Code No. 206

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Main & Backlog) Examination, May / June 2018

Subject: Antennas and Wave Propagation

Time: 3 Hours **Max. Marks: 75**

Note: (i) Answer All Questions From Part-A & Any five Questions From Part-B.
(ii) Missing data, if any may suitably be assumed.

PART–A (25 Marks)

1. Define a uniform linear array (2)
2. Distinguish between directive gain and power gain of an antenna (3)
3. A radio link has a 15W transmitter connected to an antenna of 2.5 m^2 effective aperture at 5 GHz. The receiving antenna has an effective aperture of 0.5m^2 and is located at 15 km from the transmitting antenna. Obtain the power delivered to the receiver assuming lossless, matched antennas (3)
4. Define line of sight (LOS) propagation (2)
5. What is the skip zone of a radio ware? (2)
6. Compare the loop antenna with short dipole (3)
7. What is principle of pattern multiplication? Explain (2)
8. Mention the advantages and disadvantages of a rhombic antenna (3)
9. Calculate the distance at which an electromagnetic wave will have the same magnitude for induction and radiation fields if its frequency is 10MHz (3)
10. Define retarded potential of an antenna (2)

Part-B (50 Marks)

1. a) Explain the following terms with respect to antenna. (i) HPBW (ii) directivity (iii) radiation intensity (iv) antenna efficiency and (v) radiation resistance (5)
   b) A half – wave dipole is made of copper (σ= 5.7 x 10^7 s/m) Wire. Determine radiating efficiency at 100MHZ if radius of wire 3 x 10^{-4}, Rr. 73Ω for half wave dipole. (5)
12 Starting from the fundamentals derive the radiation resistance of a half wave dipole (10)
13. Discuss about constructional feature, dimensional considerations, beam with, directivity and applications of horn antenna. (10)
14. a) Synthesize an array having two isotropic point sources of same amplitude but in phase quadrature separated by a distance of λ/2 placed symmetric with respect to origin. Draw the radiation pattern. (6)
   b) Write a note on binomial arrays. (4)
15 a) Give the structure of ionosphere and explain the mechanism of skyware propagation (7)
   b) Calculate the radio horizon for a 100m transmitting antenna and a receiving antenna of 25 mts. (3)
16 a) By deriving Frii's transmission formula, determine the maximum effective area of a hertzian dipole of length 10cm operating at 100 MHZ. if the antenna receives 3/4W of power, obtain the power density of the incident wave. (7)
   b) obtain the distance at which the induction and radiation fields are equal (3)
17. Write explanatory notes on
   a) Parabolic reflectors (5)
   b) Surface waves (5)

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Code No. 206/N

FACULTY OF ENGINEERING

BE 3/4 (ECE) II - Semester (New) (Supplementary) Examination, December, 2017

Subject: Antennas and Wave Propagation

Time: 3 hours **Max. Marks: 75**

Note : Answer all questions from Part-A & Any Five Questions from Part-B.

PART – A (25 MARKS)

1	What is the significance of gain of an antenna?		2
2	If the radiation resistance of an antenna is 75 ohms and loss resistance 25 ohms. Compute the efficiency of an antenna		2
3	What are advantages and disadvantages of microstrip antenna?		2
4	Discuss the principle of pattern multiplication		3
5	What is the significance of pitch angle in helical antenna?		2
6	What is the basic concept of reflector antenna?		3
7	What are the advantages of an antenna arrays?		2
8	Define Binomial array		3
9	Define optimum working frequency		3
10	Discuss briefly about variations in Ionosphere		3

PART – B (50 MARKS)

11	a)	An infinitesimal electric dipole is centered at the origin and lies along z-axis. Find the far-zone electric and magnetic fields radiated	6
	b)	Compare monopole antennas and dipole antennas	4
12		How to obtain two modes in helical antenna? Obtain the expression for axial ratio	10
13		With reference to paraboloids, explain the following with neat diagrams: a) f/D ratio b) Spill over and aperture efficiency c) Front to back ratio d) Different types of feeds.	10
14		What is End fire array? Derive the condition for maxima, null directions and also Calculate the beam width of an End fire array.	10
15	a)	Explain in detail about Ground wave propagation	6
	b)	A television transmitter antenna has a height of 169 meters and the receiving antenna has a height of 16 meters. What is the maximum distance through which the TV signal could be received by space propagation? What is the radio horizon in this case?	4

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16 a) Discuss in detail about design consideration of Rhombic antenna 5

b) Explain far field pattern of circular loop antenna 5

17 Write short notes on:

a) Yagi-Uda antenna 5

b) Sky wave propagation 5

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Md. Akram Ahmed
MTECT

Code No. 3462/N

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II - Semester (New)(Main) Examination, May / June 2017

Subject: Antennas and Wave Propagation

Time: 3 Hours. **Max. Marks: 75**

Note: Answer all Questions in Part – A, and any five questions from Part – B.

PART – A (25 Marks)

1. Compare power gain and Directive gain. (2)
2. Obtain distance from an antenna where near field is equal to far field. (2)
3. Draw the diagram of rectangular microstrip antenna and sketch its fields. (2)
4. Why is loop antenna called as magnetic dipole? (3)
5. Draw the radiation pattern of vertical dipole. (2)
6. Differentiate 'V' antenna from rhombic antenna . (3)
7. Why frequency independent antennas are called so? (3)
8. How is beam scanning achieved with array antenna? (3)
9. What is the free space loss factor? (2)
10. What are the effects of ground on low frequency wave propagation? (3)

PART – B (50 Marks)

11 a) Explain how the electric field lines are formed and detached from short dipole antenna. (8)
b) Comment on antenna temperature. (2)

12 a) Obtain field equations of half wave dipole. (8)
b) What are the differences between transmission line and dipole antenna? (2)

13 What is the principle of equality of path length? How is it applicable to Horn antennas? Obtain an expression for the directivity of a pyramidal horn in terms of its aperture dimensions. (10)

14 a) Explain in detail the different cases of the array containing two isotropic sources (7)
b) Discuss principle of pattern multiplication. (3)

15 a) Explain the following terms: (8)
i) Critical frequency ii) MUF
iii) Skip Distance iv) Virtual height
b) Find the range of LOS system when the receive and transmit antenna heights are 10m and 100m respectively. (2)

16 a) Discuss the effect of earth on vertical radiation patterns of an antenna. (5)
b) Discuss about design considerations of log-periodic antenna. (5)

17. Write short notes on:
a) Lens antenna (5)
b) Friis transmission formula (5)

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Code No. 3177

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II-Semester (Suppl.) Examination, November / December 2016

Subject : Antennas and Wave Propagation

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Distinguish between broad-side and end-fire arrays.	3
2	Write an expression for power radiated by a Hertzian dipole.	2
3	Calculate the HPBW of an eight-element end-fire array with spacing between consecutive elements equal to $\lambda/2$.	3
4	Define line-of-sight (L05) propagation.	2
5	What is the effect of earth on vertical patterns of an antenna?	3
6	Define HPBW and BWFN of an antenna array.	2
7	State Friis transmission formula.	2
8	What are the E-plane and H-plane patterns?	3
9	Define parasitic array.	2
10	Distinguish between phase and group velocities of an e.m. wave.	3

PART – B (50 Marks)

11 a) Explain the concept of retarded potential. 5

b) The radiation intensity of a certain antenna is $2 \sin\theta \sin^3\Phi$ (for $0 \le \theta \le \pi$ and $0 \le \Phi \le \pi$) and zero elsewhere. Determine the directivity of the antenna. 5

12 Discuss the radiation characteristics of an a.c. element and define its near and far-field. Also obtain the distance at which both fields become equal. 10

13 Define effective aperture area of an antenna. Obtain maximum effective aperture area of i) half-wave and ii) short dipole. 10

14 What are end-fire and broad-side arrays? Obtain BWFN and HPBW of both of these two types. 10

15 a) Define pattern multiplication for antenna arrays using this concept, obtain the pattern of a binomial array of four point sources. 5

b) Explain the effect of interelement phase shift on beam scanning. 5

16 a) Describe the advantages and disadvantages of microstrip antennas. 5

b) Explain the method of antenna temperature measurement. 5

17 a) Briefly discuss about i) duct propagation and ii) sky wave propagation 5

b) At what frequency, a wave must propagate for the D-region to have a refractive index of 0.5. Take electron density equal to 400 for the given region. 5

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Code No:11563/CBCS

FACULTY OF ENGINEERING

B.E. (ECE) VI – Semester (CBCS) (Main) Examination, May / June 2019

Subject: Antennas and Wave Propagation

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A, & any Five questions from Part-B.

