Hall Ticket Number :

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Code: 19A46BT

R-19

III B.Tech. II Semester Regular Examinations July 2022
Radar Engineering
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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	Marks	CO	Blooms Level

UNIT–I

1. a) Discuss about the integration of radar pulses in detail.   7M   CO1   BL2

   b) Derive the radar equation in terms of minimum detectable power and gains of transmitting and receiving antenna.   7M   CO1   BL6

OR

2. a) Discuss in detail about the block diagram of radar.   7M   CO1   BL2

   b) Identify the different ranges of frequencies that radar can operate and give their applications?   7M   CO1   BL1

UNIT–II

3. a) Explain the operation of a FM-CW altimeter With the help of suitable block diagram.   8M   CO1   BL2

   b) Describe methods to achieve isolation between transmitter and receiver of CW Doppler radar if same antenna is to be used for transmission and reception.   6M   CO1   BL2

OR

4. a) Explain about FM-CW radar.   7M   CO1   BL2

   b) List and explain the applications of CW radar.   7M   CO1   BL1

UNIT–III

5. a) Calculate the lowest blind speed of an MTI system operating at 4.2 cm wavelength and transmitting at a pulse repetition time of 286 μs.   7M   CO2   BL3

   b) Determine the factors limiting the performance of an MTI system.   7M   CO2   BL3

OR

6. a) Illustrate about the Range Gated Doppler Filters of MTI radar.   8M   CO2   BL4

   b) Explain in detail about MTI radar with power amplifier.   6M   CO2   BL2

UNIT–IV

7. a) Compare and contrast conical scan and sequential lobing type tracking techniques.   7M   CO3   BL5

     b) Outline the basic principle of continuous angle tracking.   7M   CO3   BL4

OR

8. a) Draw and explain the following with respect to Tracking in range:

       i. Echo pulse **ii**. Early-late range gates

       iii. Difference signal between early and late range gates.   8M   CO3   BL2

     b) Differentiate different trackers.   6M   CO3   BL2

UNIT–V

9. a) Distinguish between the matched and non-matched filters.   7M   CO3   BL4

     b) Outline the noise figure derivation when two networks in cascade   7M   CO3   BL4

OR

10. a) Build Branch type duplexer and explain its operation.   7M   CO3   BL6

     b) Explain the functioning and characteristics of PPI display and A-Scope   7M   CO3   BL2

END

Code: 19A462T

III B.Tech. II Semester Regular Examinations July 2022

VLSI Design

(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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		Marks	CO	Blooms Level

UNIT–I

1. a) Analyze the CMOS inverter in different regions with relevant diagrams. — 7M — CO2 — L2

   b) Explain about various Pullups. — 7M — CO2 — L2

OR

2. a) List out the processing steps involved in the NMOS fabrication. — 6M — CO1 — L1

   b) Explain CMOS fabrication using P-well process with neat diagrams. — 8M — CO1 — L2

UNIT–II

3. a) Discuss about the design rules for wires, contacts and transistors layout diagrams for CMOS inverters. — 4M — CO3 — L2

   b) Draw the stick diagram and layout for CMOS 2-input NAND gate. — 10M — CO3 — L3

OR

4. a) Discuss in detail about scaling and derive scaling factors for various parameters — 8M — CO3 — L2

   b) Find the scaling factor for Gate area (Ag) and gate Capacitance (Cg). — 6M — CO3 — L1

UNIT–III

5. a) Derive an expression for sheet resistance (Rs) and apply the concept for calculation of sheet resistance for CMOS inverter. — 8M — CO4 — L2

   b) Draw the circuit diagram of NMOS Super buffer and explain. — 6M — CO4 — L2

OR

6. a) Mention the name of different alternative gate circuits for designing of VLSI circuits? And explain any two of them with neat circuit diagrams. — 7M — CO4 — L2

b) Calculate inverter resistance for nMOS with Zpu=4 for pull up transistor and Zpd=1for pull down transistor and for CMOS Zpu=1 for pull up transistor and Zpd=1 for pull down transistor.

7M CO4 L2

UNIT–IV

7. a) Explain about High density memory elements with neat diagrams.

7M CO4 L1

b) Design a multiplier and discuss the merits and demerits with an example.

7M CO4 L2

OR

8. a) With a neat diagram, explain 4-bit barrel shifter.

7M CO4 L2

b) Explain about FPGA with a neat diagram.

7M CO4 L2

UNIT–V

9. a) With a neat diagram, explain need for testing.

7M CO5 L2

b) Explain briefly fault models and IDDQ testing.

7M CO5 L2

OR

10. a) Explain Programmable Logic Array(PLA) with an example

7M CO5 L1

b) Explain the concept of design verification tools used in VHDL synthesis tools.

7M CO5 L2

END

R-19

Code: 19A46ET

III B.Tech. II Semester Regular Examinations July 2022
Digital Image Processing
(Electronics and Communication Engineering)

Max. Marks: 70　　　　　　　　　　　　　　　　　　　Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Explain how images are acquired by using array sensors.	7M	CO1	L2
	b)	Describe about Image Sampling & Quantization.	7M	CO1	L2
		OR			
2.	a)	State and Prove Translation and Scaling properties of 2D DFT.	7M	CO1	L2
	b)	Derive the kernel coefficients for N=8 of Walsh Transform.	7M	CO1	L6
		UNIT–II			
3.	a)	Explain the histogram equalization method of image enhancement.	7M	CO2	L2
	b)	Demonstrate Some basic Intensity Transformation functions.	7M	CO2	L2
		OR			
4.	a)	Compare smoothing & sharpening in spatial domain.	7M	CO2	L2
	b)	Differentiate between spatial & frequency domain image Enhancement.	7M	CO2	L2
		UNIT–III			
5.	a)	Explain about Restoration in the presence of Noise only	7M	CO3	L2
	b)	Write short notes on image noise models.	7M	CO3	L1
		OR			
6.	a)	Discuss about degradation function estimation methods.	7M	CO3	L2
	b)	Explain the use of wiener filtering in image restoration.	7M	CO3	L2
		UNIT–IV			
7.	a)	Write short notes on HSI Color model.	7M	CO4	L1
	b)	Explain any two methods used in pseudo color image processing.	7M	CO4	L2
		OR			
8.	a)	Explain about basics of full color image processing.	7M	CO4	L2
	b)	Summarize the concept of conversions from one color model to another model.	7M	CO4	L2
		UNIT–V			
9.	a)	Explain the operators used for detecting edges in an image.	7M	CO5	L2
	b)	Write a short notes on region based segmentation.	7M	CO5	L1
		OR			
10.	a)	Explain about image compression model.	7M	CO5	L2
	b)	Write a short notes on coding redundancy.	7M	CO5	L1

****END****

Code: 19A463T

III B.Tech. II Semester Regular Examinations July 2022
Microwave Engineering
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours
Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)
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			Marks	CO	Blooms Level

UNIT–I

1. a) Differentiate microwave engineering from other low-frequency RF engineering. — 7M CO1 L5

   b) A rectangular waveguide has a cross section of 1.5cm X 0.8cm, = 0, $\mu = \mu 0$ and $\varepsilon = 4\varepsilon o$. The magnetic field component is given as

   $$H_x = 2\sin\left(\frac{fx}{a}\right)\cos\left(\frac{3fy}{b}\right)\sin(fx10^{11} - \text{S}z)$$
   A/m.

   Determine
   I. The mode of operation
   II. The cut off frequency
   III. The phase constant
   IV. The propagation constant
   V. The wave impedance — 7M CO1 L3

OR

2. a) Explain the propagation of TM wave in rectangular waveguide. — 7M CO1 L2

   b) For a Rectangular Waveguide, Prove that $\frac{1}{\lambda_g^2} = \frac{1}{\lambda_o^2} - \frac{1}{\lambda_c^2}$ — 7M CO1 L3

UNIT–II

3. a) Define a resonant cavity and give at least two examples. Where are these used? — 7M CO1 L2

   b) An air-filled circular waveguide has a radius of 5 cm and is used as a resonator for TE_{111} mode at 8 GHz by placing two perfectly conducting plates at its ends. Determine the minimum distance between the two plates. — 7M CO1 L3

OR

4. a) What are cavity resonators? Derive the equations for resonant frequencies for a circular cavity resonator. 7M CO1 L2

   b) What do you understand by quality factor of a cavity resonator? 7M CO1 L2

UNIT–III

5. a) Compare E-plane and H-plane tee junctions. Justify the use of magic tee as a duplexer. 7M CO2 L5

   b) Explain any one waveguide phase shifter. 7M CO2 L2

OR

6. a) Compare and assess Circulator and Isolator. 7M CO2 L5

   b) A 20 mW signal is fed into port 2 of a lossless Directional Coupler of coupling coefficient 20 dB and Directivity of 50 dB. Find the power at the output ports. 7M CO2 L3

UNIT–IV

7. With the help of Applegate diagram, explain the operation of a reflex klystron; show that the theoretical efficiency of reflex klystron is 27.78%. 14M CO2 L3

OR

8. a) Explain how the oscillations are sustained in cavity magnetron with suitable sketches assuming that – mode oscillations already exist. 10M CO2 L2

   b) Explain how the same effect is obtained without strapping. 4M CO2 L2

UNIT–V

9. a) Discuss about the various Gunn oscillation modes in detail. 7M CO2 L2

   b) Calculate VSWR of a rectangular guide of 2.3cmx1.0cm operating at 8GHz. The distance between twice minimum power points is 0.09cm. 7M CO2 L3

OR

10. Explain the operation of TRAPATT diode and derive the expressions for power output and efficiency of TRAPATT diode. 14M CO2 L5

END