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C20-EC–404

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BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DECE – FOURTH SEMESTER EXAMINATION

MICROWAVE AND SATELLITE COMMUNICATION SYSTEMS

Time : 3 Hours] [*Total Marks* : 80

PART—A 3×10=30

Instructions : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. List any three applications of ground wave propagation.

2. Classify the layers of ionosphere.

3. Define the terms *(a)* refractive index and *(b)* virtual height.

4. Classify antennas based on *(a)* construction and *(b)* bandwidth.

5. Define the terms *(a)* radiation intensity and *(b)* directivity.

6. State the need of antenna arrays.

7. List different microwave passive devices.

8. Define the terms *(a)* dominant mode and *(b)* cut-off wavelength of a waveguide.

9. State the need of a duplexer.

10. List any three advantages of satellite communication system over terrestrial communication system.

PART—B

8×5=40

Instructions : (1) Answer **all** questions.

(2) Each question carries **eight** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. *(a)* Explain the ground wave propagation with the equation for electric field at a distant place. 8

(OR)

(b) Explain space wave (tropospheric wave) propagation. 8

12. *(a)* Explain the function of parabolic reflector (Dish antenna). 8

(OR)

(b) Explain horn antenna and give its applications. 6+2

13. *(a)* Explain the working principle of reflex klystron. 8

(OR)

(b) Explain the working of GUNN diode. 8

14. *(a)* Derive free space RADAR range equation. 8

(OR)

(b) Draw and explain block diagram of continuous wave (CW) radar. 3+5

15. *(a)* Draw and explain block diagram of a satellite communication system (satellite on board). 4+4

(OR)

(b) Explain the application of satellite in GPS (Global Positioning System). 8

PART—C

10×1=10

Instructions : (1) Answer the following question.

(2) The question carries **ten** marks.

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. What is the impact on trajectory of electrons in the interaction space of a magnetron under the influence of RF voltage to produce self-consistent mode of oscillations?

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