Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2018-19
EXM/P/09/00

S. Y. M. Sc. | **School of Science** | **Physics**
PSS 608 | **Microwave Physics and Applications** | **Semester – IV**
Day - Tuesday
Date - 28/05/2019
Seat No. | **End Semester Examination** | **Max Marks: 20**
PRN No. | **Student Sign.**

Invigilator Sign. | **Examiner Sign.** | **Marks Obtained**
(A)
Time - 2.30 to 3.00 pm

Instructions: 1) All Questions are compulsory.
2) Mark √ to the correct option. Do not circle.
3) More than one options marked will not be considered for assessment.
4) Rough calculations on paper are not allowed.
5) Use non-programmable calculator is allowed.

Q.1	A) Select correct alternative	Marks	Bloom's Level	CO
i)	The propagation constant of a transmission line with impedance and admittance of 9 and 16 respectively is ----------. a) 25 b) 144 c) 12 d) 7	01	L2	608.1
ii)	What is the phase variation range for reflection coefficient in the transmission lines? a) 0° to 90° b) 90° to 150° c) 0° to 180° d) 90° to 360°	01	L2	608.1
iii)	Normalized impedance of 0.3+j0.4 lies in the ----------. a) upper half of the impedance smith chart b) lower half of the impedance smith chart c) horizontal line of the chart d) none of the mentioned	01	L2	608.2
iv)	The simplest method of reducing the forbidden range of impedances is to ----------. a) increase the distances between the stubs b) reduce the distance between the stubs c) increase the length of the stubs	01	L2	608.2

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d) reduce the length of the stubs

v)	Travelling wave parametric amplifiers are used to ----------. a) provide a greater gain b) avoid the need for cooling c) provide a greater bandwidth d) reduce the number of Varactor diodes required	01	L1	608.3
vi)	BJTs are suitable for RF applications because of ----------. a) smaller bandwidth b) low power handling capacity c) less noise characteristics d) wide range of operating frequency	01	L2	608.3
vii)	A space between two cavities in two cavity klystron is ----------. a) drift space b) free space c) running space d) normal space	01	L1	608.3
viii)	A duplexer is used ----------. a) to couple two different antennas to a transmitter without mutual interference b) to allow the one antenna to be used for reception or transmission without mutual interference c) to prevent interference between two antennas when they are connected to a receiver d) to increase the speed of the pulses in pulsed radar	01	L2	608.4
ix)	A slotted line can be used to measure --------- and the distance of ---------- from the load. a) SWR, first voltage minimum b) SWR, first voltage maximum c) characteristic impedance, first voltage minimum d) characteristic impedance, first voltage maximum	01	L1	608.4
x)	---------- is the progressive decrease of signal strength with increasing distance.	01	L1	608.4

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a) Radiation b) Attenuation

c) Modulation d) propagation

B) Fill in the blanks

i)	A measure of the mismatch between line and load impedance is called as ----------.	01	L1	608.1
ii)	A Magic – Tee is nothing but ----------.	01	L1	608.2
iii)	PIN diode is suitable for use as a ----------.	01	L1	608.3
iv)	Reflectometer can also be used as a ----------.	01	L1	608.4
v)	When the reverse bias effect goes beyond the valley point tunnel diode behaves as a ----------.	01	L1	608.3

C) State True or False

i)	All power applied at the input of the line will be absorbed by the load if $Z_0=Z_L$. ----------	01	L1	608.1
ii)	In a waveguide magic-T there is no coupling of power between port 1 and port 4. ----------	01	L1	608.2
iii)	Traveling Wave Tube is an oscillator. ----------	01	L1	608.3
iv)	An isolator has a very large operating bandwidth and independent of any isolator parameter. ----------	01	L1	608.4
v)	Ferrite isolators are two port microwave devices. --------	01	L1	608.4

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PSS 608

School of Science
Microwave Physics and Application
End Semester Examination

Physics
Semester – IV
Max Marks: 80

Time- 3.00 to 5.30 pm

Day - Tuesday
Date- 28/05/2019

Instructions:

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Neat diagrams must be drawn wherever necessary.
4) Use of logarithmic table and calculator are allowed.

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Q.2	Answer the following questions	Marks	Blooms Level	CO
a)	Apply transmission line theory to find the transmission line equations and its solution.	12	L3	608.1
b)	A certain transmission line has a characteristic impedance of 75+j0.01Ω and is terminated in a load impedance of 70+j50Ω. Calculate a) reflection coefficient b) transmission coefficient	4	L3	608.1
	OR			
b)	Construct standing wave ratio in terms of reflection coefficient.	4	L3	608.1

Q.3	Answer the following questions	Marks	Blooms Level	CO
a)	Explain impedance matching in detail. Explain the types of impedance matching.	12	L2	608.2
b)	Analyze the use of directional coupler in the transmission of microwave power.	4	L4	608.2
	OR			
b)	Distinguish between E plane and H plane tees.	4	L4	608.2

Q.4	Answer the following questions	Marks	Blooms Level	CO
a)	What is velocity modulation? How is it achieved in a two cavity Klystron? Describe the construction and working of	12	L3	608.3

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two cavity Klystron.

b)	Draw the voltage versus current characteristic of a tunnel diode. Hence, explain its negative resistance characteristic.	8	L2	608.3
	OR			
b)	Explain construction, working and mechanism of operation of magnetron.	8	L2	608.3
c)	Distinguish between the parametric up converter and down converter.	4	L4	608.3

Q.5	**Answer the following questions**	**Marks**	**Blooms Level**	**CO**
a)	Explain standing wave detector unit. Describe the slotted line techniques of modulated and unmodulated frequency for low VSWR measurement in detail.	12	L5	608.4
b)	Explain the impedance measurement in microwave using experimental set up.	8	L4	608.4
	OR			
b)	Differentiate the role of TR and ATR switches in branch type duplexer and balanced duplexer.	8	L4	608.4
c)	Discuss microwave reflectometer technique with proper diagram.	4	L2	608.4

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