

## QP CODE: 25019764

Reg No	:	
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# B.Sc DEGREE (CBCS) ) REGULAR/ IMPROVEMENT/ REAPPEARANCE / MERCY CHANCE EXAMINATIONS, FEBRUARY 2025

## **Fourth Semester**

B.Sc Electronics Model III

## Core Course - EL4CRT11 - MICROWAVE ELECTRONICS

2017 Admission Onwards

65D92FED

Time: 3 Hours

Max. Marks: 80

#### Part A

Answer any **ten** questions. Each question carries **2** marks.

- 1. Mention any four applications of microwaves.
- 2. Give the expression for propagation constant y and explain each term in it.
- 3. Briefly explain the propagation of waves in rectangular waveguides
- 4. What do you mean by cut-off wavelength of a waveguide?
- 5. Briefly explain power losses in a waveguide.
- 6. Explain microwave taper.
- 7. What is a Hybrid ring?
- 8. What are cavity resonators?
- 9. Explain velocity modulation in a Klystron.
- 10. Briefly explain reflex klystron.
- 11. How frequency pulling and pushing are achieved in magnetron?
- 12. How a 180 degree phase difference is achieved between the applied voltage and the resultant current of an IMPATT diode?

(10×2=20)

Part B

Answer any **six** questions. Each question carries **5** marks.

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- 13. What are microwaves? Briefly explain history of microwaves.
- 14. What is a standing wave? Obtain the expression for the VSWR of two wire transmission line.
- 15. List the similarities and differences between a hollow wave guides and transmission lines in terms of propagation of electromagnetic waves.
- 16. Explain dominant mode and degenerate modes in rectangular waveguides.
- 17. Explain the operation of a directional coupler.
- 18. What is a circulator? Give its schematic diagram.
- 19. Explain how varactors diodes are used in parametric amplifiers.
- 20. What do you mean by negative resistance? What are the major negative resistance solid state devices used for microwave oscillations?
- 21. With the aid of a suitable diagram, describe the construction of a PIN diode. What are its applications?

(6×5=30)

#### Part C

# Answer any **two** questions.

## Each question carries **15** marks.

- 22. Explain the various types of transmission lines. Discuss their merits and demerits.
- 23. With reference to a wave guide, discuss the terms -group velocity, phase valocity, wave impedance. Derive equations for these quantities.
- 24. With the aid of a suitable diagram, explain the operation of a Faraday rotation ferrite isolator. List its applications.
- 25. Give the limitations of vacuum tubes. Explain the transit-time effect as it affects high-frequency amplyfing devices.

(2×15=30)