PART – A (20 Marks)

1. Distinguish between far field and near field of an antenna. 2
2. Define antenna radiation pattern. Draw and explain its parameters. 2
3. List some applications of a Helical antenna. 2
4. State secant law. 2
5. Write the excitation coefficients of 5 element binomial array. 2
6. Compare broadside and endfire arrays. 2
7. What is the E-plane metal plate lens? 2
8. Define line of sight propagation. 2
9. Differentiate V antenna from Rhombic antenna. 2
10. Define parasitic array. 2

PART – B (50 Marks)

11. (a) What is Lorentz gauge condition? Show that 8

$$\frac{\nabla\nabla\cdot\bar{A}}{j\omega\mu\varepsilon} - j\omega\bar{A} = \frac{1}{j\omega\mu\varepsilon}\left(\nabla\times\nabla\times\bar{A}\right)$$

Where $\bar{A}$ is magnetic vector potential.

(b) At what distance induction and radiation field are equal? 2

12. What is the Hertzian dipole? Obtain expressions for the radiation fields of it. 10
13. Explain about working principle of
    (i) Parabolic antenna
    (ii) Horn antenna 10
14. (a) Explain in detail the different cases of the array containing two isotropic sources. 8
    (b) Discuss the principle of pattern multiplication. 2
15. (a) Give the structure of ionosphere and explain the mechanism of sky wave propagation. 6
    (b) Describe any one method to measure the gain of an antenna. 4
16. (a) Explain the cassegrain feeding of paraboloid reflector and its advantages. 5
    (b) Obtain the maximum effective aperture of short dipole antenna 5
17. Write a short note on 10
    a) Friss transmission formula 5
    b) Effect of earth on vertical patterns 5

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Code No. 11557/CBCS

FACULTY OF ENGINEERING

B.E. VI – Semester (CBCS)(Inst.)(Main) Examination, May / June 2019

Subject: Process Control

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A & answer any five questions from Part-B.

PART – A (10 x 2 = 20 Marks)

1. What is Thermal Element Lag? 2
2. Explain the term Process Degree of Freedom. 2
3. What is an Anticipatory Controller Mode? 2
4. Explain the function of Two Position Floating Controller. 2
5. What is meant by Tunning of controller? 2
6. What is an Electrical Actuator? 2
7. Explain the function of Pneumatic Actuator. 2
8. Elaborate the selection of Control valve. 2
9. With a neat diagram explain the Relay controller. 2
10. Draw the Basic structure of PLC. 2

PART – B (5 x 10 = 50 Marks)

11. a) With a Schematic Diagram explain Flow Process. 5

    b) A Triangular Wire has an equation $q = C_v\sqrt{2gh^5}$ Calculate the Resistance. 5

12. a) Explain PD Controller with analytic expression. 5

    b) With a Schematics diagram explain Single Speed Floating Control. 5

13. a) Explain Static error, Offset error and Velocity error. 5

    b) In the application of Ziegler Nichols method oscillations are observed in the process with proportional band set to 400/01 in the time period of 10 minutes. Find the setting of Three Controller mode? 5

14. a) Explain Control Valve Sizing and Selection. 5

    b) With a neat PLC Software with an example. 5

15. a) With a neat diagram explain PLC operations. 5

    b) Explain the PLC Software with an example. 5

16. a) Draw the Ladder Diagram for the following function when PBI is pressed the Red light turns On, when PB2 is pressed neither of the light turns ON. 5

    b) With a neat diagram explain Pneumatic Valve Positioner. 5

17. Write short notes on

    a) Liquid Process 4

    b) Automatic Controller 3

    c) Integral control mode 3

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15. a) Describe the construction and principle of operation of operation of valve type lightning arrester (3)

b) What is a ground wire? How do ground wires protect the over head lines against direct lightning strokes (7)

16. a) Explain with a neat sketch the construction and working of SF_6 Circuit Breaker (5)

b) In a system of 132KV, 3 phase, 50 Hz, The circuit phase to ground capacitance is 0.01 µF, The inductance is 6 Henry. Calculate (5)

i) The poles of a CB if a magnetising current of 10 Amps (Instantaneous value) is interrupted. And also calculate

ii) The value of resistance to be used across the contacts to eliminate the restriking voltage

17. Write short notes on

a) Protective scheme for the Parallel feeder System. (4)

b) Peterson coil (3)

c) Buchholz Relay (3)

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Code No: 11551/CBCS

FACULTY OF ENGINEERING

B.E. VI – Semester (CBCS) (EEE) (Main) Examination, May / June 2019

Subject: Switch Gear and Protection

Time: 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part – A & any five questions from Part – B.

PART – A (10 x 2 = 20 Marks)

1. Distinguish between primary and back up protection (2)
2. What is universal relay torque equation? (2)
3. Draw the block diagram of microprocessor based over current relays (2)
4. Define the terms (2)
   a) Recovery voltage
   b) Restriking voltage.
5. What are the causes and effects of over voltages (2)
6. Give a brief note about the Auto Reclosure (2)
7. What is magnetizing inrush current? (2)
8. The symmetrical breaking capacity of a circuit breaker is x MVA, find its making capacity value (2)
9. Write the differences between Amplitude comparator and phase comparator (2)
10. An over current relay of rating of 5 A and setting 150% is connected to the secondary of a CT of ratio 400/5 and the relay fault current is 30 A. Calculate the current in the line for which the relay picks up. (2)

PART – B (10 x 5 = 50 Marks)

11. a) Explain about generator transformer unit protection (3)
    b) With a neat diagram explain the construction and working of Stator Inter Turn Protection scheme (7)
12. a) Give a brief note about the duality between Amplitude comparator and phase comparator (6)
    b) Mention the types of Phase comparators (4)
13. a) With a neat sketch explain the construction and working principle of induction type directional relay. Also plot its V-I characteristic. (7)
    b) Draw one line diagram of power system network to illustrate different protective zones of system. (3)
14. a) Explain how the arc is initiated in circuit breakers (2)
    b) Derive an expression for Restriking voltage and Rate of Rise of Restriking Voltage of a circuit breaker (8)

contd…2

17 Analyze the following continuous beam shown in Fig. 6 by either flexibility or stiffness method if the support 'B' sinks down by 10mm. Take E = 200 GPa and I = 1.35×10^{-3} m^4. Also draw BMD.

