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**B. Tech. 6th Semester (ECE) F. Scheme Examination,
May-2017**

MICROWAVE AND RADAR ENGG

Paper-EE-302-F

Time allowed : 3 hours] [Maximum marks : 100

Note : Attempt five questions in all, selecting one question from each section. Question No. 1 is compulsory.

1. (a) Briefly describe similarities and dissimilarities between two wire transmission line and waveguide. 4
- (b) What are the limitations of conventional tubes at microwave frequencies ? Explain how these limitations can be overcome. 4
- (c) Write different applications of circulator. 4
- (d) What is a parametric amplifier ? How is it different from a normal amplifier ? 4
- (e) What is basic principle of radar system ? Give its limitations also. 4

Section-A

2. (a) An air filled rectangular waveguide has dimensions 7.2 cm by 3.4 cm. Calculate group and phase velocities in the dominant mode at a frequency of 2.4 GHz. 10
- (b) What is wave guide ? Explain different types of wave guide in detail. 10

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3. (a) A rectangular waveguide with dimensions of 3×2 cms operates in the TM_{11} mode at 20 GHz. Determine the characteristic wave impedance. 10
- (b) Explain propagation of TE waves in circular waveguide. 10

Section-B

4. (a) Give construction, operation, performance characteristics and application of two cavity klystron amplifier. 10
- (b) What are ferrites ? Why are these useful in microwaves ? Mention their typical properties. 10
5. (a) Explain the terms frequency pushing, frequency pulling and strapping with reference to a magnetron? 10
- (b) Write short note on magic tee. 10

Section-C

6. (a) Explain the operation of a varactor diode. Discuss the constructional details, equivalent circuit and figure of merit. Mention its applications also. 10
- (b) Draw and explain the characteristics of tunnel diode. 8
7. (a) Explain the construction, operation and applications of the IMPATT diode. 10
- (b) Describe how the power of a microwave generator can be measured using bolometer technique. 10

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Section-D

8. (a) A guided missile tracking radar has following specifications
Transmitted power = 400 kw; pulse repetition frequency = 1500 pps,
pulse width = 0.8μ sec.
Determine
(i) Unambiguous range
(ii) Duty cycle
(iii) Average power
(iv) Suitable bandwidth of the radar.
- (b) Write short note on radar frequencies. 10
9. (a) Draw the block diagram of basic radar system and explain the function of each block. 10
- (b) What do you mean by the term range ambiguity ? How can this ambiguity be resolved? 10

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