FACULTY OF ENGINEERING

B. E. (Civil) (CBCS) VII – Semester (Main) Examination, December 2019
Subject: Finite Element Techniques

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. Develop the transformation matrix for a 2-node d-D truss element whose axis is inclined at an angle 30^0 with global axis.

2. Write properties of global stiffness matrix K.

3. Derive the constructive matrix D for a plain strain problem.

4. Write down the shape functions for 4 noded rectangular elements using natural coordinate system.

5. A 3-node triangle element has coordinates in cm: 1 (2,2), 2 (5,4) and 3 (1,6). Evaluate the shape functions N at an interior point P(3,4).

6. Differentiate a Lagrangian element from a Serendipity element.

7. Explain the significance of Jacobian matrix J in finite element analysis.

8. Distinguish between is-parametric elements, sub-parametric elements and super parametric elements.

9. Briefly explain about the volume coordinates.

10. Write stress – strain matrix for an axisymmetric element.

PART – B (5 x 10 = 50 Marks)

11. Using Rayleigh-Ritz method, find the deflection at mid span of a simply supported beam of span 'L', subjected to an uniformly distributed load 'a' on entire span and compare the deflection with exact solution. Take trail function as $y = a \sin(\pi x/L)$ [10]

12. For the two nodded stepped bar shown Fig.1, determine the nodal displacements, element stresses and reaction forces. [10]

$E_{all} = 0.7 \times 10^5$ M Pa, $E_{st} = 2 \times 10^5$ M Pa.
$A_{all} = 2400$ mm^2, $A_{st} = 600$ mm^2.

Fig 1
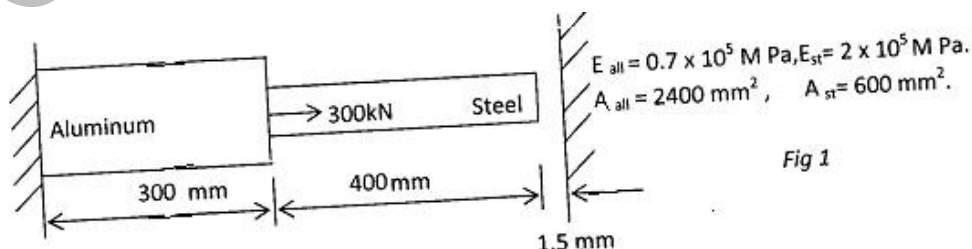
13. (a) Derive the equilibrium equations for 3-D continua subjected to body forces. [5]

    (b) Explain about plane stress and plane strain conditions of a problem with examples. [5]

14. Evaluate the stresses for the CST element having nodes at 1(5, 15), 2(15, 5) and 3(25, 15)mm with E = 70 GPa, µ = 0.3 and thickness equal to 1mm. Consider the

…..2

problem as plane strain condition. The displacements at nodal points are $u_1 = 0.005$mm, $u_2 = 0.0$mm, $u_3 = 0.005$mm, $v_1 = 0.002$mm, $v_2 = 0.0$mm, $v3 = 0.0$mm. [10]

15. Derive the strain-displacement matrix 'B' for a 4 noded rectangular element as shown in Fig 2. [10]
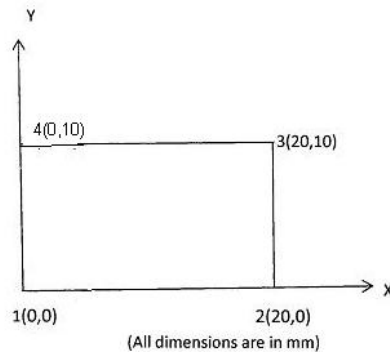

Fig 2.

(All dimensions are in mm)

16. Obtain the strain-displacement matrix 'B' for a nodded triangular element axi-symmetric ring element. [10]

17. Write short notes on the following: [4+3+3]

   (a) Write the jacobian matrix for 3-noded triangle and 4-noded quadrilateral elements.

   (b) Explain the Gauss quadrature technique of integration.

   (c) Derive the strain-displacement matrix B for higher order 3-noded bar element.

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FACULTY OF ENGINEERING
B.E. VII Semester (CBCS)(EEE)(Main) Examination, December 2019

Subject : Electrical Machine Design

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 Define superconductivity.

