



**JSS MAHAVIDYAPEETHA**  
**JSS SCIENCE AND TECHNOLOGY UNIVERSITY**  
**SRI JAYACHAMARAJENDRA COLLEGE OF ENGINEERING**  
**JSS Technical Institutions Campus, Mysuru – 570 006, Karnataka**

**JANUARY/FEBRUARY 2021 SEMESTER END EXAMINATIONS**

**PROGRAMME: B.E.**

**BRANCH: E&C**

**SEMESTER: V**

**SECTION: 'A' & 'B'**

**PAPER SETTER: Dr. M.N. Jayaram**

**DATE: 23.01.2021**

**DAY: Saturday**

**TIME: 9.30 A.M. to 12.30 P.M.**

**DURATION: 3 hrs.**

**MAX. MARKS: 100**

**MICROWAVE AND ANTENNAS**

**NOTE:**

1. PART-A is compulsory.
2. Use internal choice to answer PART-B Questions.
3. Any missing data may be suitably assumed

**PART – A**

Q. No.	CO	CD	QUESTION	MARKS
1.	CO3	L3	How do you convert low pass to High pass microwave filter? Design a denormalized 6 <sup>th</sup> order Butterworth high pass filter with following data $R_0=50\Omega$ , $f_c=5\text{GHz}$ , Filter coefficients $g_1=g_6=0.518$ , $g_2=g_5=1.414$ & $g_3=g_4=1.932$ . Write filter diagram also.	10
2.	CO2	L3	State Kepler's III Law for satellite communication. Which are the parameters that can be determined from this law? Compute approximate radius of geosynchronous orbit, assume $\mu = 3.986005 \times 10^{14} \text{ m}^3 / \text{sec}^2$ . List the advantages of this orbit.	10
3.a)	CO2	L3	Elements of S-matrix of a two port N/wave $S_{11}=S_{22}=5/13$ , $S_{12}=S_{21}=j12/13$ . What are its characteristics? Compute Reflection and Insertion losses.	06
b)	CO2	L3	What are the errors that occur in a radiometric receiver? How they are minimized?	04
4.a)	CO4	L3	Briefly discuss about sensitivity of a radar receiver. Find the sensitivity of a pulse radar with $\delta f=3\text{MHz}$ , $N.F=9\text{dB}$ , $T_0=17^\circ\text{C}$ . What is the sensitivity in dbm Scale?	05
b)	CO4	L3	Highlight the significance of MUR in radar system. How MUR can be optimized?	05

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5.	CO3	L2	Summarize the significance of the following antenna parameters. a) Beam solid angle b) Directivity c) Radiation resistance d) Effective aperture e) Antenna Bandwidth	10
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**PART – B**

Q. No.	CO	CD	QUESTION	MARKS
6.	CO3	L2	What are the effects of electromagnetic radiations on the personal, ordance and fuel? How they are taken care off?	10
<b>OR</b>				
7.a)	CO3	L2	What is dual nature of electrons? Explain. List the application of Tunnel diode.	05
b)	CO3	L2	How Gunndiode produces sustained oscillations? Which are the modes that are possible?	05

8.	CO1	L2	Explain the significance of satellite transponders, power supply units and attitude control in space segment.	10
<b>OR</b>				
9.	CO1	L2	With the help of neat diagrams explain the working of SS-TDMA in satellite systems.	10

10.	CO4	L3	Compare two important standards of global TV systems with reference to different parameters in the form of table. Which are the similarities and differences?	10
<b>OR</b>				
11.	CO4	L3	What is DVB? Explain. Compare different standards in the beam of a table.	10

12.	CO1	L2	Explain the basic principle of a CW Radar (two antenna type) with neat diagram. What are it advantages and disadvantages?	10
<b>OR</b>				
13.	CO1	L2	Summarize different Scanning and combining techniques in radars with neat diagrams. What are their applications?	10

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14.a)	CO1	L2	What are antenna field zones? Explain with a diagram.	05
b)	CO1	L2	Explain construction, specification, applications of a slot antenna.	05
<b>OR</b>				
15.	CO1	L2	Which are the advanced radars used in domestic and military applications? Briefly explain them (IEEE Paper).	10

### Course Outcome

CO-1	Explain principles of microwaves.
CO-2	Demonstrate problem solving ability and modeling.
CO-3	Design and analyze microwaves.
CO-4	Investigate and distinguish different types of microwave circuits, antennas and demonstrate their applications.

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