FACULTY OF ENGINEERING
B. E. (Civil) VII – Semester (CBCS) (Supplementary) Examination, October 2020

Subject: Finite Element Techniques

Time: 2 hours   **Max. Marks: 70**

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**
1. What is Discretization?
2. What is the significance of Jacobian Matrix?
3. Define Iso-parametric, Sub-parametric and Super-parametric elements.
4. Differentiate Plane stress and Plane strain conditions.
5. For the bar shown in fig.1 using Rayleigh-Ritz method, determine the displacement at the point P. Take E =1, A=1 and the body force per unit volume ρg = 1.
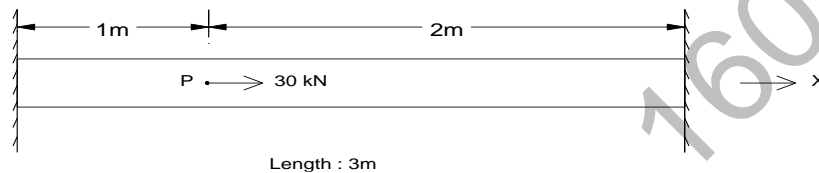

fig. 1

6. Evaluate the integral $\int_2^4 (4 - 12x + 9x^2)\, dx$ using 2-point guass quadrature formula.
7. Describe the classification of elements analysed in Finite Element Techniques based upon the number of dimensions with examples.
8. Define Area Coordinates and Volume Coordinates.
9. Write at least three properties of Stiffness Matrix.
10. What are axi-symmetric elements? Explain with an example.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**
11. Derive the constitutive relationship matrix 'D' for 3-D elastic Continuum.

12. (a) A stepped bar is subjected to an axial load as shown in the fig.2, find the support reactions and the element stresses. Take E = 2 x 10⁵MPa.   5
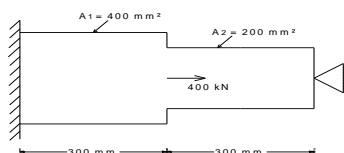

fig.2

(b) Analyze the following truss shown in fig.3 using elimination Approach.

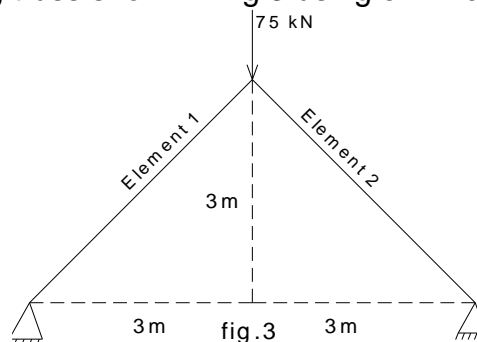

fig.3

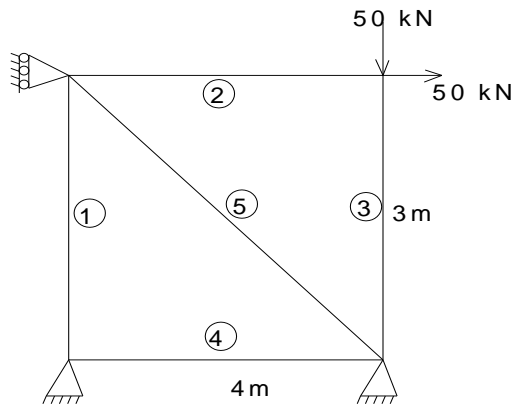13. Analyse the plane truss shown in fig.4 using principles of virtual displacements, AE = 5000kN for all the members.

fig.4

14. (a) Derive strain displacement matrix [B] for a 3-noded constant strain triangle (CST) element.
    (b) Calculate the strains ε_{xx}, ε_{yy} and Y_{xy} for the CST element defined by the nodes 1(3, 3), 2(9, 3), 3(6, 8). If the displacement at the nodes are $[u_1, v_1, u_2, v_2, u_3, v_3]$ = [0.2, 0.1, 0.3, -0.5, -0.5, -0.3].

15. Derive the shape functions for eight noded quadrilateral element for serendipity family. Use natural co-ordinates system.

