5101-Y
PHYSICS

Time : 3 Hours] **[Maximum Marks : 70**

Section–A 1 each

1. What is the basis of Kirchhoff's function law ?
2. What consideration led de-Broglie to suggest that material particles can also show wave property ?
3. In which region of electromagnetic spectrum does the Balmer series of hydrogen atom lie ?
4. How does the energy gap vary with doping in a pure semiconductor ?
5. Will the transistor work if we interchange its emitter and collector ? Give reason to justify your answer.

Section–B 2 each

6. Explain mutual induction. Define co-efficient of mutual induction.

Or

What is meant by mean value and r.m.s. value of A.C. ?

7. An object is placed at a distance of 10 cm in front of a concave mirror of radius of curvature 40 cm. Find the position nature and magnification of the image.

8. What are limitations of Bohr's theory of hydrogen atom ?

9. Explain how OR gate is realised.

10. Explain the need of modulation in communication system.

Section–C 3 each

11. Derive an expression for energy stored in a capacitor.

12. A wire of resistance 5 ohms stretched to twice of its original length. What will be its (i) new resistivity (ii) new resistance ?

Or

A voltage of 30 V is applied across a colour coded carbon resistor with first, second and third rings of blue, black and yellow colours. What is the current flowing through the resistor ?

13. State Ohm's law and derive it from the concept of drift velocity of free electron.

14. Derive an expression for magnetic field at a point well inside a solenoid carrying current.

15. State and explain Faraday's law of electromagnetic induction.

16. Calculate the impedance of series LCR circuit.

17. Give two uses of each of the following :

    (a) Gamma rays

    (b) Infrared rays

    (c) Ultraviolet rays