PG/IIS/PHS/206/25

M.Sc. 2nd Semester Examination, 2025

PHYSICS

(Analog Electronics-II)

PAPER – PHS-206

Full Marks : 25

Time : 1 hour

Answer **all** questions

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

GROUP – A

1. Attempt any *two* of the following questions : 2×2

   (*a*) Why SCR cannot be fabricated using Germanium semiconductor ?

(*b*) Define internal poles and internal zeros of a network.

(*c*) Define characteristic impedance of a transmission line. Why is it named so ?

(*d*) Show that if a transmission line be open ended, then there will be total reflection of the signal from that open end.

GROUP – B

2. Attempt any *two* of the following questions : 4×2

(*a*) Explain the working of an AC light dimmer using TRIAC and DIAC by drawing its proper circuit diagram.

(*b*) Design a series type Foster network to give a driving point impedance of +j.200 ohms at $\omega = 1$ Megaradians per second. There is to be a zero at $\omega = 3$ Megaradians per second and poles at $\omega = 2$ & 4 Megaradians per second.

(*c*) What do you mean by iterative impedance of a two port network ? Find the expression of it for a T network.

(*d*) State and explain the two corollaries of Foster's reactance theorem.

GROUP – C

3. Attempt any *one* of the following questions : 8×1

(*a*) Draw the circuit diagram of a constant K band stop filter and derive the expressions for its cut off frequencies. Derive the expressions for attenuation constant, phase constant and characteristics impedance in the pass band and attenuation bands. Also draw their variations as a function of frequency. 8

(*b*) (*i*) Derive Telegraph's equations and solve them to derive the general expressions

for voltage and current at any general point along the length of a practical transmission line.

(*ii*) Hence explain how cable fault is located in a transmission line. 6 + 2

[Internal Assessment – 5 Marks]