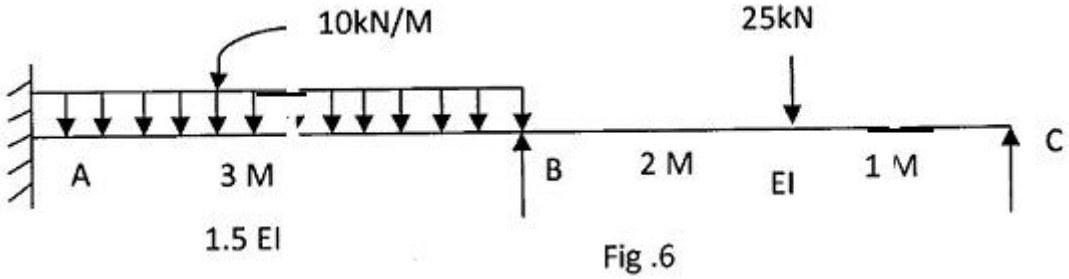

Fig .6

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13 Construct the influence line diagram for forces in the members U_1U_2, L_1L_2 for the truss shown in Fig. 3. Hence calculate the forces in these members due to a dead load of 20 kN/m and moving live load of 30 kN/m which is longer than the span. Take each panel 6 m width each, members U_1L_1 = 3m and U_2L_2 = 5m.

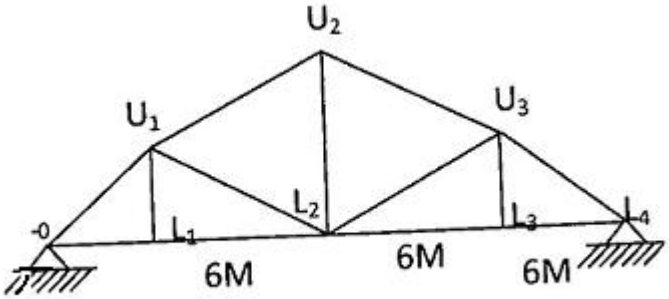

Fig. 3

14 A suspension bridge of 100 m span has a three hinged stiffening girder supported by cables having a central dip of 10 m. The left half of the span of the bridge is loaded with uniformly distributed load of intensity 25 kN/m. Determine the reactions and draw the bending moment and shear force diagram for the stiffening girder.

15 Analyse the beam shown in Fig. 4 using flexibility method and draw the BMD. Assume EI is the same for all the members.

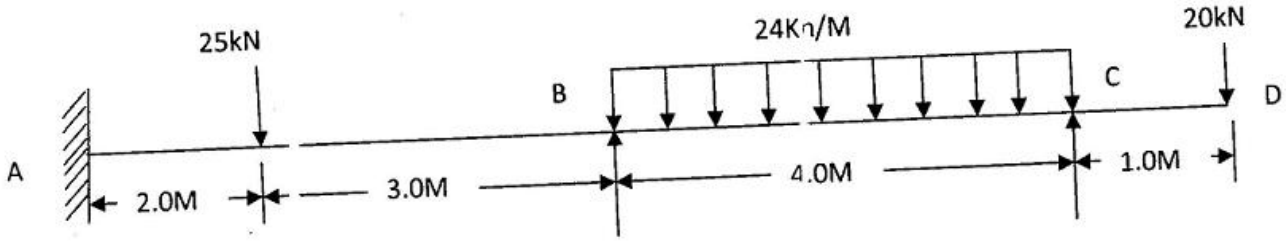

Fig. 4

16 Analyze the plane truss shown in Fig. 5 using stiffness matrix approach.

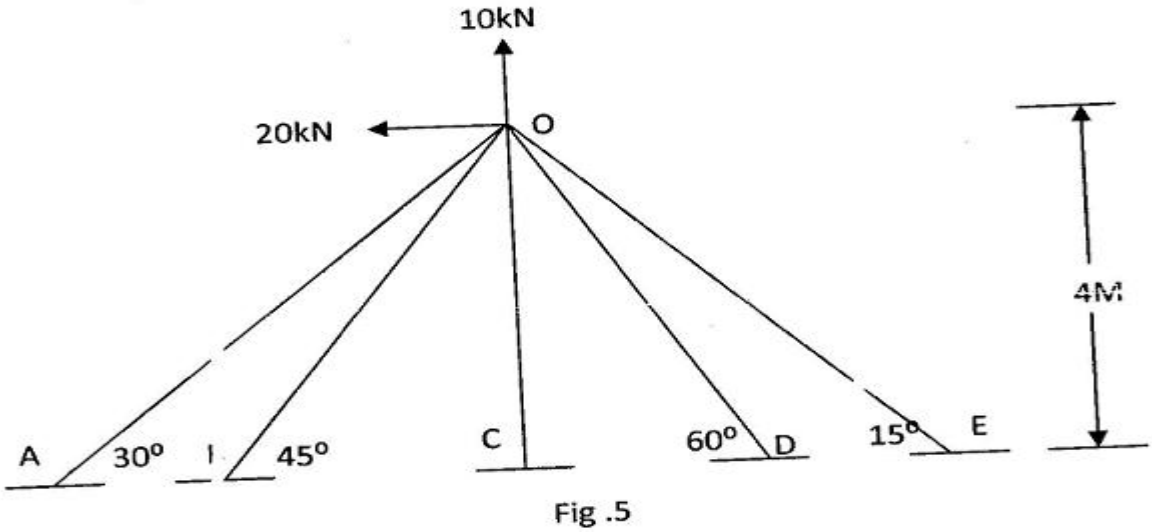

Fig .5

Code No. 11529 / CBCS

FACULTY OF ENGINEERING

B.E. (Civil) VI – Semester (CBCS) (Main) Examination, April / May 2019

Subject: Theory of Structures – II

Time: 3 Hours **Max.Marks: 70**

Note: Answer all questions form Part-A and any five questions from Part-B

PART – A (10x2 = 20 Marks)

1 Define influence line diagram and write the uses of the influence line diagram.

2 An U.D.I of intensity 20 kN/m and length 5 m, crosses a simply supported girder of span 20 m calculate the EUDELL.

3 Draw the influence line diagram for the force in the bottom chord member of 3rd panel in the 6 panelled warren truss.

4 Calculate the length of suspension cable of span 100 m and central dip of 4 m supports of the cable are at the same level.

5 Define flexibility coefficient and write the properties of flexibility coefficient matrix.

6 Determine the flexibility matrix for a fixed beam by treating the end moments as redundant.

7 Define kinematic indeterminacy. The kinematic indeterminacy of a fixed beam is _____.

8 Develop the stiffness matrix for the beam shown in Fig. 1.

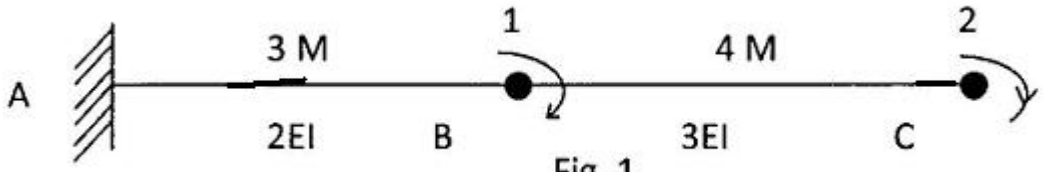

Fig. 1

9 Name two software used in the field of structural analysis.

10 Develop the stiffness matrix for 2 noded beam elements with 3 Degrees of freedom at each node.

PART – B (5x10 = 50 Marks)

11 An uniformly distributed load of intensity of 15 kN/m of length 6 m crosses a simply supported girder of span 20 m. Find the maximum bending moment and shear force at a section 5 m from the right support. Also determine the absolute maximum bending moment and shear force in the girder.

12 The wheel loads shown in Fig. 2 roll over a beam of span 15 m. Find the maximum bending moment @ 5m section from the left end. Also, determine the position and magnitude of absolute maximum B.M. in the girder.

