M.Sc. 4th Semester Examination, 2024

ELECTRONICS

(*Microwave and Power Electronics*)

PAPER – ELC-401(Old)

Full Marks : 50

Time : 2 hours

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

Answer any **four** questions : 2×4

1. Define different elements of S-matrix.

2. What is matched condition ? What is reciprocal network ? $1 + 1$

3. What is Q-factor of a resonator ?

4. How negative resistance is obtained in IMPATT diode ?

5. What is the role of gate voltage in PNPN device ?

6. What are the conditions for tunnelling in tunnel diode ?

GROUP – B

Answer any **four** questions : 4×4

7. What is a 3 port network ? What are the conditions for a lossless network ? $2 + 2$

8. What are E-Plane Tee & H-Plane Tee junction ? Write their S-matrix. $2 + 2$

9. What are four ports of a direction coupler ? What are symmetric and asymmetric coupler ? $2 + 2$

10. How does velocity modulation happen in klystron ?

11. What are the conditions the elements of S-matrix hold for which a network is reciprocal, lossless & matched at all ports ?

12. Show how a transmission line can the used as resonator.

GROUP – C

Answer any **two** questions : 8×2

13. Find the Hull cut-off voltage of magnetron. 8

14. Draw the equivalent circuit of Tunnel diode and find the resonant frequency. $4 + 4$

15. Draw the two transistor model of PNPN device & explain the operation. Find Anode current. $(1 + 3) + 4$

16. Explain different processes of turning 'ON' a PNPN device.　　8

[Internal Assessment — 10 Marks]

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