16. An axi-symmetric body with a linearly distributed load on the conical surface is shown in fig.5. Determine the equivalent point loads at the nodes 1 and 2. Also determine the load matrix due to body force if the thickness of the plate is 10mm. Take $Y = 7.85 \times 10^{-5}$ N/mm^3.   10
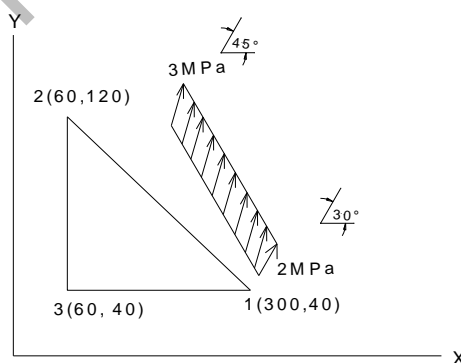

fig.5

17. The (x, y, z) coordinates of nodes of a 3-D 4-Noded tetrahedral element in mm are 1(0, 15, 15), 2(0, 0, 15), 3(15, 0, 15) and 4(0, 0, 0). If the displacement of vertex 1 in Z-direction is -0.5 mm, determine the displacement of the centroid of the face 1-2-3, if the face 2-3-4 is fixed. Also evaluate D matrix, if $E = 2 \times 10^5$ N/mm^2 and μ= 0.25. 10

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FACULTY OF ENGINEERING
B. E. (EEE) (CBCS) VII – Semester (Suppl.) Examination, October 2020

Subject: Electrical Machine Design

Time: 2 hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1. List the alloys of copper.
2. Differentiate between grain oriented and non-oriented steel sheet.
3. Illustrate leakage flux from salient poles.
4. Define the heating time constant.
5. List the various factors that affect the choice of specific electric loading.
6. Illustrate the main dimensions of D.C. machine with neat figure.
7. Derive an expression for voltage per turn in a transformer.
8. Define SCR and write the significance of SCR in synchronous machines.
9. Name the different methods used ion computer aided design.
10. List the electrical properties of insulating materials.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11. (a) Quote few lines about superconductor.
    (b) Recall about sheet steel, cold rolled steel and laminated core materials.

12. (a) The temperature rise of a transformer is 25^0C after 1 hour and 37.5^0C after 2 hours of starting from cold conditions. Calculate its final steady temperature raise and the heating time constant if its temperature falls from final steady value to 40^0C in 2.5 hours when disconnected. Calculate its cooling time constant. The ambient temperature is 30^0C.
    (b) Give the classification of magnetic materials according to their relative permeability and discuss about any one type.

13. (a) Recall the output equation of a DC machine from fundamentals.
    (b) A 350 kW, 500V, 450 rpm, 6 pole D.C. generator is built with an armature diameter of 0.87m and core length of 0.32m. The lap wound armature has 660 conductors. Calculate specific electric and magnetic loadings.

14. (a) A 250kVA, 6600/400V, 3-phase core type transformer has a total loss of 4800W, on full load. The transformer tank is 1.25m. in height, and 1 X 0.5m. in plan. Design a suitable scheme for cooling tubes if the average temperature rise is to be 35 degree. The diameter of tube is 50mm. and is spaced 75mm. from each other. The average height of the tube is 1.05 m. specific heat dissipation due to radiation and convention is respectively 6 and 6.5 w/m^2 –degree Celsius. Assume that convention is improved by 35% due to provision of tubes.
    (b) Discuss about the output equation of 3 phase transformer.

15. (a) Discuss in detail computer aided design of a electrical machine with the help of flow charts by using any two approaches.
    (b) List the advantages and disadvantages of computer aided design of electrical machines.

16. (a) Discuss briefly about different duty types.
    (b) Explain relationship between real and apparent flux densities with necessary equations.

17. (a) Discuss and explain 'heating time constant' and 'cooling time constant' of an electrical machines.
    (b) Discuss about different contraction factors in electrical machine design.

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FACULTY OF ENGINEERING
B.E. (Inst.) (CBCS) VII Sem. (Suppl.) Examination, October 2020

Subject: Analytical Instrumentation

Time: 2 hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1. What is the principle of absorption instruments?   ?
2. Define PH.
3. What are sample handling techniques?
4. Define polar-graphs.
5. What is the difference between colorimeter and spectrophotometer?
6. Explain the principle of NMR.
7. What is selective ion electrode?
8. What are basics of gas chromatography?
9. Write a short note on conductivity meter.
10. Name the various types of gas analyzers.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11. a) Describe the sources of errors and calibration of spectrophotometer.
    b) What are limitations of Beer Lambert's law?

