity of the following material vary with the increase in their temperature:
     (i)metallic conductor (ii) semiconductor
13. Mention the expression for frequency of LC oscillations and explain the terms used.
14. Name the constituent radiation of electromagnetic spectrum which
     a) is used in satellite communication b) Is used for studying crystal structure
15. Using Huygens principle, draw a diagram to show refraction of plane wave front incident obliquely on a surface separating two media.
16. The ground state energy of hydrogen atom is -13.6eV. What are Kinetic energy and potential energy of electron in this state?
17. Write any two characteristics of nuclear force.
18. Define the term 'range' and 'bandwidth' used in electronic communication system.

Part C
II Answer any Five of the following questions: **5x3=15**
19. Obtain the expression for effective capacitance of two capacitors connected in parallel.
20. With a neat circuit diagram, explain how a pointer galvanometer is converted into ammeter.
21. Write the expression for time period of oscillation of small compass needle in uniform magnetic field and explain the terms. In this case if the magnitude of the magnetic field is reduced to ¼, how does the time period change?

22. Define Curie temperature. State and explain Gauss law in magnetism.
23. Derive the relation f=R/2 in the case of a concave mirror.
24. Give the de Broglie explanation of Bohr's quantization rule.
25. Obtain the expression for half-life of a radioactive element.
26. With a neat circuit diagram, explain the working of a npn transistor in CE mode as a switch.

Part D

IV Answer any Two of the following questions: 2x5=10
27. Define electric potential energy of a system of charges. Derive an expression for Potential energy of a system of two point charges in the absence of external electric field.
28. State Ohm's Law. Deduce Ohm's law in vector form J=σE
29. Define internal resistance and e.m.f of a cell. Obtain the expression for current drawn by external resistance using Ohm's law.

V Answer any Two of the following questions: 2x5=10
30. What is self inductance of a coil? Write its SI unit. Obtain the expression for energy stored in an inductor.
31. Give the theory of interference and arrive at the condition for constructive interference.
32. Explain the working of common emitter n-p-n transistor as an amplifier. Determine its power gain.

IV Answer any Three of the following questions: 3x5=15
33. Two capacitors of capacitance 600pF and 900pF are connected in series across a 200V supply. Calculate (i) the effective capacitance of the combination, (ii) the p.d. across each capacitor and (iii) the total charge stored in the system.
34. The magnetic fields at two points on the axis of a circular coil at a distance of 0.05m and 0.2m from the centers are in the ratio 8:1. Find the radius of the coil.
35. A 80Ω resistor and 20μC capacitor are connected in series with an AC source of 220V-50Hz. Calculate the potential difference across each of them.
36. Light from a luminous point at the bottom of a glass slab of thickness 3cm strikes the upper surface. The rays which are totally reflected at the top surface outline a circle of radius 2.4cm. Find RI of glass.
37. Calculate the change in stopping potential for photoelectrons emitted from a surface if wavelength of incident light is reduced from 5900A$^\circ$ to 5000A$^\circ$.

****