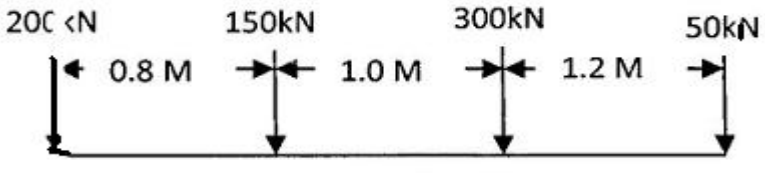

Fig. 2

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Code No. 11249/O

FACULTY OF ENGINEERING

B.E. (I.T.) 4/4 I - Semester (Old) Examination, May / June 2019

Subject : VLSI Design

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1	Explain how a MOSFET works as a switch.	(3)
2	Explain the operation of transmission gate logic.	(3)
3	Draw the CMOS diagram of xor gate.	(2)
4	Write about the layers used to create MOSFET.	(2)
5	Write in brief about the stick diagrams?	(3)
6	Explain Cell concepts briefly.	(2)
7	Explain with a diagram Tri State circuit.	(3)
8	What is propagation delay and write the expression for the same.	(3)
9	Write the verilog code of half adder.	(2)
10	Write in brief about testing.	(2)

PART – B (50 Marks)

11	(a) Illustrate bubble pushing using De Morgan's Law.	(5)
	(b) Draw the CMOS diagram of XOR and XNOR logic gate and explain with a truth table.	(5)
12	(a) Draw the layout of three input NAND.	(5)
	(b) Write about photolithography.	(5)
13	(a) Draw the DC characteristics of CMOS inverter and find the midpoint voltage.	(4)
	(b) With a neat diagram explain CMOS process flow for fabrication.	(6)
14	(a) Explain read and write operation of DRAM cell.	(5)
	(b) Write about effect of charge storage on floating gate.	(5)
15	(a) What is an interconnect? Derive the delay modeling of an interconnect.	(5)
	(b) Write the verilog code for full adder.	(5)
16	(a) Design a 4 bit barrel shifter.	(5)
	(b) Write about multipliers.	(5)
17	(a) Design an 8:1 MUX using 2:1MUX transmission gates.	(5)
	(b) Write about RTL and Behavioral modelling.	(5)

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Code No. 11249/N/S

FACULTY OF ENGINEERING

B.E. (I.T.) 4/4 I - Semester (New)(Suppl.) Examination, May / June 2019

Subject : VLSI Design

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1	What is Moore's law?	(2)
2	Draw the stick diagram of NOT gate.	(3)
3	What are blocking and non blocking statements in verilog?	(3)
4	Explain scaling concept of MOSFET.	(2)
5	Describe threshold voltage in MOSFET.	(2)
6	Design Y=A(B+C) using CMOS logic.	(3)
7	Explain charge leakage in clocked CMOS logic.	(2)
8	Describe fanout and input capacitance in CMOS inverter.	(3)
9	Define pass transistor logic.	(2)
10	Explain multiple rung ladder network.	(3)

PART – B (50 Marks)

11	(a) Draw transmission gate using 4x1 mux.	(5)
	(b) Draw RC model of FET with MOS capacitances.	(5)
12	Explain the fabrication of CMOS process.	(10)
13	(a) Draw the layout of transmission gate and non inverting buffer.	(7)
	(b) Draw the RC switch model of CMOS inverter.	(3)
14	(a) Explain read and write operation of 4T SRAM.	(7)
	(b) Explain IT dynamic RAM.	(3)
15	(a) Explain different kinds of modelling techniques in verilog.	(7)
	(b) Explain master slave D flipflop operation.	(3)
16	(a) Design complementary pass Transistor logic using AND/NAND gates.	(5)
	(b) Describe rise time and fall time in CMOS inverter.	(5)
17	Write short notes on:	
	(a) latch up condition	(5)
	(b) Crosstalk	(5)

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12 (a) Discuss any two applications of artificial intelligence 5

(b) Consider the game tree given in figure.1, in which the root corresponds to a MAX node and the values of a static evaluation function, if applied, are given at the leaves. 5

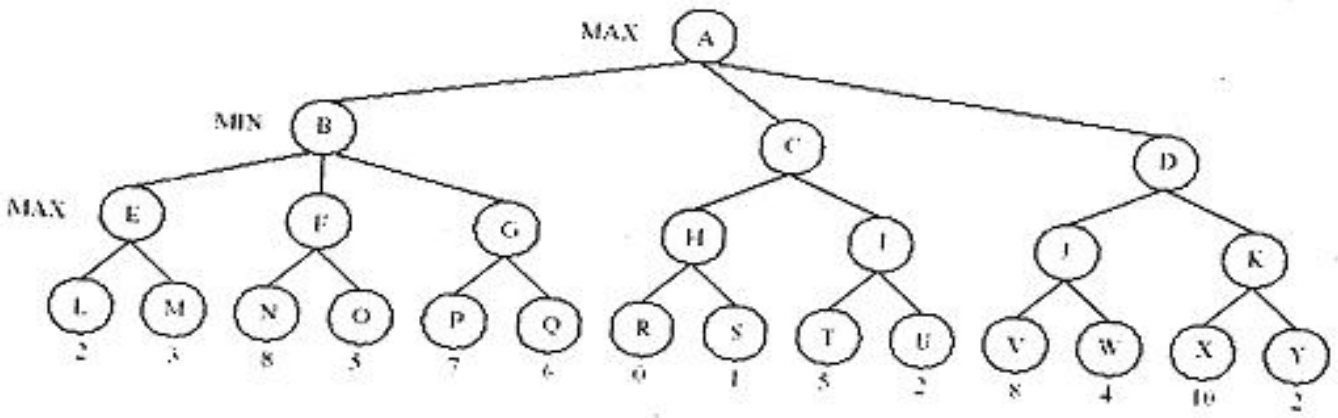

Fig.1: Game Tree

What is the minimax value computed at the root node for this tree? What move should MAX choose? Show all intermediate values at each node as they get updated.

13 List the components of STRIPS operator? Give an illustration of how forward search method proceeds by applying recursive STRIPS. Draw a search graph generated by applying one operator. 10

14 What is an expert system? Explain the main components of an expert system 10

13 Explain the importance of Natural Language Processing? Enumerate the various phases in NLP 10

16 (a) Define Entropy. 2

(b) Assume a domain with three attributes A, B, and C. Each attribute has two possible values T and F. Given below is a set of instances.

A	B	C	Target
T	T	T	Yes
T	T	F	NO
T	F	T	Yes
F	T	T	Yes
F	T	F	NO
F	F	F	Yes

Calculate the information gain for the attributes A, B and C. Which attribute would be selected by the standard ID3 algorithm. 8

17 (a) What is a neural network? What are its different layers? 5

(b) Explain briefly about Fuzzy Inference. 5

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Code No. 11239 / S

FACULTY OF ENGINEERING

B.E. 4/4 (CSE) I-Semester (Suppl.) Examination, May / June 2019

Subject : Artificial Intelligence

Time: 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part A. Answer any five questions from Part B.