12. a) Explain Infra-red spectrophotometer with neat diagram. Also explain the types of IR spectrometry.
    b) What are the applications of mass spectroscopy?

13. Explain principle of NMR spectroscopy. What are different types of NMR?

14. a) With the help of diagram, explain conductivity meter.
    b) Discuss in detail the electrodes used in PH meters.

15. a) With a neat diagram, explain thermal conductivity analyzer.
    b) With a neat diagram, explain Infra-red gas analyzer.

16. a) Explain the double beam spectrophotometer with suitable diagram.
    b) Discuss about amino acid analyzers.

17. Write short notes on the following:
    a) Mass spectrometers.
    b) Air pollution monitoring instruments.

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FACULTY OF ENGINEERING
B.E (ECE) VII-Semester (CBCS)(Suppl.) Examination, October 2020

Subject: Microwave Techniques

Time: 2 hours   **Max. Marks: 70**

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1. Sketch E & H field distributions of TE in Parallel Planes.
2. Define TE, TM, and TEM Modes of wave propagation.
3. A 10GHz signal is to be propagated through a Rectangular wave guide. Calculate the dimensions of Wave Guide and Guide wavelength for dominant mode of Propagation.
4. Define "Dominant Mode" .Which is the Dominant mode in Rectangular Wave Guide.
5. Write the Properties of S-Matrix.
6. Define Faraday rotation.
7. Define Bunching and Velocity Modulation in Reflex Klystron Oscillator.
8. Differentiate between O-type and M-type devices.
9. Explain Gunn Effect with a neat Sketch.
10. Distinguish between Micro-Strip lines and Strip Lines.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11. a) Evaluate the Propagation of TE waves through parallel planes.
    b) Exhibit the Characteristics of TE & TM Waves in parallel Conducting planes.

12. a) Explain why TEM Mode cannot propagate in Rectangular Wave Guide.
    b) The dominant mode of a Wave propagating in Rectangular Wave Guide is 2.2cm*1 cm and frequency of operation is 9.4 GHz. Calculate the guide wavelength.

13. a) Deduce the S-Matrix of Directional Coupler and Mention its properties.
    b) Differentiate between reciprocal and non-reciprocal devices.

14. a) Show that the theoretical efficiency of Reflex Klystron is 22.78%.
    b) Define Mode Jumping in Cavity Magnetron. Explain clearly how it is avoided.

15. a) Draw the geometry of Strip Lines, Micro Strip lines, Slot Lines and Fin Lines.
    b) Explain Construction, Operation and Practical applications of PIN Diode.

16. a) Differentiate between Linear and Cross-field amplifiers.
    b) Discuss Impedance Measurement using Magic-Tee.

17. Write short notes on any two of the following :
    a) TWT.
    b) Cavity Resonators.
    c) Ferrite phase shifters.

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FACULTY OF ENGINEERING
B. E. (M/P) (CBCS) VII – Semester (Suppl.) Examination, October 2020

Subject: Industrial Engineering

Time: 2 hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1. Define Industrial engineering.
2. Define merit rating.
3. What are the basic element are Forecasting?
4. What are the differences in functions of routing and dispatching in PPC?
5. What are the basic components of an inventory system?
6. Write down the expression of EOQ, defining each item in it.
7. What are the functions of quality control department?
8. Explain about fixed order quality system.
9. What is decision making?
10. Explain about routine and strategic decisions.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11. (a) What is scientific management? Briefly discuss the contributions made by F.W.Taylor towards scientific management.
    (b) Differentiate between Job evaluation and Merit rating. Explain any one method of Job evaluation.

12. (a) Describe the functional organization of production planning and control.
    (b) What is the main difference between planning and follow-up?

13. (a) Explain the deterministic and stochastic inventory models.
    (b) What are the relevant costs associated with an inventory? Explain.

14. (a) Discuss the importance of quality control in an industry. Why statistical quality control preferred? Explain.
    (b) Discuss the general structure for double sampling plan. What are its advantages and disadvantages? Explain.

15. (a) What are the quantitative methods n decision making? Explain.
    (b) Briefly explain the cost analysis for decision making.

16. (a) What are the aims and functions of personal managements?
    (b) The supply of special component has the following price scheduling:
    0 to 99 items: Rs.1000 per unit
    100 items and above: Rs.950 per unit
    The inventory holding costs are estimated at 25% of the value of the inventory. The procurement ordering costs are estimated at Rs.2000 per order. If the annual requirement of the component is 300 units, compute the economic order quantity for the procurement of these items.

17. (a) What is the procedure for constructing $\bar{X}$-R charts.
    (b) Briefly explain about the Decision Tree.

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FACULTY OF ENGINEERING
B.E. (A.E) VII - Semester (CBCS) (Suppl.) Examinations, October 2020

Subject : Metrology and Automobile Instrumentation

Time: 2 hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**
1   What are the applications of slip gauges in industry?
2   Discuss any two important uses of an autocollimator in the industry.
3   Define a comparator. Discuss the functional requirements of a comparator
4   What is a dial indicator operating principle?
5   List any five various geometric tests for testing machine tools.
6   What is a profilometer?
7   Explain the working of a proving ring with a neat sketch.
8   Explain the principle of piezoelectric load cell
9   Explain the concept of ambient temperature compensation in thermocouples.
10 Discuss specific applications of materials used in thermo-couples.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**
11 a) State and explain Taylor's principle of plain limit gauges.
   b) Discuss the uses of Plug, ring and snap gauges.

12 a) Explain the working mechanism of a dial indicator.
   b) Explain with a neat sketch the principle, operation and uses of an optical projector.

13 a) Derive the formula for measuring the effective diameter of thread by 3-wire method
   b) Write short notes on surface roughness measurement by profilometer.

14 a) Explain the principle of operation of LVDT with its advantages.
   b) Explain the principle of operation of piezo electric load cell, state its advantages.

15 a) Discuss the working of a Bourdon tube pressure gauge with a neat sketch.
   b) Explain the various types of materials used in thermo couples.

16 a) Differentiate between hole basis and shaft basis systems
   b) Explain the working principle of back pressure type pneumatic comparator with neat sketch.

17.a) What are strain gauges? Explain the applications of Wire and foil type resistance strain gauges with neat sketches.
   b) Explain the construction and working of Parkinson gear testing machine with neat sketch.

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FACULTY OF ENGINEERING
B.E. VII- Semester (CSE)(CBCS)(Suppl.) Examination, October 2020

Subject: Information Security

Time: 2 hours   **Max. Marks: 70**

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**
1. What is Security Blueprint?
2. Differentiate between a threat and an attack?
3. Draw 3-D NSTISSC Model of Security.
4. Specify the five elements of Business Impact Analysis?
5. What are the different Cipher Methods?
6. What is residual risk?
7. What is timing attack?
8. How is a Policy different from a Law?
9. Define Honeypots?
10. What is cost Benefit Analysis?

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**
11. (a) Explain critical characteristics of Information?
    (b) What are the various threats of information Security?

12. What is Risk Management? Discuss the various components of risk Management?
13. (a) What is a VPN? Differentiate between tunnel mode and transport mode?
    (b) Explain different types of IDPS?

14. Explain in detail cipher Methods using Encryption?

15. (a) Explain Bull's Eye Model?
    (b) What are the non-technical aspects of Implementation?

16. (a) Explain DES Algorithm in detail?
    (b) Discuss the attacks on Crypto system?

17. Write short note on:
    (a) Public key Infrastructure.
    (b) Dos and DDos attack
    (c) Types of Law

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FACULTY OF ENGINEERING
B.E. (I.T) VII – Semester (CBCS) (Suppl.) Examination, October 2020

Subject: Wireless Mobile Communication

Time: 2 hours   Max. Marks: 70

PART – A

Note: Answer any five questions.   **(5x2 = 10 Marks)**

1   What is meant by frequency reuse in cellular networks?
2   Write the differences between CDMA, TDMA, FDMA.
3   Mention the features of 3G technologies.
4   What is meant by Handover in GSM?
5   What is meant reverse tunneling?
6   Mention the features of Ipv6.
7   Write a brief note on IP Packet delivery.
8   What is meant by a mobile Agent?
9   What is snooping TCP?
10 Write the features of J2ME.

PART – B

Note: Answer any four questions.   **(4x15 = 60 Marks)**

11 a) Draw the block diagram of a cellular system and explain how a call is made between land line and the mobile user. Draw the timing diagram.
   b) Write the difference between soft handoff and hard handoff.

12 a) Explain the method to generate pseudo-noise sequence.
   b) Explain about Direct sequence Spread Spectrum (DS-SS).

13 Explain about GSM architecture with the help of a suitable block diagram.

14 a) Give a brief description about the entities and terminology used in mobile IP.
   b) Explain about agent advertisement and discovery with suitable diagrams?

15 a) Discuss the applications and challenges of a MANET.
   b) Explain about Bluetooth.

16 a) Explain about Wireless application protocol architecture in detail.
   b) Explain about transmission / timeout freezing in mobile TCP.

17 Write a short note on the following:
   a) SDMA
   b) IEEE 802.11 protocol architecture.

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FACULTY OF ENGINEERING
BE 4/4 (Civil) I-Semester (Backlog) Examination, October 2020

Subject: Foundation Engineering

Time: 2 hours   Max. Marks: 75

PART – A

Note: Answer any seven questions. (7x3 = 21 Marks)

1 Explain what Newmarks influence chart.

2 What is an isobar? Explain.

3 "The allowable soil pressure for foundations in cohesive soils is generally controlled by bearing capacity". Say yes or No and Justify.

4 "The Plate load test is more useful for cohesion less soils than cohesive soils". Say yes or No and Justify.

5 Explain the terms sample disturbance and its limitations

6 Explain the term "seating drive" in SPT.

7 What is negative skin function? Explain.

8 "The efficiency of pile group can be more than 100%". Say yes or No and Justify.

9 What is meant by Bore-log? Explain,

10 What are the objectives of Soil Exploration?

PART – B

Note: Answer any three questions. (3x18 = 54 Marks)

11 a) Derive an expression for finding the vertical stress under a point load in the elastic medium using Boussinesq's theory.
  b) A 30 KN point load acts on the surface of a horizontal ground. Find the intensity of vertical pressure at a depth of 5m in the ground directly under the load using Boussinesq's theory.

12 a) What are the principal modes of failures and discuss them with neat sketches.
  b) A square footing of 2m x 2m is placed over loose sand of density 16KN/m^3 and at a depth of 1.0m. The angle of shearing resistance is 30^0. Determine the total load that can be carried by the footing. Take Nc=30.14, Nq=18.4, and Nγ =5.1.

13 a) Explain the pile load test with neat diagram.
  b) A Precast concrete pile is driven with a 30KN drop hammer with a free fall of 1.5m.The average penetration in the last few blows is 6mm per blow. Estimate the allowable load on the pile using Engineering News Formula

14 a) What are the different shapes of wells? Discuss the characteristics of each shape.

  b) What is a coffer dam? Name different types of coffer dams and discuss their advantages and disadvantages.

15 a) What is electro-osmosis. What is its advantages and disadvantages as compared with conventional dewatering systems.
   b) Discuss critically about the Bore-log.

16 a) Explain about the Standard Penetration Test and use of N-values for estimating the bearing capacity.
   b) A 16 pile group has to be arranged in the form of a square in clay with uniform spacing. Neglecting the end bearing, determine the optimum spacing of the piles in terms of pile diameter .Assume shear mobilization factor=0.7

17 Write short notes on the following:
   a) New Marks Influence chart
   b) Group action in piles and their Efficiency.

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FACULTY OF ENGINEERING

B.E. 4/4 (EEE) I – Semester (Backlog) Examination, October 2020

Subject: Electric Drives and Static Control

Time: 2 hours   **Max. Marks: 75**

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1. Draw speed-torque characteristic of an electric drive, in which load torque is

    (a) dependent on speed (b) independent of speed. Give examples.

