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(p)

(5)

(q)

(i)

terms:



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Roll No. PAPER ID : 131603

(SEM. VI) THEORY EXAMINATION, 2014-15

Attempt all the questions. : stoM

Attempt any four parts of the following: 5×4=20 I

What are waveguides? Explain the following

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characteristic impedance change with change What is microstrip line? How does its

Show that TE01 and TM10 modes do not exist

rectangular waveguide and draw its field Derive the field distribution of TE10 mode in

in width to height ratio.

in rectangular wave guide.

(iii) Cut-off wavelength.

Phase velocity

(ii) Group velocity

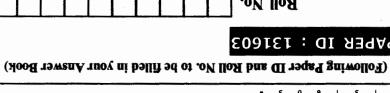
Each question carries equal marks.

[Total Marks *100

Time: 3 Hours]

WICKOMAVE ENGINEERING

B. Tech.



EEC603

Printed Pages: 4

formance. bas esboib TTAAAAT bas of Gunn diode.

10×5=20

attenuation using μ wave

scuss any one method for

ean by insertion loss and

escribe a voltage standing

ent features of microwave

carriage and its importance

wattmeter technique

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le detector

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R) meter.

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struction, fabrication and

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- <u>@</u> A rectangular wave guide has a cross sectional (c) cut off wave length. (a) free space wavelength, (b) cut off frequency, frequency is 9.0 GHz. Calculate the value of area $2.29~\text{cm} \times 1.45~\text{cm}$ and the operating
- \oplus Define quality factor of a cavity resonator. rectangular cavity resonator. Derive expression for quality factor Q of a
- Attempt any four parts of the following:5×4=20 What do you mean by microwave passive devices? Describe E-plane tee, H-plane tee
- <u>ල</u> 3 What are S-parameters? Why are they used network? at microwave frequencies to describe multiport

and Magic tee.

its [S] matrix is given by Describe rotary-vane attenuator. Show that

$$[S] = \begin{bmatrix} 0 & \sin^2 \theta \\ \sin^2 \theta & 0 \end{bmatrix}$$

What is a phase shifter? Describe a rotary phase shifter and explain its principle.

<u>@</u>

e

Show that the scattering matrix of four port carcular using magic tees is

$$[S] = \begin{bmatrix} 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

- Contd...

- \odot of an isolator. With support of figures explain the working
- following: Attempt any two parts of the

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- $10 \times 2 = 20$
- A two cavity klystron amplifier has the shunt impedance = 49 k Ω . Determine between centers of cavities = 4cm and effective gap spacing in either cavity = 1 mm, spacing Beam current = 30 mA, frequency = 8GHz, following specifications : Beam voltage = 900 V,
- Electron velocity
- D.C. transit time of electron
- (iii) Input voltage for maximum output voltage
- Voltage gain in dB

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R.F. signal to be 9 GHz with peak to peak value of 10 mV and $V_a = 1000 \text{ V}$. cavity gap to be 2mm and the frequency of electron enters the cavity at the instant when By means of an appropriate diagram explain the R.F. signal is at its negative peak. Assume the modulated velocity of electron if the the operation of a reflex klystron. Calculate

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With support of figure explain the working of

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following: Attempt any two parts of the

 $10 \times 2 = 20$

Give the construction of tunnel diode. Explain its volt-ampere characteristics

 $10 \times 2 = 20$



- (b) Explain the construction, fabrication and domain formation of Gunn diode.
- (c) Explain IMPATT and TRAPATT diodes and compare their performance.
- 5 Attempt any two parts of the following:
 - (a) Explain:
 - (i) Thermocouple detector
 - (ii) Bolometer mount technique
 - (iii) Calorimeter wattmeter technique
 - (iv) Slotted line carriage and its importance in μW test bench.
 - (b) Discuss the salient features of microwave measurements. Describe a voltage standing wave ratio (VSWR) meter.
 - (c) What do you mean by insertion loss and attenuation? Discuss any one method for measurement of attenuation using μ wave test bench.

Printed Pages: 4



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(SEM. VI) THEORY E

Time: 3 Hours]

Note: At

Attempt all the Each question ca

- 1 Attempt any four par
 - (a) What are wavego terms:
 - (i) Phase veloc
 - (ii) Group velo
 - (iii) Cut-off wav
 - (b) Derive the field rectangular was pattern.
 - (c) Show that TE01 in rectangular v
 - (d) What is microcharacteristic in in width to hei

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