



(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3094

Roll No.

--	--	--	--	--	--	--	--	--	--

B. Tech.**(SEM. VI) EXAMINATION, 2008-09
MICROWAVE AND RADAR ENGG.***Time : 3 Hours]**[Total Marks : 100**Note : Attempt all questions.***1 Attempt any four of the following : 5×4=20**

- (a) Derive the field component present in TM₁₁ mode of propagation in rectangular waveguide and draw its field pattern.
- (b) A rectangular air filled copper waveguide with dimension 2.28 cm and 1.01 cm is operated at 9.2 GHz with a dominant mode. Find cut-off frequency, guide wavelength, phase shift, phase velocity and characteristic impedance.
- (c) An air-filled circular cylindrical cavity has a radius of 3.5 cm. The cavity is tuned by a plunger that allows the length to be varied from 5.2 to 6.8 cm. Determine the range of resonating frequency.



- (d) What are the various ways the electro magnetic waves can be coupled to wave guide. How TE₁₀ mode can be excited in Rectangular waveguide.
- (e) With figure discuss the working of Matched and short terminations.
- (f) How VSWR of an unknown load can be measured by using reflecto meter technique.

2 Attempt any FOUR of the following : 5×4=20

- (a) What are scattering parameters. How they one important at microwave frequencies. Discuss its properties.
- (b) With the help of diagram. Explain the working of Magic Tee. Discuss any of its two applications.
- (c) Give two examples of reciprocal devices and explain the working of any of them.
- (d) A three port circulator has an insertion loss of 1 dB, isolation 30 dB and VSWR = 1.5 Find the S malux.
- (e) Explain the working of crystal debctor and discuss its relevance in the measurement of microwave power.
- (f) Explain the methods of measurement of ferquency using Microwave bench setup.



3 Attempt any **two** of the following : 10×2=20

(a) (i) A reflex Klystron is operated at 9 GHz 6
with dc beam voltage of 600 V for $1\frac{3}{4}$
mode, repeller space length 1mm, dc
beam current 10 mA. The beam coupling
coefficient is assumed to be 1. Calculate,
the repeller voltage, electronic efficiency
and output power.

(ii) How bunch formation takes place in 4
duft region in two cavity Klystron ?
Explain.

(b) With support of diagram explain 8 Cavity 10
Magndron. Discuss the role of slow wave
strcture in TWT.

(c) (i) What is the operating principle of 5
GUNN diode Explain its working.

(ii) With support of diagram, explain the 5
working of I M P A T T diodes.

4 Attempt any **two** of the following : 10×2=20

(a) With schematic diagram, explain the working 10
of travelling wave tube and compare it with
multi cavity klystrois.



- (b) What is Varactor diode? Discuss its two applications. How TRAPATT can be designed using IMPATT and how it is important. 10
- (c) With block diagram explain the working of any ADAR. 10

5 Attempt any **two** of the following : 10×2=20

- (a) Describe the operating principle and application of M.T.I. Radars. 10
- (b) Discuss the importance of Radar clutters. 10
- (c) Explain the working of Radar Receiver for pulse Radar. 10