PART – A (25 Marks)

1	Differentiate between Intelligence and Artificial Intelligence	2
2	Define the problem as state space search problem and prove water jug problem	3
3	What do you mean by knowledge representation	2
4	Define resolution for predicate calculus.	3
5	Represent in propositional calculus the knowledge contained in the following sentence: “If cruise ships only go on big rivers and go on the ganges, then ganges is a big river”	3
6	Illustrate a two-layer feed-forward network with two inputs, two hidden modes and one output mode.	2
7	Describe information gain in a decision tree	2
8	What is fluent in situation calculus	3
9	Name any two speech acts	2
10	Differentiate between a crisp set and a fuzzy set. Define membership function in fuzzy system	3

PART-B (5x10 = 50 Marks)

11	Tony, Mike, and John belong to the Alpine Club. Every member of the Alpine Club is either a skier or a mountain climber or both. No mountain climber likes rain, and all skiers like snow. Mike dislikes whatever Tony likes and likes whatever Tony dislikes. Tony dislikes rain and snow. Use resolution refutation to prove that “Is there a member of the alpine club who is a skier but not a mountain climber?”	10

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Code No. 11213/S

FACULTY OF ENGINEERING

B.E 4/4 (M/P) I-Semester (Suppl.) Examination, May / June 2019

Subject: Metrology and Instrumentation

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1 Differentiate between Dynamic Errors and Systemic Errors. (3)
2 What are the various types of Plug gauges? Sketch any two of them and state their specific applications. (3)
3 Explain the principle of pneumatic comparator with a neat sketch. (3)
4 Distinguish between Measuring instrument and a Gauge. (2)
5 What is Wringing? List few essential conditions of Wringing slip gauges. (2)
6 Explain the principle of GO and NO-GO gauges. (2)
7 What are proving ring strain gauge load cells? (3)
8 List the various elements of the Spur gear which are checked for the accuracy of the gear. (2)
9 Explain about Interchangeability. (2)
10 Explain Runout and Concentricity for inspection of gear. (3)

PART – B (5x10 = 50 Marks)

11 (a) Explain manufacture of slip gauges and calibration of slip gauges. (5)
(b) Explain the working of Tomlinson gauges with neat sketch. (5)

12 (a) Sketch and describe the optical system of N.P.L flatness interferometer? And also explain the principle of measurement by light wave interference methods. (5)
(b) Explain Coordinate Measuring Machine (CMM) and what are the geometric (GD&T) features included in CMM software, sketch each. (5)

13 (a) Explain the working of Parkinson gear tester. (5)
(b) Derive the expression for measuring the effective diameter of screw thread by 3-wire method. (5)

14 (a) Sketch and explain the principle and working of LVDT displacement transducer. (5)
(b) Define the gauge factor of a strain gauge and derive the expression. (5)

15 Explain the measurement of pressure, using different elastic transducer elements? State and discuss the laws of thermoelectricity. (10)

16 (a) Explain the principles of thread gauging. (5)
(b) Distinguish between basic hole and shaft system. (5)

17 Write short notes on any Two of the following : (10)
(a) Back Pressure type Pneumatic Comparator.
(b) Piezo electric load cell.
(c) Rosette gauge with neat sketch

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Code No. 11198/O

FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I – Semester (Old) Examination, May / June 2019

Subject: VLSI Design

Time: 3 Hours **Max. Marks: 75**

Part – A (25 Marks)

1. What are the compiler directives? 2
2. Different between data flow modeling and structural modeling. 3
3. How to design mealy model using verilog? 2
4. What is synthesis? Give Synthesis flow. 3
5. Draw V-I Characteristics of NMOS Transistor in Enhancement mode. 2
6. Differentiate between CMOS Technology and Bi-CMOS Technology 3
7. Draw the stick diagram of two inputs NOR gate. 2
8. Write steps to be followed to measure sheet resistance 3
9. Draw logic circuit of carry skip adder. 3
10. Draw the structure of NAND based ROM memory cell 2

Part – B (50 Marks)

11. a) What are the different types of delays in verilog and how they can be included in a HDL module Wave forms. 5

    b) List out various data types in verilog? Explain them in detail. 5

12. a) Develop a verilog code for 8 to 1 Multiplexer. 5

    b) What is Moore model? How it is different from mealy model. Write a verilog code for half adder using Moore model. 5

13. a) Design a 3 input XOR gate using CMOS logic. 5

    b) What is transmission gate logic? Design 4 to 1 MUX using transmission gate logic. 5

14. a) Draw the layout diagram of the function $F = \overline{A + B + C}$. Show all the layers 5

    b) How to calculate the delay of two input NAND gate? Explain with the help of logic circuit. 5

15. a) Design a 4bit carry select adder. Explain its operation with an example. 5

    b) Draw 4 bit barrel shifter. Describe its operation. 5

16. a) Differentiate between DRAM and SRAM 5

    b) Design a D flip-flop using transmission gate logic. 5

17. Write a short note on

    a) Electrical properties of MOS transistor 4

    b) Gate level Net list 3

    c) NOR based ROM cell 3

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Code No. 11198 / S

FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I – Semester (New) (Suppl.) Examination, May / June 2019

Subject: VLSI Design

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1 Compare enhancement and depletion modes of MOSFET. (3)

2 Draw the CMOS circuit for the logic expression $f = \overline{a.(b+c)}$ (3)

3 What are Lambda based design rules. (2)

4 Define delay in ICs. (2)

5 Draw the circuit diagram of 3T DRAM cell. (2)

6 Design D flip flop using transmission gates. (3)

7 What cross talk is in interconnects? (2)

8 Why are buffers inserted in long connecting wires? (3)

9 What is a cascode amplifier? (2)

10 Draw the circuit of a BJT current mirror. Give the expression for I_{out}. (3)

PART – B (50 Marks)

11 a) What is Body effect. How does it influence the MOSFET operation? (3)

b) Draw the AOI logic gate diagram and CMOS circuit for the expression.

$$f = \overline{[(a.b)+(c.d)].e}$$ (7)

12 a) Calculate the resistance for nMOSFET with channel length L = 8λ and width W= 2λ. The sheet resistance of n- channel is $10^4 \Omega/m^2$. (3)

b) Draw the stick diagram and layout for a 2-input NAND gate. (7)

13 a) Explain the design of a 4 X 1 MUX. (5)

b) Describe the operation of 6T SRAM cell. (5)

14 a) What is the model to represent RC delay in interconnects in ICs. Derive the expression for the delay. (7)

b) How is inductance measured in interconnects. (3)

15 a) Derive the expression for the voltage gain of a common source amplifier with current mirror load. (5)

b) How the output resistance can be increased using cascode current mirror. Derive the expression for r_{out}. (5)

16 a) Design Ex – OR gate using transmission gates. (4)

b) Design NOR based ROM. Explain its operation. (6)

17 Write short notes on: (10)

a) Carry Select adder

b) Inverter with different loads

c) Dynamic register element.

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13 (a) Draw and explain operation of a separately excited dc motor controlled by a 3-phase semi converter, assuming continuous conduction. Also derive an expression for output voltage. (7)

(b) The speed of a 50 kW, 500 V, 120 A, 1500 rpm separately excited dc motor is controlled by a 3-phase full converter fed from 400 V, 50 Hz supply. Find the firing angle to obtain a speed of (– 1000) rpm. (3)

14 (a) Discuss briefly operation of a VSI fed 3-phase induction motor. (5)

(b) A 3-phase, 415 V, 50 Hz, 1440 rpm star connected slip ring induction motor has the following per phase parameters referred to stator: R1 = 0.12 Ω; R2 = 0.1 Ω; X1 = 0.4 Ω; X2 = 0.4 Ω; Xm = ∞ . Effective per phase turns ratio is unity. The speed control is by chopper controlled resistance in rotor circuit. For a speed of 1200 rpm, the inductor current is 100 A and chopper resistance is 1.8 Ω, calculate (i) chopper frequency and duty cycle (ii) rotor and stator currents and (iii) frequency of rotor current. (5)

15 (a) Discuss briefly the closed loop V/f control of a self controlled 3-phase synchronous motor. (5)

(b) A 5 kW, 3-phase, 440 V, ϕ50 Hz, 4 pole, u.p.f, delta connected synchronous motor has Xs = 12 Ω and negligible Rs. The motor is controlled by constant V/f ratio upto rated speed and constant terminal voltage above rated speed. Calculate armature current and power factor for 40% of rated torque and 2000 rpm. (5)

16 (a) Derive an expression for energy relation during starting and plugging of a dc shunt motor. (5)

(b) Using a neat circuit diagram and waveforms, explain the operation of a 1-phase Dual converter fed dc motor. (5)

17 Discuss any two of the following:

(a) Load equalization (5)

(b) Static Scherbius drive (5)

(c) Brushless dc motor (5)

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Code No. 11183 / S

FACULTY OF ENGINEERING

B.E. 4/4 (EEE) I - Semester (Suppl.) Examination, May / June 2019

Subject : Electric Drives and Static Control

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part-A & any five questions from Part-B.

PART – A (25 Marks)

1 Draw a motor driving a hoist load in 1st and 2nd quadrants. (3)

2 What are the components of load torques? Which of the components can be neglected? (3)

3 What are the methods to reduce the energy during starting? (2)

4 The slip of a 3-phase, 4 pole, 50 Hz induction motor at the instant of plugging is 1.96. Calculate its speed at motoring and slip at dynamic braking. (3)

5 A separately excited dc motor is fed from a Type A, 200 V dc chopper, with duty ratio of 70%. Find the rms value of free-wheeling diode. (3)

6 Draw Voltage vs. Flux of a dc drive for (i) constant power (ii) constant torque (2)

7 Why Cyclo-converter fed induction motor normally operates at low speeds? (2)

8 Draw approximate per phase equivalent circuit diagram of a 3-phase induction motor at a harmonic frequency. (2)

9 What are the merits of self controlled synchronous motor over separate control? (2)

10 Mention few industrial applications of switched reluctance motor. (3)

PART – B (50 Marks)

11 (a) Explain steady-state stability of a drive system and derive the condition for the same. (5)

(b) Draw and explain how speed of a 3-phase induction motor can be controlled so that starting torque is equal to maximum torque in (i) forward motoring and (ii) reverse motoring in four quadrants. (5)

12 (a) Describe how dynamic braking can be performed on a separately excited dc motor and draw its speed-torque characteristics. (5)

(b) Explain how energy loss of a dc shunt motor during starting can be computed at (i) no load and (ii) full load (5)

15 a) Enumerate the various methods of soil exploration and mention the circumstances under which each is best suited. 5
b) Discuss the calculation of reactions in struts. 5

16 a) Write short notes on correction for construction period. 5
b) Discuss in detail about single and multi under reamed piles. 5

17 a) Write the construction of pneumatic caissons. 5
b) Discuss the methods of Dewatering. 5

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Code No. 11173 / S

FACULTY OF ENGINEERING

B.E. 4/4 (Civil) I-Semester (New) (Supplementary) Examination, May / June 2019

Subject : Foundation Engineering

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Sketch the contact pressure distribution below flexible and rigid footings resting on clay. 2

2 The increment in vertical stress σ_z directly beneath a point load was found to be 450 kPa. Compute σ_z under the same load at a point (2, 1, 2). 3

3 Define Net ultimate bearing capacity. 2

4 Explain allowable pressure on footings. 2

5 Brief about over burden pressure correction to be applied on standard penetration number. 3

6 Using a drop hammer of 25 kN capacity and the height of drop being 5m, the average penetration over the last 6 blows was 12.5mm. Determine the allowable load on the pile using Engineering news formula. 3

7 When do you prefer a floating caisson? 2

8 Draw different shapes of wells. 3

9 Define inside and outside clearance of a sampling tube and mention their range. 3

10 To call a sample undisturbed, which properties of the soil are to be protected. 2

PART – B (50 Marks)

11 a) Compare Boussinesq's theory with Westergaard's theory and comment on the validity of these elastic theories in estimation of σ_z. 5

b) A space between two concentric circles of dia 10m and 5m is loaded with UDL of 150 kPa at ground level. Find the vertical stress increase at the center of circles at a depth of 2m below ground level using Boussinesq's theory. 5

12 Derive the Terjaghi's bearing capacity equation for shallow foundations. Also mention its assumptions and limitations. 10

13 a) Explain the procedure for separation of point bearing and skin frictional resistance of piles. 5

b) Determine the safe load carrying capacity of a group of 15no. of 300mm sized square piles arranged in 3 x 5 pattern, installed to a depth of 9m in a pure clayey deposit. The properties of the clay include q_u = 120 kPa, α = 0.68. 5

14 a) Explain various types of cofferdams and the conditions in which each of them is ideal. 5

b) Explain the process of sinking of well foundations. 5

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Code No. 2381 / N

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (New) (Main) Examination, April / May 2013

Subject: Antennas and Wave Propagation

Time: 3 Hours **Max.Marks: 75**

Note: Answer all questions from Part – A and any five questions from Part – B.

PART – A (25 Marks)

1. Distinguish between far field and near field of an antenna. (2)
2. An antenna has a field pattern given by $E(\theta) = \cos^2\theta$ for $0^o \le \theta \le 90^o$. Find the directivity. (3)
3. Define antenna beam efficiency. (2)
4. What is an end fire array? (3)
5. Write the excitation coefficients for a 5 element binomial array. (2)
6. Define MUF. (2)
7. Describe the wide band characteristics of helical antenna. (3)
8. What is skip distance? (3)
9. What is atmospheric duct? (2)
10. In ionospheric propagation critical frequency is 8 MHz with 100 km virtual height for a particular layer and the skip distance is 200 km. Calculate the angle of incidence. (3)

PART – B (5x10 = 50 Marks)

11.(a) Derive an expression for electric and magnetic components of a Hertizian dipole. (6)
(b) Determine the directivity of source with sine square power pattern.
Given $U = U_M \sin^2\theta$; $0 \le \phi \le 2\pi$, $0^o \le \theta \le \pi$. (4)

12.(a) Derive an expression for radiated electric field of a n-element array with uniform excitation (magnitude and phase) and inter-element spacing $\lambda/2$. (4)
(b) Consider an array of two identical infinitesimal dipole separated by a distance $\lambda/4$ with same magnitude excitation but a phase excitation difference β between the elements. Find the nulls of the total field for $\beta=0$; $\beta=\pi/2$. (6)

13. What is pattern multiplication using this concept obtain the pattern of binomial array of 8 point sources? (10)

14.(a) With a neat sketch explain about Yagi-uda antenna. (6)
(b) Explain the working principle of parabolic reflector antenna. (4)

15. Briefly discuss about the formation of ionosphere and describe now the radio waves can be propagated using ionosphere. Derive the expression for the relative refractive index of the ionosphere. (10)

16.(a) Explain the working principle of microstrip antenna and also give its advantages and disadvantages. (6)
(b) Explain the principle of a metal plate lens antenna. (4)

17. Write short notes on:
a) Turnstile antenna (3)
b) Space and surface wave (4)
c) Horn antenna (3)

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Code No. 3078

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Suppl.) Examination, December 2010

Subject : Antennas and Propagation

Time : 3 Hours Max.Marks: 75

Note: Answer all questions from Part – A. Answer any Five questions from Part – B.

PART – A (25 Marks)

1. If length of an antenna is increased, the directive gain 2
   (a) Increases (b) Decreases (c) Remains the same (d) Becomes infinite
2. Define "Radiation resistance". 2
3. A 10 cm long dipole antenna carrying a current of 1 Amp at $(10^8/2\pi)$ Hz, radiates into free space. Calculate the average power radiation from the antenna. 3
4. List the important application of loop antenna. 2
5. What is the level of first side lobe for a uniformly excited linear array? 2
6. The element pattern of an array has nulls along (0°, 30°, 120°). The group pattern has nulls along (0°, 45°, 120°, 270°). The total nulls of the array are _____ 3
7. Differentiate between turnstile antenna and Yagi-uda array antenna. 3
8. Describe the principle of working of log-periodic antenna. List its applications. 3
9. The frequencies in VHF range are propagated by means of 2
   (a) Ground wave (b) Space wave (c) Sky wave (d) Surface wave
10. Write the Frii's transmission formula. 3

PART – B (50 Marks)

11.(a) Derive the Frii's transmission formula. 7

(b) Describe antenna parameters. 3

12.(a) Explain the working principle of Helical antenna. 6

(b) Find the effective length of a monopole antenna. 4

13. Find the expression for the radiation pattern of uniform linear array with following specifications: 10
    Number of elements = 4
    Inter element spacing = 0.6λ
    Inter element phase shift = zero
    Calculate half power beam width of this array.