2 Differentiate soft and hard magnetic materials.

3 Relate real and apparent flux densities.

4 Recall output equation of D.C. Machine and mention each term.

5 State specific electric loading and specific magnetic loading.

6 Illustrate the main dimensions of D.C. machine.

7 Relate single phase transformer and three phase transformer output equations.

8 Write the importance of SCR in synchronous machines.

9 List the different approaches in CAD of electrical machine.

10 List the advantages of digital computers in CAD for electrical machines.

PART – B (50 Marks)

11 a) Explain briefly about the suitability of given insulating material for a
      particular application..site at least four different materials.   5
   b) Classify the insulating materials based on temperature by providing   5
      examples for each.

12 a) Explain the procedure for estimating mmf for air gap and teeth.   5
   b) Calculate mmf required for air gap of machine having a core length of 0.32m
      including 4 ducts of 10mm. each .Pole arc-0.19m, slot pitch=65.4mm,slot
      opening=5mm,air gap length=5mm,flux per pole =52m wb, Given carters
      coefficient is 0.18 for open/gap = 1 and is 0.28 when open/gap=2.   5

13 a) List the significance of electrical loading and magnetic loading in case of
      D.C. Machine.   4
   b) Calculate the D and L of armature core for a 55kW. 110V, 1000 rpm, 4 pole
      shunt generator assuming specific electric loadings and specific magnetic
      loadings are 26000A.cod/m., and 0.5wb/m2 respectively. The pole arc should
      be 70% of pole pitch and length of core about 1.1.times the pole arc .Allow 10A
      for field current and assume a voltage drop of 4V for armature circuit,.   6

14 a) Design the main dimensions, air gap length, No. of slots, stator turns per
      phase and cross sectional area of stator conductors for a 3 phase, 20 h.p.,
      400V,6 pole,50Hz. , 970 rpm induction motor suitable for star/delta starting.
      Assume magnetic and electric loadings as 0.45Wb/m2 and 23000 A/cond./m,
      respectively. Ratio of core length to pole pitch is 0.85, full load efficiency of
      0.88 and power factor of 0.89.   5
   b) Evaluate the output equation of a.AC machine from fundamentals   5

15. a) Discus the different approaches in the design using computers. 6
    b) Recall short notes on general procedure for optimization in computer aided
       design. 4

16. a) Discuss briefly about different duty types. 5
    b) Discuss about different contraction factors in electrical machine design 5

17. a) List general properties of copper, aluminum and steel. 6
    b) List the electrical properties of insulating materials. . 4

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FACULTY OF ENGINEERING

B. E. (Inst.) (CBCS) VII – Semester (Main) Examination, December 2019

Subject: Analytical Instrumentation

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 the principle of absorption instruments?

2. Define molar extinction coefficient.

3. What are Sample Handling Techniques?

4. Define molar absorptivity.

5. What is the difference between colorimeter and spectrophotometer?

6. Write the application of chromatography.

7. Write a short note on NMR.

8. Write a short note on conductivity meter.

9. Write a short note on calomel electrode.

10. Write about air pollution monitoring instruments.

PART – B (5 x 10 = 50 Marks)

11. With the help of a mathematical equation, explain Beer Lambert's law. What are the limitations of Beer Lambert's law?

12. Explain double beam spectrophotometer.

13. Draw the diagram of magnetic deflection mass spectrometer and explain why high vacuum is essential for mass spectrometer.

14. Explain in detail gas chromatography with net diagram.

15. Define P^H. Explain electrodes used in P^H measurement.

16. Write the principle of thermal conductivity meter and explain about water pollution monitoring instrument.

17. What is Paramagnetic Oxygen analyzer? Explain how CO in air is estimated using IR gas analyzers.

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FACULTY OF ENGINEERING

B.E. VII-Semester (CBCS)(ECE) (Main) Examination, December 2019
Subject: Microwave Techniques

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

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

PART-A (20 Marks)

1. Define the "dominant mode". Which is the dominant mode in a circular waveguide? 2

2. What are guided waves? Give examples. 2

3. What are the properties of a S-matrix? 2

4. Distinguish between 'O' type and 'M' type microwave tubes. 2

5. What is a Gunn effect? 2

6. State the characteristics of an IMPATT diode. 2

7. Write the characteristics of slot lines. 2

8. What are the HF limitations of conventional tubes? 2

9. Explain applegate diagram for a double Klystron system. 2

10. What are the advantages and disadvantages of a rectangular waveguide? 2

PART-B(50 Marks)

11. Explain parallel plane wave guide and derive its field expressions for TE modes. 10

12. For a rectangular waveguide of dimensions 2.5 x 1.0 cm^2 field component has $H_Z = 20\cos(/a)x.e^{j10^{11}t + \gamma z}$. Identify the propagation mode and direction of propagation. Also determine wave impedance, phase constant and cut-off frequency. 10