2. How the circuit diagram of a dc series motor can be changed to get no-load speed?

3. The speed of a 3-ϕ 4-pole, 50 Hz induction motor is 1400 rpm. Calculate its slip at (a) dynamic braking (b) plugging.

4. What are the methods to reduce energy loss during starting of a motor?

5. The speed of a separately excited dc motor fed from a dc chopper is 1500 rpm at 200 V, when T_{OFF}/T_{ON} is 0.20. Calculate its speed, when T_{OFF}/T_{ON} is zero.

6. What are the advantages of closed loop control of dc drive?

7. Draw schematic diagram of a static Scherbius drive.

8. A 3-ϕ, 400 V, 50 Hz, 4-pole, induction motor runs at 1425 rpm. At constant slip, calculate its speed when it is fed by a 3-ϕ cyclo-converter at 12.5 Hz.

9. What do you mean by V/f control of a 3-ϕ synchronous motor?

10. Show how speed of a BLDC motor changes with load.

PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

11. (a) Explain with neat circuit diagram how speed-torque characteristics of a dc shunt motor can be modified to get reduced nc-load speed and derive the expression used.

    (b) Sketch five possible combinations of speed-torque linear curves of motor and load and indicate its stability.

12. (a) Describe how counter current braking is performed on a separately excited dc motor showing its speed-torque characteristics in three quadrants.

(b) Explain how energy loss of a dc series motor during starting can be computed at full load.

13. (a) A separately excited dc motor is controlled by a Type A chopper. Assuming continuous conduction, draw the following waveforms. (i) supply voltage (ii) supply current (iii) load voltage (iv) load current (v) device current.

(b) A 230 V dc source is connected to a separately excited dc motor through a chopper operating at 500 Hz. The load torque at 1200 rpm at 32.5 Nm. If $R_a = 0.3\ \Omega$, $L_a = 2mH$ and motor constant is 1.2 Vsec/rad, calculate the min. and max. values of armature current, neglecting losses.

14. (a) Discuss briefly operation of AC Voltage regulator fed 3-ϕ induction motor drive with a neat schematic circuit diagram.

(b) A 3-ϕ, 400 V, 6 pole, 50 Hz, star connected slip ring induction motor is controlled by static Krammer drive. The inverter is directly connected to the supply. If the motor is required to operate at 800 rpm, determine the firing angle of the inverter. Voltage across the open-circuited slip rings at stand-still is 600 V, neglecting all voltage drops across devices and inductor.

15. (a) Draw and explain briefly the constructional features of BLDC motor.

(b) Explain the principle of operation of a Switched reluctance motor with a neat schematic circuit diagram.

16. (a) Derive an expression for energy relation of a 3-ϕ induction motor during (i) acceleration and (ii) dynamic braking.

(b) Discuss the operation of 120^0 conduction mode VSI controlled star connected 3-ϕ induction motor with neat waveforms.

17. Discuss the following:

(a) Effect of load inertia and load equalization.

(b) Modified speed-torque characteristics of 3-ϕ induction motor for different rotor resistances.

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FACULTY OF ENGINEERING
B.E. 4/4 (ECE) I - Semester (Old) (Backlog) Examination, October 2020

### Subject : VLSI Design

Time: 2 hours   Max. Marks: 75

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1 What are the Various Data types in Verilog HDL?
2 Write differences between the functions and Tasks?
3 Draw layouts of two transistor which are connected in series and parallel.
4 Differentiate between stick diagram and layout.
5 Distinguish between Procedural assignment and continuous assignment.
6 What is primitive cell? Write its significance.
7 Implement two input AND and NAND gate using complementary pass transistor logic.
8 Draw stick diagram of NOR gate.
9 Write the difference between structural modeling and data flow modeling.
10 Calculate the ON Resistance from Vdd to Gnd for the given inverter circuit   show in figure. If N- channel sheet resistance is R_{sp} = 2.5 x 10^4 Ω per square? R_{sn} = 10^4 Ω per square
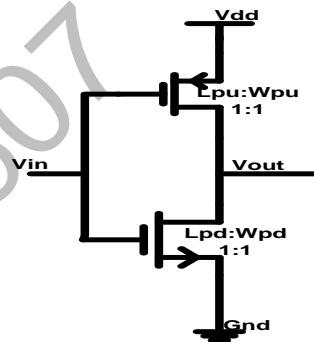
PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

11 (a) Design a 4-bit Parallel adder using the functions.
   (b) Implement 2XI multiplexer using switch level modeling. Write its truth table.

12 (a) Design a controller for sequence detector which detects 1011 using Mealy or MooreFSM.
   (b) Write a Verilog HDL Code for 16 X 1 MUX using 2 X 1 MUX Task

13 (a) Draw the layout of two input NOR gate.
   (b) Define active contact, poly contact and metal contact and units their characteristics
14 (a) Derive the drain current expression for n channel enhancement MOSFET operating in Non-Saturation and Saturation Region ?
   (b) Define the term threshold voltage of MOSFET and explain its significance.

15. (a) Draw the stick diagram for the given function

$$f = \overline{(A + B)C}$$

   (b) Determine pull-up to pull-down ratio of an NMOS inverter driven by another NMOS inverter?

16. (a) Draw the schematic diagram of 6T SRAM cell and explain in detail its operation? Explain its Read and write cycle?
   (b) Draw and explain the structure of a Carry select adder.

17.   Write short notes on the following
   a) Explain the operation of NAND based ROM design?
   b) Draw 3T DRAM Cell and explain the write and Read operation?
   c) Draw the Layout of NOR Gate?

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FACULTY OF ENGINEERING

B.E. 4/4 (ECE) I-Semester (New) (Backlog) Examination, October 2020

Subject : VLSI Design

Time: 2 hours   **Max. Marks: 75**

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1. Draw V_{DS} Vs I_D curve for NMOS enhancement type MOSFET

2. What complications arise due to body effect?

3. Draw the stick diagram of NOR gate using CMOS.

4. What are lamda based design rules? Why should we follow them?

5. What are the drawbacks of carry look ahead adder?

6. Neatly draw 3T Dynamic RAM cell.

7. Define crosstalk with net sketch.

8. Why the buffer insertion for long wires is required?

9. Draw Simple CMOS current mirror. How many transistors are required to realize the current mirror?

10. Which type of current mirror amplifier is used as active load when high input impedance is desired?

PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

11. a) Explain the operation of CMOS inverter and its switching characteristics. with relevant sketches.
    b) What are the advantages of Transmission gate over CMOS? Design 4x1 MUX using Transmission gate.

12 a) Draw the layout diagram of 2 input NAND gate.
    b) How to estimation of CMOS inverter delay. Explain.

13 a) What is barrel shifter? Explain NOR based ROM memory and its operation.
    b) Explain read and write operation of 6T SRAM cell.

14. a) How do we calculate RC delay in long wires?
    b) Explain about interconnect coupling capacitances in detail?

15 a) Draw and explain common – source amplifier with a current mirror active load.
    b) Explain about Source-degenerated current mirror.

16 a) Draw CMOS circuit for   a) EXOR gate   b) f= (a.b+c).d.
    b) Explain MOS transistor operation with different loads.

17 Write notes on:
    a) Carry Select Adder
    b) Depletion mode MOS Transistor

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FACULTY OF ENGINEERING
BE 4/4 (M/P/AE) I-Semester (Backlog) Examination, October 2020

Subject: Metrology and Instrumentation

Time: 2 hours   **Max. Marks: 75**

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1 Differentiate between calibration and sensitivity.
2 What are the various types of plug gauges ?Sketch any two of them and state their specific applications.
3 What is Taylor's Principle?
4 Explain the working principle of strain gauge load cells.
5 List various devices used for measuring of force.
6 Name and sketch three main types of Fits.
7 Define primary texture and secondary texture with neat sketch.
8 State the laws of thermoelectricity.
9 Briefly explain foil type resistance strain gauge.
10 Define Surface Roughness.

PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

11 (a) Explain the working of Tomlinson gauges with a neat sketch.
    (b) List different types of micrometers and explain any of the two.

12 (a) Explain with a sketch the measurement of straightness errors using autocollimator.
    (b) What is Chart gauge? Explain various parameters used for characterizing surface roughness.

13 (a) Explain the principle of Thread gauging.
    (b) Distinguish between basic hole and basic shaft systems.

14 (a) Explain desirable characteristics of strain gauge material.
    (b) How do you measure axial load and bending load?

15 (a) How do you measure pressure using Pirani gauge?
    (b) List and define various static characteristics of measuring devices.

16 Write short notes on the following.
    (a) