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Code: 19A46BT

III B.Tech. II Semester Supplementary Examinations December 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)

UNIT-I

- | | Marks | CO | Blooms Level |
|---|-------|-----|--------------|
| 1. a) Draw the block diagram of a basic radar system and explain the function of each block. | 7M | CO1 | BL2 |
| b) Calculate the peak power and duty cycle of radar whose average transmitter power is 200W, pulse width of 1 μ s and a pulse repetition frequency of 1000Hz? | 7M | CO1 | BL3 |

OR

- | | | | |
|---|----|-----|-----|
| 2. a) Describe the multiple-time around echoes and explain how they can be distinguished from unambiguous echoes? | 7M | CO1 | BL2 |
| b) List all the possible losses in a radar system and discuss the possible causes of each of them. | 7M | CO1 | BL1 |

UNIT-II

- | | | | |
|---|----|-----|-----|
| 3. a) Develop the block diagram of range gated Doppler filters and explain. | 7M | CO1 | BL3 |
| b) Analyze the operation of multiple frequency CW radar. | 7M | CO1 | BL4 |

OR

- | | | | |
|---|----|-----|-----|
| 4. a) With the help of a suitable block diagram, explain the operation of a CW Doppler radar in a sideband super heterodyne receiver. | 7M | CO1 | BL2 |
| b) Write short notes on Range and Doppler measurement of a target using a FMCW radar. | 7M | CO1 | BL1 |

UNIT-III

- | | | | |
|---|----|-----|-----|
| 5. a) Differentiate Monopulse tracker and Conical scan tracker. | 8M | CO2 | BL2 |
| b) Illustrate the principle of Staggered PRF in MTI radar. | 6M | CO2 | BL3 |

OR

- | | | | |
|---|----|-----|------------|
| 6. a) Construct the MTI Radar with Power amplifier transmitter. | 7M | CO2 | BL6 |
| b) Define Blind Speed and interpret the use of delay line cancellor | 7M | CO2 | BL2 |

UNIT-IV

- | | | | |
|--|----|-----|-----|
| 7. a) Summarize the amplitude comparison mono pulse tracking technique. | 8M | CO3 | BL5 |
| b) Describe automatic tracking of a target through range gating technique. | 6M | CO3 | BL2 |

OR

- | | | | |
|--|----|-----|-----|
| 8. a) Demonstrate the phase comparison mono pulse tracking technique in a radar system with the help of necessary block diagram. | 8M | CO3 | BL3 |
| b) Justify why tracking radar has poor accuracy at low elevation angles. | 6M | CO3 | BL5 |

UNIT-V

- | | | | |
|---|----|-----|-----|
| 9. a) Derive the frequency response function of matched filter with nonwhite noise. | 7M | CO3 | BL6 |
| b) Differentiate branch-type duplexers and balanced duplexers. | 7M | CO3 | BL2 |

OR

- | | | | |
|--|----|-----|-----|
| 10. a) Interpret principle and characteristics of a matched filter. | 7M | CO3 | BL4 |
| b) Explain how a circulator can be utilized for a radar receiver protection. | 7M | CO3 | BL3 |

END

Code: 19A462T

III B.Tech. II Semester Supplementary Examinations December 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)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Explain the fabrication of Bi-CMOS technology with relevant diagrams.	10M	CO1	L2
b) List the differences between CMOS and Bipolar technologies.	4M	CO1	L1
OR			
2. a) Derive the relationship between pull-up to pull-down ratio for an NMOS inverter driven by another NMOS inverter(Z_{pu}/Z_{pd})	8M	CO2	L2
b) Draw the transfer characteristics of CMOS inverter and explain.	6M	CO2	L1
UNIT-II			
3. a) Draw the stick diagram and mask layout for CMOS NAND gate and CMOS NOR gate.	10M	CO3	L3
b) Find the scaling factor for Gate area (A_g) and gate Capacitance (C_g).	4M	CO3	L1
OR			
4. a) Discuss in detail about scaling and derive scaling factors for various parameters	8M	CO3	L2
b) Discuss about the design rules for wires, contacts and transistors layout diagrams for NMOS and CMOS inverters.	6M	CO3	L2
UNIT-III			
5. a) Calculate inverter resistance for nMOS with $Z_{pu}=4$ for pull up transistor and $Z_{pd}=1$ for pull down transistor and for CMOS $Z_{pu}=1$ for pull up transistor and $Z_{pd}=1$ for pull down transistor.	7M	CO4	L2
b) 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

OR

6. a) Derive an expression for sheet resistance (R_s) and apply the concept for calculation of sheet resistance for CMOS inverter. 8M CO4 L2
- b) Draw the circuit diagram of inverting type NMOS super buffer and explain. 6M CO4 L2

UNIT-IV

7. a) With a neat diagram, explain 4-bit barrel shifter. 7M CO4 L2
- b) Explain 4-bit Serial- parallel multiplier with a neat diagram. 7M CO4 L2

OR

8. a) Design an array multiplier and discuss the merits and demerits with an example. 7M CO4 L2
- b) Explain about High density memory elements with neat diagrams. 7M CO4 L1

UNIT-V

9. a) Explain the concept of design verification tools used in VHDL synthesis tools. 7M CO5 L1
- b) Explain Programmable Logic Array(PLA) with an example 7M CO5 L2
10. a) Explain briefly fault models and IDDQ testing. 7M CO5 L2
- b) With a neat diagram, explain sequential logic testing. 7M CO5 L2

END

Date:-29-12-2022

Duration: 120Min.

Max.Marks:70

Choose the correct Answer.

100 X 1 = 100 Marks

Directions (1-10): Read the following passage carefully and answer the questions given below it. Certain words have been printed in BOLD to help you locate them while answering some of the questions.

By launching a missile attack on Syria, U.S. President Donald Trump has made good on his threat to use force if chemical weapons are used in the civil war-stricken country, but he has also escalated the devastating, multi-sided conflict. This is the second time Mr. Trump has ordered a missile attack on Syria. Last year, after a chemical attack in **Idlib** province, the U.S. fired 59 cruise missiles at an airbase of President Bashar al-Assad. This time, after a suspected chemical attack in **Douma** near Damascus, the U.K. and France joined hands with the U.S. to punish Mr. Assad's regime. On Friday night, over 100 missiles targeted three regime facilities; with this, the Pentagon said, **Syria's chemical weapons programme** has been gutted. While the use of chemical agents against civilians cannot and must not go unpunished, the manner in which the U.S. and its allies have acted raises serious questions. The U.S. undertook the strike before the Organisation for the Prohibition of Chemical Weapons even began its investigation in **Douma** to ascertain if chemical weapons had in fact been used. It should have waited till the inter-governmental watchdog completed its investigation and then presented the case for action in the UN Security Council with requisite evidence. By acting merely on the basis of inputs from their intelligence agencies, the U.S.-led alliance flouted international law. Syrian government supporters chant slogans against U.S. President Donald Trump during demonstrations following a wave of U.S., British and French military strikes, in Damascus, Syria, on Saturday.

It is also doubtful if Mr. Trump's "mission accomplished" bravado is justified. The fact that a provocation was perceived for a second strike within a year suggests that the first one failed to deter the Assad regime. On the other hand, Mr. Trump has dragged the U.S. deeper into the Syrian civil war. If there is a future chemical attack, either by Mr. Assad or by his rivals, the U.S. will be forced to act again, perhaps more harshly. Worryingly, every time the U.S. bombs Syria, the chances of a military confrontation in the country between the U.S. and Russia heightens, given that Moscow remains firmly behind Mr. Assad. What Syrians need is not more bombs and missiles, but an end to the war, which has killed at least 400,000 people in seven years. There is no dispute that Mr. Assad is presiding over a monstrous military machine that has used brute force against his own people. But the ground reality in Syria is so complex that a sudden collapse of the regime would push the country and the millions who live in relative stability in regime-held territories into further misery. That is the last thing anyone wants. The focus of the West needs to shift from unilateral military action to aggressive multilateral diplomacy to find an immediate end to violence and then a long-lasting political solution. For that, the U.S. and Russia have to work together under a UN mandate. There is no other **path to peace** in Syria.

1. How many missiles have been launched by the U.S, U.K and France on Syria?
 - (a) 59 cruise missiles
 - (b) 60 cruise missiles
 - (c) 106 cruise missiles
 - (d) 100 cruise missiles

2. What do Syrians need now?
 - (a) more bombs and missiles
 - (b) account of 400,000 people killed in past seven years
 - (c) a treaty that can bring peace in the country
 - (d) an end to the war
3. Which ‘**path to peace**’ is mentioned in Syria?
 - (a) focus of the west on the unilateral military action
 - (b) future chemical attack either by Mr. Assad or by his rivals
 - (c) shift to aggressive multilateral democracy to put an complete end to violence and a long-lasting political solution
 - (d) by launching a missile attack and making a counter stroke
4. ‘**Syria’s chemical weapons programme has been gutted**’ means...?
 - (a) Syria’s chemical weapons programme has been failed
 - (b) Syria’s chemical weapons programme has been accomplished
 - (c) Syria’s chemical weapons programme has been banned
 - (d) Syria’s chemical weapons programme has been initiated
5. How many times the attack has been made on the Syria by the U.S?
 - (a) seven times (b) six times (c) one time (d) two times
6. What will happen if there is a future chemical attack by Mr. Assad or by his rivals?
 - (a) the U.S. will be forced to surrender
 - (b) the U.S, U.K and France will be forced to join together
 - (c) the U.S. will be forced to act again, perhaps more harshly
 - (d) the U.S. will be forced to act again, perhaps more politely
7. Find out the meaning most SIMILAR to the word given below from the passage “GUTTED”
 - (a) banished (b) abolished (c) destroyed (d) rebuked
8. Find out the meaning most SIMILAR to the word given below from the passage ‘REQUISITE ‘
 - (a) perquisites (b) dispensable (c) essential (d) unnecessary
9. Find out the meaning most SIMILAR to the word given below from the passage MANDATE’“
 - (a) a summon (b) compulsion (c) abnegation (d) to unauthorize
10. ‘BRUTE’ identify the similar meaning to the given word
 - (a) senseless (b) ruthless (c) sensible (d) brutal

Directions (11-15): In each of the following questions, out of the given alternatives choose the one which best expresses the meaning of the given word

11. *Lethal*
 - a) unlawful b) Deadly c) Sluggish d) Smooth
12. *Lethargy*
 - a) Laxity b) Impassivity c) Serenity d) Serenity

13. *Diligent*
 a) Intelligent b) Energetic c) Modest d) Industrious
14. *Pivotal*
 a) movable b) crucial c) internal d) mechanical
15. *Dank*
 a) Dangerous b) Ugly c) Plunder d) Plunder

Directions (16-20): In each of the following questions, choose the word opposite in meaning to the given word

16. *Assert*
 a) Agree b) Acquiesce c) Abjure d) Abdicate
17. *Profane*
 a) Arrogant b) Benign c) Respectful d) Pious
18. *Obstinate*
 a) Inflexible b) prominent c) pliable d) Fashionable
19. *Fraternity*
 a) Hospitality b) hostility c) brotherhood d) Enmity
20. *Magnify*
 a) Induce b) Diminish c) Destroy d) Shrink

Directions (21-25): In each of the following questions, some alternatives are suggested for the idiom/phrase in italic in the sentence. Choose the one which best expresses the meaning of the idiom/phrase in italics.

21. *To keep one's head*
 a) To be agile b) To keep calm c) To think coherently d) None of these
22. *A close shave*
 a) A lucky escape b) A clean shave c) A well-guarded secret d) A narrow escape
23. *To hold something in leash*
 a) To restrain b) To disappoint c) To dismiss d) To discourage
24. *To cross swords*
 a) To fight b) To defend c) To kill d) To rob
25. *A snake in the grass*
 a) Secret or hidden enemy b) Unforeseen happening
 c) Unrecognisable danger d) Irreliable person

Directions (26-30): In each of the following questions, out of the four alternatives, choose the one which can be substituted for the given words/sentences.

26. *The place where public government or historical records are kept*
 a) coffer b) pantry c) scullery d) Archives
27. *Practice of a married woman having extra marital relationship*
 a) Polygamy b) Puberty c) Lechery d) Adultery

28. *Large scale departure of people*
 a) Migration b) Emigration c) Immigration d) Exodus
29. *To examine one's own thoughts and feelings*
 a) Meditation b) Retrospection c) Reflection d) Introspection
30. *A government by the nobles*
 a) Democracy b) Bureaucracy c) Autocracy d) Aristocracy

Directions (31-40): In each of the following questions, a word has been written in four different ways out of which only one is correctly spelt. Find the correctly spelt word.

- 31 a) alienate b) allienate c) aliennate d) alienatte
- 32 a) accommodate b) accomodate c) accomodate d) accomodate
- 33 a) leisure b) leissure c) leasure d) lesiure
- 34 a) pasanger b) pessenger c) pesanger d) passenger
- 35 a) comitment b) comitment c) commitment d) comitmant
- 36 a) passenger b) passengar c) pasanger d) passanger
- 37 a) Spychology b) psychology c) psychology d) psichology
- 38 a) bauquet b) boqueche c) bouquet d) boque
- 39 a) collaberation b) calloberation c) colleberation d) collebaration
- 40 a) exaggarate b) exagarate c) exeggaratte d) exaggerate

Directions(41--45) : In each sentence below, there are two blank spaces. Below each sentence some pairs of words are given which are numbered. (a), (b), (c), (d) and (e). Pick out the most appropriate pair to fill in the blanks in the same order, to make the sentence meaningfully complete.

41. Cholestrol has long been identified as a silent killer because the patient has no..... of the danger freely his system.
 a) idea, infecting b) thought, attacking
 c) notion, ravishing d) information, invading
42. I have just the memory of my father to..... now, but my faith in him has never been.....
 a) recall, missing b) store, forgotten c) love, shaken d) worship, mistaken
43. He gave me an additional of Rs.200 a month by of the Commissioner
 a) allowance, permission b) pay, allowance
 c) salary, admittance d) payment, agreement
44. I am not to sell you my house unless you offer a more price.
 a) conform, true b) prepared, realistic c) ready, correct d) having, actual
45. If we do not take care in our industry, we will have to a grave problem.
 a) normal, experience b) proper, face c) adequate, catch d) intensive, aggravate

Direction (46-50): Pick out the most effective word from the given words to fill in the blank to make the sentence meaningfully complete.

46. I am not _____ to sell you my house unless you offer a more _____ price.
(a) confirm, true (b) prepared, realistic (c) ready, correct (d) having, actual
47. Mr. Johnson ----- a boat and ----- into the bay.
(a) hired, rowed (b) rented, swam (c) boarded, went (d) borrowed, intruded
48. It appears that in those drought stricken areas hunger had ___hundreds of persons to mere ____
(a) converted, phantoms (b) transformed, shadows
(c) reduced, skeletons (d) changed, skeletons
49. They wanted to ____ all these books, but they could not find _____ time to do so.
(a) cover, almost (b) pursue, necessary
(c) dispose, some (d) read, sufficient
50. It is useless to attempt to _____ from every danger, some _____ must be taken.
(a) escape, chances (b) free, challenges (c) protect, decisions (d) flee, risks

Direction (51-60): In each question, apart of sentence is printed in italics. Find out the phrase below which can correctly substitute that part of the sentence. If the sentence is correct as it I, the answer is 'no correction required' or 'no improvement'.

51. Rohit is *as fast as* or perhaps faster than Manish
a) equally fast (b) almost as fast (c) as fast (d) no correction required
52. The carpenter is the most skilled of *all the other carpenters* in our workshop.
a) Carpenter (b) of all other carpenters (c) of all carpenters (d) no improvement
53. *All his family members* are in Kanpur.
a) all of his family members are in kanpur
b) all the family members of his
c) all the members of his family
d) no correction required
54. He plays cricket and tennis *also*
a) both (b) besides (c) too (d) no improvement
55. He *has eaten* his food
a) has had (b) has taken (c) has swallowed (d) no improvement
56. *The police are trying to solve the mystery*
a) was (b) has been (c) is (d) no improvement
57. *Bad habits must nipped at the bud*
a) nipped of the bud (b) nipped in the bud (c) nipped on the bud (d) no improvement
58. They all loved each other
a) among each other (b) one another (c) for each other (d) no improvement

79. Last summer he went (a)/to his uncle's village,(b)/and enjoyed very much(c)/no error(d)

80. They walked (a)/besides each other (b)/ in silence(c)/ no error(d)

Directions:(81-85) In each of the following questions, a sentence has been given in Active/Passive voice. Out of the four alternatives suggested select the one which best expresses the same sentence in passive/ Active voice.

81. Mona was writing a letter to his father

- a) A letter is being written by mona to his father
- b) A letter was being written by mona to his father
- c) A letter is written by mona to his father
- d) A letter was written by mona to his father

82. He teaches us grammar

- a) grammar is taught to us by him
- b) we are being taught grammar by him
- c) Grammar is being taught us by him
- d) They are taught Grammar by him

83. He will write a letter next week

- a) A letter would be written by you
- b) A letter will be written by him next week
- c) A letter is written by him
- d) A letter was written by him next week

84. They know him

- a) He is known by them
- b) He is know to them
- c) He is known to them
- d) He was known by them

85. *My uncle promised me a present*

- a) A present was promised by my uncle to me
- b) I was promised a present by my uncle
- c) I had been promised a present by mu uncle
- d) I was promised by my uncle a present

(Directions 86-95) Choose the most appropriate work in the context of the passage, from the given alternatives.

The keeper, Lord Shiva himself, is known to be the greatest hunter of them all, as he sits on a tiger skin and covers his... (85)... body with animal fur. But to (86) in (87)... killing of animals is against the(88)..... law, as one may kill only that which one can(89).... However, man being man is the only ...(90)..... who kills for sport, knowing it to be sport, thereby... (91)... all norms of ... (92)... behaviour. The Americans ... (93)... out the bison from the face of North America, as the Indian Maharajas and British Sahibs did the cheetah and almost the lion and tiger from Indian-animals which you don't eat but ...(94)... the walls of your house with----95-----

- 86 a) beautiful b) bare c) vacant d) uncovered
- 87 a) involve b) include c) indulge d) interfere
- 88 a) wanton b) unreasonable c) rash d) disregarded
- 89 a) spiritual b) cosmic c) supernatural d) manly
- 90 a) consume b) devour c) gobble d) grab
- 91 a) beast b) brute c) creature d) animal
- 92 a) transferring b) neglecting c) transgressing d) desecrating

- 93 a) contingent b) civilized c) complementary d) crude
94 a) eradicated b) erased c) wiped d) removed
95 a) garnish b) tarnish c) decorate d) grandeur

Directions (96-100) : Rearrange the given five sentences A,B,C, D,E and F in the proper sequence so as to form a meaningful paragraph and then answer the questions given below them

- A. As he got up, a frightened native told him about the man-eater.
B. When he approached the thick bush, he saw the lion running towards him.
C. Tom was awakened by the fearful screams of the villagers.
D. In a stage of fright, a shot was fired accidentally by Tom, but it hit the lion.
E. Tom decided to chase the lion and took out his gun.

- 96 Which of the following should be the first sentence?
a) A b) B c) C d) D
- 97 Which of the following should be the second sentence?
a) A b) B c) C d) D
- 98 Which of the following should be the third sentence?
a) A b) B c) C d) D
- 99 Which of the following should be the fourth sentence?
a) A b) B c) C d) D
- 100 Which of the following should be the last sentence?
a) A b) B c) C d) D

Hall Ticket Number :

R-19

Code: 19A463T

III B.Tech. II Semester Supplementary Examinations December 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)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Write some major applications of microwave engineering.	7M	CO1	L5
b) A rectangular waveguide is to be designed to guide a 12 GHz signal under the dominant mode. Calculate the cross-sectional dimension of the waveguide.	7M	CO1	L3
OR			
2. a) Describe the frequency bands occupied by the entire electromagnetic spectrum and the advantages & disadvantages.	7M	CO2	L2
b) Draw a neat sketch showing the variation in the value of wave impedance with frequency for TE, TM and TEM modes for rectangular waveguides.	7M	CO2	L2
UNIT-II			
3. a) What is dominant mode of TM and TE waves in circular waveguides?	7M	CO1	L2
b) An air-filled rectangular cavity resonator has $a=d=2$ cm, and $b=1$ cm and is operated in the TE ₁₀₁ mode calculate			
i. Resonant frequency.			
ii. If the cavity is filled with a dielectric of relative permittivity 2.5, what is the resonant frequency?	7M	CO1	L3
OR			
4. a) Give the TE wave components in circular waveguides using Bessel functions.	7M	CO1	L2
b) Design an air-core Circular Waveguide that will be able to guide only the dominant TE ₁₁ mode at 10 GHz, with a safety margin of 25%. What is the cut-off frequency of the next higher mode?	7M	CO1	L6

UNIT-III

5. a) With a neat sketch, describe the basic operating principle of a two-hole Directional Coupler. 7M CO2 L2
- b) Explain the applications of a Magic Tee 7M CO2 L2

OR

6. a) Describe in detail Waveguide Corners, Bends and Twists 7M CO2 L2
- b) A microwave Tee Junction is matched terminated at all its ports. A signal power of 1 W from a matched generator is fed into it through its H-arm. Find the output power at the output ports. 7M CO2 L3

UNIT-IV

7. Derive the equation of velocity modulation for a two cavity Klystron amplifier. 14M CO2 L3

OR

8. a) What are the limitations of conventional vacuum tubes at microwave frequencies? 7M CO2 L2
- b) A reflex klystron operates at the peak mode of $n = 2$ with beam voltage is 300 V, beam current is 20 mA, and signal voltage is 40 V. Determine
- I. Input power in watts
 - II. Output power in watts
 - III. The efficiency 7M CO2 L3

UNIT-V

9. a) Write short notes on "LSA mode in GUNN diode". 7M CO2 L2
- b) Explain the operation of RWH-Two valley theory with suitable diagrams? 7M CO2 L2
- OR**
10. a) Describe the measurement of impedance using slotted line and Smith chart. 7M CO2 L2
- b) Distinguish between low frequency measurement and microwave measurements. 7M CO2 L2

END