13. (a)Derive the S-matrix for an E-plane Tee. 7

    (b)What are ferrites? Explain the Faraday's law for Ferrites. 3

14. Draw the schematic of a two cavity Klystron amplifier. With the help of an applegate diagram, Explain its working. 10

15. Explain the principle and operation of PIN diode? Explain the phenomenon of "Gunn effect" with neat diagrams. 10

16.(a)With a neat diagram, explain the working of a four port circulator using a magic tee. 6

    (b) Derive the expression for the resonant frequency of a rectangular cavity resonator. 4

17. Write a short notes on the following 10

    a) Microstrip lines

    b) Magnetrons

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FACULTY OF ENGINEERING
B.E VII Semester (CBCS) (M/P)(Main) Examination, December 2019

Sub: Industrial Engineering

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. Describe the functions of Management.
2. Mention the various principles of scientific management as given by Henry Fayol.
3. Explain about job shop, open job shop and closed job shop.
4. Define forecasting.
5. What is the importance of inventory control?
6. What is Economic order Quantity?
7. State the objectives of statistical Quality Control (SQC).
8. Mean number of defectives produced = 3%. Find control limits.
9. State the essential requirements of job evaluation programme.
10. What is the importance of decision making?

PART – B (5 x 10 = 50 Marks)

11. (a) Describe the scientific management of F. W. Taylor.   5M
    (b) What is job evaluation? Explain point method of job evaluation.   5M

12. (a) Explain the terms Routing, Scheduling and Dispatching in PPC.   5M
    (b) Briefly explain the sales Forecasting Techniques that will significantly affect the functioning of the enterprise.   5M

13. (a) Calculate EOQ if annual consumption of raw material is 20,000 units. Cost of placing the order is Rs. 20 per order. Interest and other carrying cost is 10% per annum.   7M
    (b) What are the relevant cost associated with an inventory? Explain.   3M

14. (a) Construct and chart from the following data: X = 17.5; R = 0.45; A_2=0.58; D_3= 0; D_4=2.11.   7M
    (b) What is the difference between single sampling and multiple sampling plans?   3M

15. (a) What are the types of managerial decisions? Explain.   5M
    (b) Briefly explain the phases of decision making process.   5M

16. (a) What are the principles of a good personal policy? Explain.   3M
    (b) An air craft company uses rivets at an approximate customer rate of 2500 kg per year. Each unit costs Rs. 30 per kg and the company personnel estimate that it costs Rs. 130 to place an order, and that the carrying cost of inventory is 10 percent per year. How frequently should orders for rivets be placed? Also, determine the optimum size of each order.   7M

17. (a) Comparison of $\overline{X}$-R-charts and P-charts.   5M
    (b) Briefly explain the scientific approach to the decision process.   5M

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FACULTY OF ENGINEERING
BE VII semester (CBCS) (A.E.)(Main) Examination, December 2019

Subject: Metrology & Automobile Instrumentation

Time: 3 Hours   **Max. Marks: 70**
Note: Answer all questions from Part A, & any five questions from Part-B

PART – A (20 Marks)

1. Differentiate between line and end standards.
2. Define unilateral and bilateral tolerances. Give examples for each.
3. Discuss the major applications of pneumatics gauges.
4. Write the applications of Tool makers microscope.
5. Discuss the major applications of CMMs.
6. What do you mean by the best-size wire?
7. Write the applications of
   a) bulk modulus gauge
   b) pirani gauge
8. What are the different Rosette gauge arrangement measure strains?
9. Explain the use of extension wires in thermocouples.
10. Discuss specific applications of materials used in thermo-couples.

PART – B (50 Marks)

11. (a) What is a sine bar? Describe its use in angle measurement and its limitations.
    (b) What are common materials and working process used in Manufacture of Slip gauges.

12. (a) Explain the working principle of back pressure type pneumatic comparator with neat.
    (b) How are CMMs classified with respect to constructional features? Sketch and state there main applications, merits and demerits.

13. (a) Describe the two wire method of finding the effective diameter of screw threads.
    (b) Explain the construction and working of Pakistan gear testing machine with neat sketch.

14. (a) Discuss the classification of errors in instrumentation systems.
    (b) Write short notes on Load cells.

15. (a) Describe the principle, operation of bulk modulus pressure gauge with a neat sketch.
    (b) Write short notes on series parallel circuits in thermocouples.

16. (a) State and explain Taylor's principle of plain limit gauges.
    (b) With the help of a neat sketch, explain the operation of Taylor-Hobson Talysurf in measurement of surface finish.

17. (a) Explain the principle of operation of LVDT with its advantages.
    (b) Write short notes on surface roughness measurement by profilometer.

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FACULTY OF ENGINEERING

BE VII Semester (CBCS) (CSE)(Main) Examination, December 2019
Subject: Information Security

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. What are the components of IS? [2M]
2. List out professions in information security. [2M]
3. Define threat, threat agent, attack, vulnerability. [2M]
4. What is benchmarking? [2M]
5. What is Sarbane-Oxley Act? [2M]
6. What is de-militarized zone(DMZ) as applicable to IS? [2M]
7. How does packet filtering firewall work? [2M]
8. How can public key cryptography used to implement authentication [2M]
9. Differentiate between foot printing and finger printing as relevant to tools for Implementing information security. [2M]
10. What is contingency planning? [2M]

PART – B (50 Marks)

11. a) Explain the characteristics of information in detail? [5M]
    b) List out different attacks. [5M]
12. Explain Risk Management? Explain different Risk control Strategies. [10M]
13. a) Explain briefly about different security polices. [6M]
    b) Explain about design of security architecture. [4M]
14. What are different types of intrusion detection systems that you can use for the design of IS systems? Discuss in depth? [10M]
15. a) Describe in detail how RSA algorithm works? [5M]
    b) Explain about Diffie-Hellman key exchange? [5M]
16. a) Explain different types of firewalls.? [5M]
    b) What is the main motivation behind the proposal of SET protocol? [5M]
17. a) Discuss the roles and responsibilities of IS staff. [6M]
    b) What is digital Forensics? [4M]

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FACULTY OF ENGINEERING

BE VII Semester (CBCS) (I.T)(Main) Examination, December 2019
Subject: Wireless Mobile Communication

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. What is a microcell?
2. Define paging system
3. What is adjacent channel interference?
4. Write the difference between infrared and Radio transmission WLAN.
5. Draw the frame Structure of GSM.
6. Define Tunnelling.
7. Write the problems faced with TCP when applied to mobile network.
8. Define MANETS and List some its applications.
9. Define Routing algorithm.
10. Define WAP. Give example.

PART – B (5 x 10 = 50 Marks)

11. Explain methods used for improving capacity and coverage of Cellular system in detail.   10

12. Discuss about various channel assignment strategies.   10

13. Explain with block diagram of DS-SS system.   10

14. Explain the architecture of GSM in detail and channel types in it.   10

15. Explain the concept of mobile IP with diagram.   10

16. a) Write the classification of routing algorithm?   3

    b) Explain DSR algorithm in detail?   7

17. Write short notes on

    a) CDMA and TDMA   5

    b) IEEE 802-11 protocol.   5

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FACULTY OF ENGINEERING
BE 4/4(CIVIL) I-Semester (Backlog) Examination, December 2019

Subject: FOUNDATION ENGINEERING

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

NOTE: Answer all Questions from part -A & Any Five Questions from part-B

PART-A (25 MARKS)

1   Sketch the vertical pressure(σz) distribution on horizontal plane at a depth(z) below the ground surface due to a point load(Q)   (2)
2   Explain Bored pile and Driven pile   (2)
3   Explain the term "REFUSAL" in SPT.   (2)
4   The load carrying capacity of an end bearing pile is estimated as 100KN. How the capacity can be doubled for the same length.   (2)
5   Explain "Braced cut"   (2)
6   "Bearing capacity of a footing on clay is independent of size of footing". Say yes or no and justify   (3)
7   Explain the types of soil samples to be collected.   (3)
8   What is a "Test pile" .Explain   (3)
9   Explain the term "N-value " in SPT   (3)
10   Explain what is a Pneumatic caisson   (3)

PART-B (50 MARKS)

11 a)   Critically discuss the concept of pressure bulb and its uses in soil engineering   (5)
    b)   A circular footing of 1.5 m radius transmits a uniform pressure of 85 KN/m^2 at ground surface. Calculate the vertical stress at a point of 1.5m directly under its centre.   (5)

12 a)   Derive Terzaghi's bearing capacity equation duly stating the assumptions.   (5)
    b)   What is the ultimate bearing capacity of a circular footing of 0.75m radius, resting on the surface of saturated clay of unconfined compressive strength of 100 KN/m^2.What is the safe bearing capacity, if the factor of safety is 3. Take Nc=5.7,Nq=1.0,Nγ =0.   (5)

13 a)   How would you estimate the group capacity of piles in 1)sand and 2) clay .   (5)
    b)   A 45 cm diameter concrete pile is driven into a homogeneous consolidated clay deposit of Cu=60 KN/m^2 and α =0.7 .If the embeded length is 10m, estimate the safe load with factor of safety 2.5.   (5)

14 a)   Discuss about the various types of coffer dams and their construction methods.   (5)
    b)   Explain with neat sketch, various components of well foundations and their function   (5)

15a)   Explain the working of single stage and multistage well point systems dulydiscussing their limitations.   5
    b)   What is meant by Tilt and Shift in well foundation and how they can be rectified.   (5)

16 a)   Explain the plate load test duly discussing its limitations.   (5)
    b)   Explain the effect of ground water table on bearing capacity for various condition on shallow foundations.   (5)

17. Write detailed notes on   (10)
    a. Under reamed piles   b. Electro-osmosis.

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FACULTY OF ENGINEERING

B.E. 4/4 (EEE) I – Semester (Backlog) Examination, December 2019

Subject: Electric Drives and Static Control

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. Draw a schematic representation of a motor driving a hoist load in 3rd quadrant.   2

2. How the circuit diagram of a dc shunt motor can be changed to get reduced no-load speed and draw its modified speed-torrque characteristics.   3

3. Explain why acceleration time of a motor should be less during starting?   2

4. In which type of braking, energy is not consumed by an induction motor and why?   2

5. The rms values of ac supply current and dc free-wheeling current of separately excited dc motor fed from a 1-ϕ semi-converter are 10 3 A and 5 A respectively. Calculate the firing angle.   3

6. Why a reactor is needed in a circulating current type dual converter?   2

7. Draw the schematic diagram of a static Krammer drive.   3

8. A 3-ϕ, 400V, 50 Hz, 4-pole, induction motor runs at 1425 rpm. At constant slip speed, if its speed is 225 rpm, calculate the frequency when it is fed by a 3-ϕ cyclo-converter.   3

9. Explain briefly 'self control' of synchronous motor drive.   2

10. What are the basic assumptions in the analysis of switched reluctance motor?   3

PART – B (50 Marks)

11. (a) How electric drives can be classified? Discuss their merits and demerits.   5

   (b) A 500 V dc series motor runs at 800 rpm and the load current in 120 A. $R_a = 0.15$ Ω and $R_f = 0.04$ Ω. Assuming field is unsaturated, calculate speed at half load-torque and field winding is connected with a diverter resistance of 0.08Ω.   5

12. (a) Explain why regenerative braking cannot be obtained in a dc series motor. Show what other braking can be applied on this motor.   5

   (b) Explain how energy loss of 3-ϕ induction motor during acceleration can be computed at full load (graphically or analytically).   5

13. (a) Draw and explain operation of a separately excited dc motor controlled by a 3-ϕ Dual converter, assuming continuous conduction.   7

(b) The speed of a 50 kW, 500V, 120 A, 1500 rpm separately excited dc motor is controlled by a 3-ϕ semi-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 static Krammer drive in recovering slip power energy of 3-ϕ induction motor.　　5

(b) A 3-ϕ, 400 V 50 Hz, delta connected, 6-pole slip ring induction motor has the following per phase parameters: $R_1 = R_2 = 0.2\ \Omega$; $X_1 = X_2 = 0.6\Omega$; $X_m = \infty$. The rotor is star connected having an effective per phase turns ratio (Stator/rotor) of 1.3. Determine the firing angle of 3-ϕ inverter so that the motor runs at 600 rpm.　　5

15. (a) Discuss briefly the closed loop V/f control of a separate controlled 3-ϕ synchronous motor.　　4

(b) What are the similarities and dissimilarities between BLDC motor and (i) synchronous motor (ii) brushed dc motor?　　6

16. (a) Draw and explain speed-torque characteristics of various loads with examples.　　5

(b) Using a neat circuit diagram and speed-torque characteristics, explain plugging operation of dc shunt motor.　　5

17. Discuss the following:

(a) Cyclo-converter fed 3-ϕ induction motor.　　5

(b) AC Voltage regulator fed 3-ϕ induction motor.　　5

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FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I-Semester (Backlog) Examination, December 2019

Subject : VLSI Design

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

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

PART- A (25 Marks)

1 What is Moore's law? What is its relevance with respect to evolution of IC Technology. (2)

2 What is latch up condition in CMOS and how to prevent it? (3)

3 Draw the layout diagram of CMOS inverter. (3)

4 What is sheet resistance? Give equation. (2)

5 Compare various adder circuits in terms of speed, area and power. (3)

6 Differentiate between SRAM and DRAM. (2)

7 Define interconnect design with neat sketch. (3)

8 What is an Elmore delay calculation? (2)

9 What are the necessities of designing small signal model of MOSFET's? (3)

10 Draw common gate Amplifier and Source-degenerated current mirrors (logic Diagram) (2)

PART- B (50 Marks)

11 a) Explain the operation of NMOS transistor and derive its current equation in linear region and saturation region. (6)
   b) Design CMOS AOI and OAI gates. (4)

12 a) What are stick diagrams? Draw the stick diagram of 2 input NAND gate. (5)
   b) Explain how the sheet resistance applied to MOS transistor when L=2 }, W=2 } (5)

13. a) Explain operation of Manchester carry chain, with a neat block diagram. (5)
    b) Draw the circuit of D-Flip flop using Transmission gates and explain its operation (5)

14. a) Define crosstalk. Explain Coupling effects on Delay in detail. (5)
    b) Explain why Buffer Insertion for very long wires is required and draw the relative interconnection? (5)

15 a) Explain the significance of Simple CMOS current mirror. (5)
   b) Draw and explain common-gate amplifier with a current mirror active load. (5)

16 a) Explain NAND –based ROM memory and its operation in detail (5)
   b) Explain the operation cascade current mirror. with a diagrams relenant diagram. (5)

17. Write notes on :
    a) BICMOS inverter (5)
    b) Interconnect coupling capacitance (5)

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FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I – Semester (Old) Examination, December 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	Write the important features of HDL	2
2	Define turn off delay	2
3	Distinguish between Case, Case z and case Z keyboards	3
4	Realize two input XOR gate using transmission gates	3
5	Draw the schematic diagram of BiCMOS inverter	3
6	Draw the I_d Versus V_{ds} curves for an N-channel Enhancement Mode MOSFET	2
7	Draw the schematic diagram of 3 Transistor DRAM cell	3
8	Define sheet resistance	2
9	Differentiate between mealy and Moore state machines	3
10	What are the uses of PLI?	2

PART – B (5x10 = 50 Marks)

11 a) Realize 4X1 multiplexer using transmission gates and write a verilog code in Switch level modeling. 5

    b) Realize 3x8 decoder and 2x4 decoder and write a verilog code for the same. 5

12 Explain briefly about FSM module to develop a verilog code for mealy model to detect the sequence 1010 for a given input data stream 010101011010 and write test bench to verify its functionality. 10

13 a) Distinguish between the task and function. 3

    b) Explain briefly the timing control in behavioral modeling with necessary examples. 7

14 a) Derive the drain current expression for n channel enhancement MOSFET. 6

    b) Explain about body effect of MOS transistor. 4

15 a) Draw the stick diagram for the given function

$$f = \overline{AB + CD}$$ 5

    b) How to estimate propagation delay for CMOS inverter? Explain. 5

16 a) Explain the operation of carry selected adder. 5

    b) Explain the operation of NAND based ROM design. 5

17 Write short notes on the following: 10
    a) Dynamic Register Element
    b) Logic Synthesis
    C) Explain 6T SRAM.

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FACULTY OF ENGINEERING

B.E. 4/4 (M/P) I-Semester (Backlog) Examination, December 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 calibration and sensitivity   2
2. What are the various types of plug ganger? Sketch any two of them and state their specific applications   3
3. Differentiate between characteristic errors and systemic errors   3
4. Sketch principle of micro meter and calculate the least count   2
5. Define the working principle of sigma comparator   2
6. What are proving ring strain gauge load cells?   3
7. Sketch the steps for measurement of axial load by strain gouges on cantilever beam   3
8. List various devices used for measuring of displacement and acceleration   3
9. State about Interchangeability applications   2
10. List the various elements measured of screen thread?   2

PART- B (50 Marks)

11. a) Explain the Taylor's principle of plain limit gauges and also explain different types of limit gauges   5
    b) Explain with neat sketch the working of auto collimator and its types   5

12. a) Define straightness flatness and cylindricity for measure of geometric accuracy in machine parts   5
    b) Explain co ordinate measuring machine (CMM)? And what are the geometric (GD & T) features included in CMM software, sketch each?   5

13. a) With a neat sketch explain the operation of Taylor Hobson Talysmf in measurement of surface finish? What is surface roughness?   5
    b) Derive the expression for measuring the effective diameter of screen thread by 3-wave method?   5

14. a) Explain static and dynamic characteristics of instruments? Write short notes on wive and foil type resistance strain gauges?   5
    b) Explain with the help of a neat diagram the working of accelerometer using seismic transducer?   5

15. a) Describe the working of high pressure measurement bulk modulus gauge with neat diagram   5
    b) How do you measure vacuum by using pirani gauge? Write short notes I series and parallel circuits in thermocouples   5

16. a) Define root mean square valve in analysis of surface   5
    b) Explain measurement of gear elements?   5

17. Write short notes on any two of the following: 10
    a) Bourdon gauge with neat sketch
    b) LVDT
    c) Piezo electric load cell

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FACULTY OF ENGINEERING

B.E. 4/4 (CSE) I-Semester (Backlog) Examination, December 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. Define heuristic function and search in a state space   (2)

2. Define the problem as State Space Problem and prove Missionaries and Cannibals
    problem   (3)

3. Write difference between predicate logic and propositional logic   (2)

4. Describe situation calculus with a suitable example   (3)

5. Write the fact form of "Marcus was assasinated by the Ceaser"?   (3)

6. What is an artificial neuron?   (2)

7. Differentiate between classification and clustering   (3)

8. Explain common sense knowledge and the difficulties in representing common
    sense knowledge?   (3)

9. What is skolemization. Give an example   (2)

10. What is a fuzzy set   (2)

PART – B (5x10 = 50 Marks)

11 Discuss about A* search algorithm and find the optimum route from Arad to
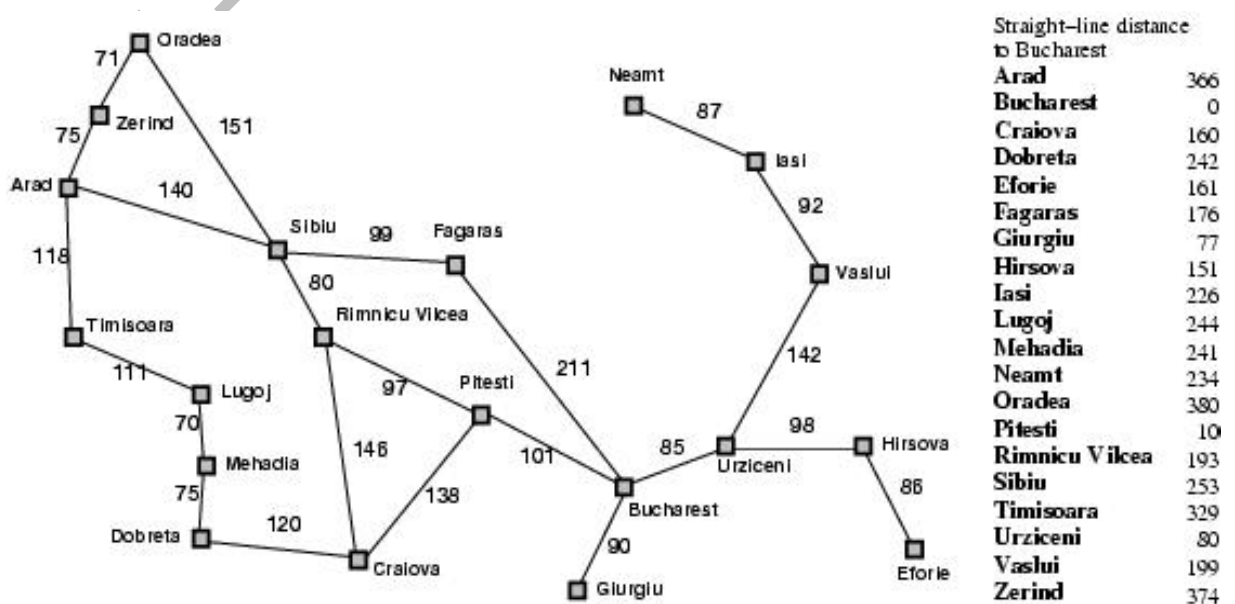   Bucharest, consider the graph in the below figure.1   (10)

Fig.1: graph for Route Finding

…2

12 (a) Explain resolution refutation procedure in predicate calculus with suitable
   example (5)

   (b) What are the drawbacks of predicate logic used in representation of facts (5)

13 Explain Back propagation Algorithm with an example (10)

14 Consider the example of "whether to wait for a table in a restaurant"? Specify a list of
   attributes required for illustrating this example as a learning problem. Apply decision
   tree learning algorithm and draw the resultant tree. (10)

15 Explain ID3 algorithm with a suitable example (10)

16 Produce the semantic analysis of the sentence "block B is on floor or block B is on C" (10)

17 For a fuzzy room cooler form the fuzzy profiles and rules for the terms strong
   negative, negative, low negative, medium, low positive, positive and high positive for
   the water flow rate. The value of flow rate ranges from 0 to 1.6 and degree of
   member ship ranges from 0 to 1.2. Draw the graph for the profile. Defuzzify the fuzzy
   output low positive. (10)

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FACULTY OF ENGINEERING
B.E. (I.T.) 4/4 I - Semester (Backlog) Examination, December 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 Discuss about RC interconnect modelling?   (2)
2 Describe precharge and evaluation modes in domino CMOS logic?   (3)
3 Describe VLSI design flow?   (3)
4 Design Y=A+BC using CMOS logic?   (2)
5 Explain MOSFET operation as switch?   (2)
6 What are gate primitives in verilog?   (3)
7 Describe active areas in n+ and p+ regions?   (3)
8 Define threshold voltage in MOSFET?   (2)
9 Draw RC model of MOSFET?   (2)
10 Explain 1T dynamic RAM?   (3)

PART – B (50 Marks)

11 (a) Derive voltage current relationship equation of nMOSFET?   (5)
   (b) Explain nMOSFET drain and transfer characteristics?   (5)

12 Draw the stick diagram and layout of two input (a)Nand and (b)Nor gates ?   (10)

13 (a) Derive the propagation delay of CMOS inverter?   (5)
   (b) Derive the midpoint voltage Vm of CMOS inverter?   (5)

14 (a) Implement Differential Cascode Voltage Switch Logic using OR/NOR logic?   (5)
   (b) Design NAND/AND logic using clocked CMOS?   (5)

15 (a) Design 8*3 priority encoder using verilog?   (5)
   (b) What is crosstalk? Explain different techniques to optimize crosstalk?   (5)

16 (a) Describe pseudo nMOS logic gates?   (5)
   (b) Explain 6T SRAM   read and Write operations?   (5)

17 Write short notes on
   (a) RC switch model of CMOS inverter?   (5)
   (b) Transmission gate based XOR/XNOR circuits?   (5)

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FACULTY OF ENGINEERING
B.E. 4/4 (IT) I-Semester (Old) Examination, December 2019
Subject : VSLI Design

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 VLSI design hierarchy.	3
2	Draw the transmission gate structure of OR2 & 2:1 MUX.	2
3	List the CMOS layers used in the design of ICS.	2
4	Draw the stick diagram of CMOS inverter.	3
5	Define the propagation delay of an inverter. Write the expression for the same.	3
6	Draw the primitive cell for the function $f = a^1b$.	2
7	Explain the refresh operation in DRAM.	2
8	Draw the Pseudo nMOS structure of i) NAND2 ii) NOR2	3
9	Write verilog code for a full adder using data flow modeling.	3
10	Define cross talk.	2

PART – B (50 Marks)

11 a)	Explain the nFET current-voltage equations.	6
b)	Using the concept of bubble pushing design CMOS circuit for AOI & OAI gates.	4
12 a)	Draw the layouts for series and parallel connected nFETS.	5
b)	What is latch up? Explain the concept of latch up. Write the steps to prevent latch up.	5
13 a)	Explain the design rules used in CMOS ICs.	4
b)	Explain the DC characteristics of a CMOS inverter and derive an expression for its mid point voltage.	6
14 a)	Draw the structure of 6T SRAM & 4T SRAM cell.	4
b)	Explain the operation of dynamic CMOS logic gate with an example.	6
15 a)	Write verilog code for a 8 : 3 priority encoder using behavioural modeling.	5
b)	Using single and multiple rung ladder circuits obtain a RC interconnect model.	5
16 a)	Explain the charge leakage problem in C^2MOS circuit.	5
b)	Explain the operation of a Master slave D Flip-Flop.	5
17 a)	Explain the concept of scaling of MOSFET.	4
b)	Draw the layouts of basic structure for i) nwell ii) n+ region iii) p+ region	3
c)	Obtain the RC switch model equivalent of a CMOS inverter.	3

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