14. Explain about working principle of 10
    (i) Parabolic reflector antenna (ii) Horn antenna

15. Discuss "DUCT PROPAGATION" in detail. 10

16. Explain working principle of 10
    (i) Rhombic antenna (ii) Turnstile antenna

17.(a) Write a note on the regular and irregular variations of ionosphere. 6

(b) List all the precautions to be taken while conducting antenna measurements. 4

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Code No. 9139

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II - Semester (Suppl.) Examination, December/January 2014-15

Subject : Antenna and Wave Propagation

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions of Part - A and answer any five questions from Part - B.

PART – A (25 Marks)

1 Radiation is the process of converting a.c. current into electromagnetic fields and antenna is a transducer that does the job. Elaborate the above statement. (3)

2 Define and explain directivity and power gain of an antenna. What is the relation between the two? (3)

3 Define and explain Retarded Potential. (2)

4 Compare broadside and end fire array. (2)

5 List out the applications of loop antenna. (2)

6 What is requirement of tapering of arrays? (2)

7 List some advantages of pattern multiplication. (3)

8 Distinguish between sectoral, pyramidal and conical horn with neat sketches. (3)

9 Write short notes on Duct Propagation. (2)

10 A television transmitter antenna has a height of 256 m and the receiving antenna has a height of 25 m. What is the maximum distance through which the TV signal could be received by space wave propagation? (3)

PART – B (50 Marks)

11 Explain the following:
(a) Normalized field pattern (b) Beam solid angle
(c) Main and side lobe (d) Polarization (e) Bean width

12 (a) What is the Hertzian dipole? Obtain expressions for the radiation fields of Hertzian dipole.
(b) Find the directivity of an antenna with a field pattern given by
$E(\theta) = \cos^2 \theta$ for $0^o \leq \theta \leq 90^o$

13 What is pattern multiplication using this concept obtain the pattern of binomial array of 8 point sources?

14 (a) Explain the working principle of microstrip antenna and also give its advantages and disadvantages.
(b) Explain the principle of a metal plate lens antenna.

15 (a) Write all precautions to be taken while conducting antenna measurements.
(b) Derive Friss transmission formula.

16 Briefly discuss about formation of ionosphere and describe how the radio waves can be propagated using ionosphere. Derive the expression for relative refractive index of the ionosphere.

17 Write short notes on : (3 + 4 + 3)
(a) Antenna temperature (b) Lens Antenna (c) Microwave link

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Code No. 5178 / S

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Suppl.) Examination, January 2016

Subject : Antennas and Wave Propagation

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Explain how an antenna radiates power into free space and list out the properties of an antenna. 3

2 Define Antenna radiation pattern. Draw and explain its parameters. 3

3 Compare the loop antenna with short dipole. 2

4 Evaluate the directivity of an isotropic radiator. 3

5 List some applications of helical antenna. 2

6 What are the various differences between binomial and linear arrays? 2

7 Write the excitation coefficient of 5 elements binomial array. 2

8 What are the advantages of patch or microstrip antenna? 2

9 At what frequency a wave must propagate for the D region to have an index of refraction 0.5? Given N = 400 electron/cc for D-region. 3

10 State secant law. 3

PART – B (50 Marks)

11 a) Derive Friss transmission formula. 4

b) Calculate the maximum effective aperture of an antenna which is operating at wave length of 5 meters and has a directivity of 75. 3

c) Calculate the radiation resistance of dipole antenna of length λ/8 m. 3

12 a) With a neat sketch explain the working principle of Helical antenna. What are the various modes under which a helical antenna can be operated?

b) Describe the wide band characteristics of Helical Antenna.

13 a) Derive the array factor of n-elements uniform linear array.

b) What is an antenna arrays? What are the reasons for using antenna arrays?

14 a) Draw the structure of three elements Yagi-Uda antenna and explain its working with one folded dipole, one director and one reflector.

b) What are advantages and disadvantages of Lens Antenna?

15 a) Explain why an antenna using a paraboloid reflector is likely to be a highly directive receiving antenna.

b) Determine the directivity of loop antenna whose radius is 0.5 m when it is operated at 0.9 MHz.

16 a) Explain about duct propagation when 100 m high duct is formed in troposphere, calculate the f_{min} to be used for communication.

b) Show that MUF of ionized layer is given by

$$f_{MUF} = f_c \sqrt{1 + (D/2h)2}$$

17 a) The observed critical frequencies of E and F layer at Guahati at a particular times are 2.5 MHz and 8.4 MHz respectively. Calculate the maximum electron concentrations of the two layers.

b) A television transmitter antenna has a height of 169m and the receiving antenna has a height of 16m. What is the maximum distance through which the TV signal could be received by space wave propagation? What is the radio horizon in this case?

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Code No. 5178

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Main) Examination, May 2016

Subject : Antennas and Wave Propagation

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Define retarded vector potential. 2

2 What is radiation resistance? Calculate the radiation resistance of a $\lambda/10$ wire dipole in free space. 2

3 Estimate the gain of a paraboloid reflector antenna operating at 10 GHz, diameter 10m and illumination efficiency is 60%. 2

4 Compare the properties of antennas with standing wave and traveling wave current distribution. 3

5 Calculate half power beam width of 10 element end-fire array with interelement spacing of $\lambda/2$. 2

6 What are different types of designs of rhombic antenna? Mention its disadvantage. 3

7 What are the disadvantages of lens antenna? 2

8 What is the E plane metal plate lens? 3

9 State the relation between critical frequency and electron density of an ionospheric layer. 3

10 Define critical frequency with neat sketch. 3

PART – B (50 Marks)

11 a) What is Lorentz guage condition? Show that $\frac{\nabla \nabla \cdot A}{j\mu\varepsilon A} - j\mu A = \frac{1}{j\mu\varepsilon A}\left[\nabla \times \nabla \times A\right]$. 8

b) At what distance induction and radiation fields are equal? 2

12 Show the radiation resistance of half-wave dipole is 73 Ω. 10

13 a) With the necessary expression and show that the first side lobe level is -13.5 dB for uniformly excited array. 7

b) Draw the folded dipole antenna. Mention the two important advantages of folded dipole antenna. 3

14 What is a principle of helical antenna? Explain its axial and normal mode of operation. 10

15 a) Show that a parabolic dish antenna can produce a very narrow beam. 5

b) Explain the Cassegrain feeding of paraboloid reflector and its advantages. 5

16 a) Describe any one method to measure the gain of an antenna. 5

b) Show that the ionosphere acts as a medium of varying refractive index, by deriving necessary equations. 5

17 Write a short notes on :

a) Effect of Earth on vertical plane patterns 5

b) Horn antenna 5

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Code No. 206

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II – Semester (Main & Backlog) Examination, May / June 2018

Subject: Antennas and Wave Propagation

Time: 3 Hours **Max. Marks: 75**

Note: (i) Answer All Questions From Part-A & Any five Questions From Part-B.
(ii) Missing data, if any may suitably be assumed.

PART–A (25 Marks)

1. Define a uniform linear array (2)
2. Distinguish between directive gain and power gain of an antenna (3)
3. A radio link has a 15W transmitter connected to an antenna of 2.5 m^2 effective aperture at 5 GHz. The receiving antenna has an effective aperture of 0.5m^2 and is located at 15 km from the transmitting antenna. Obtain the power delivered to the receiver assuming lossless, matched antennas (3)
4. Define line of sight (LOS) propagation (2)
5. What is the skip zone of a radio ware? (2)
6. Compare the loop antenna with short dipole (3)
7. What is principle of pattern multiplication? Explain (2)
8. Mention the advantages and disadvantages of a rhombic antenna (3)
9. Calculate the distance at which an electromagnetic wave will have the same magnitude for induction and radiation fields if its frequency is 10MHz (3)
10. Define retarded potential of an antenna (2)

Part-B (50 Marks)

1. a) Explain the following terms with respect to antenna. (i) HPBW (ii) directivity (iii) radiation intensity (iv) antenna efficiency and (v) radiation resistance (5)
   b) A half – wave dipole is made of copper (σ= 5.7 x 10^7 s/m) Wire. Determine radiating efficiency at 100MHZ if radius of wire 3 x 10^{-4}, Rr. 73Ω for half wave dipole. (5)
12 Starting from the fundamentals derive the radiation resistance of a half wave dipole (10)
13. Discuss about constructional feature, dimensional considerations, beam with, directivity and applications of horn antenna. (10)
14. a) Synthesize an array having two isotropic point sources of same amplitude but in phase quadrature separated by a distance of λ/2 placed symmetric with respect to origin. Draw the radiation pattern. (6)
   b) Write a note on binomial arrays. (4)
15 a) Give the structure of ionosphere and explain the mechanism of skyware propagation (7)
   b) Calculate the radio horizon for a 100m transmitting antenna and a receiving antenna of 25 mts. (3)
16 a) By deriving Frii's transmission formula, determine the maximum effective area of a hertzian dipole of length 10cm operating at 100 MHZ. if the antenna receives 3/4W of power, obtain the power density of the incident wave. (7)
   b) obtain the distance at which the induction and radiation fields are equal (3)
17. Write explanatory notes on
   a) Parabolic reflectors (5)
   b) Surface waves (5)

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Code No. 206/N

FACULTY OF ENGINEERING

BE 3/4 (ECE) II - Semester (New) (Supplementary) Examination, December, 2017

Subject: Antennas and Wave Propagation

Time: 3 hours **Max. Marks: 75**

Note : Answer all questions from Part-A & Any Five Questions from Part-B.

PART – A (25 MARKS)

1	What is the significance of gain of an antenna?		2
2	If the radiation resistance of an antenna is 75 ohms and loss resistance 25 ohms. Compute the efficiency of an antenna		2
3	What are advantages and disadvantages of microstrip antenna?		2
4	Discuss the principle of pattern multiplication		3
5	What is the significance of pitch angle in helical antenna?		2
6	What is the basic concept of reflector antenna?		3
7	What are the advantages of an antenna arrays?		2
8	Define Binomial array		3
9	Define optimum working frequency		3
10	Discuss briefly about variations in Ionosphere		3

PART – B (50 MARKS)

11	a)	An infinitesimal electric dipole is centered at the origin and lies along z-axis. Find the far-zone electric and magnetic fields radiated	6
	b)	Compare monopole antennas and dipole antennas	4
12		How to obtain two modes in helical antenna? Obtain the expression for axial ratio	10
13		With reference to paraboloids, explain the following with neat diagrams: a) f/D ratio b) Spill over and aperture efficiency c) Front to back ratio d) Different types of feeds.	10
14		What is End fire array? Derive the condition for maxima, null directions and also Calculate the beam width of an End fire array.	10
15	a)	Explain in detail about Ground wave propagation	6
	b)	A television transmitter antenna has a height of 169 meters and the receiving antenna has a height of 16 meters. What is the maximum distance through which the TV signal could be received by space propagation? What is the radio horizon in this case?	4

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16 a) Discuss in detail about design consideration of Rhombic antenna 5

b) Explain far field pattern of circular loop antenna 5

17 Write short notes on:

a) Yagi-Uda antenna 5

b) Sky wave propagation 5

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Md. Akram Ahmed
MTECT

Code No. 3462/N

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II - Semester (New)(Main) Examination, May / June 2017

Subject: Antennas and Wave Propagation

Time: 3 Hours. **Max. Marks: 75**

Note: Answer all Questions in Part – A, and any five questions from Part – B.

PART – A (25 Marks)

1. Compare power gain and Directive gain. (2)
2. Obtain distance from an antenna where near field is equal to far field. (2)
3. Draw the diagram of rectangular microstrip antenna and sketch its fields. (2)
4. Why is loop antenna called as magnetic dipole? (3)
5. Draw the radiation pattern of vertical dipole. (2)
6. Differentiate 'V' antenna from rhombic antenna . (3)
7. Why frequency independent antennas are called so? (3)
8. How is beam scanning achieved with array antenna? (3)
9. What is the free space loss factor? (2)
10. What are the effects of ground on low frequency wave propagation? (3)

PART – B (50 Marks)

11 a) Explain how the electric field lines are formed and detached from short dipole antenna. (8)
b) Comment on antenna temperature. (2)

12 a) Obtain field equations of half wave dipole. (8)
b) What are the differences between transmission line and dipole antenna? (2)

13 What is the principle of equality of path length? How is it applicable to Horn antennas? Obtain an expression for the directivity of a pyramidal horn in terms of its aperture dimensions. (10)

14 a) Explain in detail the different cases of the array containing two isotropic sources (7)
b) Discuss principle of pattern multiplication. (3)

15 a) Explain the following terms: (8)
i) Critical frequency ii) MUF
iii) Skip Distance iv) Virtual height
b) Find the range of LOS system when the receive and transmit antenna heights are 10m and 100m respectively. (2)

16 a) Discuss the effect of earth on vertical radiation patterns of an antenna. (5)
b) Discuss about design considerations of log-periodic antenna. (5)

17. Write short notes on:
a) Lens antenna (5)
b) Friis transmission formula (5)

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Code No. 3177

FACULTY OF ENGINEERING

B.E. 3/4 (ECE) II-Semester (Suppl.) Examination, November / December 2016

Subject : Antennas and Wave Propagation

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1	Distinguish between broad-side and end-fire arrays.	3
2	Write an expression for power radiated by a Hertzian dipole.	2
3	Calculate the HPBW of an eight-element end-fire array with spacing between consecutive elements equal to $\lambda/2$.	3
4	Define line-of-sight (L05) propagation.	2
5	What is the effect of earth on vertical patterns of an antenna?	3
6	Define HPBW and BWFN of an antenna array.	2
7	State Friis transmission formula.	2
8	What are the E-plane and H-plane patterns?	3
9	Define parasitic array.	2
10	Distinguish between phase and group velocities of an e.m. wave.	3

PART – B (50 Marks)

11 a) Explain the concept of retarded potential. 5

b) The radiation intensity of a certain antenna is $2 \sin\theta \sin^3\Phi$ (for $0 \le \theta \le \pi$ and $0 \le \Phi \le \pi$) and zero elsewhere. Determine the directivity of the antenna. 5

12 Discuss the radiation characteristics of an a.c. element and define its near and far-field. Also obtain the distance at which both fields become equal. 10

13 Define effective aperture area of an antenna. Obtain maximum effective aperture area of i) half-wave and ii) short dipole. 10

14 What are end-fire and broad-side arrays? Obtain BWFN and HPBW of both of these two types. 10

15 a) Define pattern multiplication for antenna arrays using this concept, obtain the pattern of a binomial array of four point sources. 5

b) Explain the effect of interelement phase shift on beam scanning. 5

16 a) Describe the advantages and disadvantages of microstrip antennas. 5

b) Explain the method of antenna temperature measurement. 5

17 a) Briefly discuss about i) duct propagation and ii) sky wave propagation 5

b) At what frequency, a wave must propagate for the D-region to have a refractive index of 0.5. Take electron density equal to 400 for the given region. 5

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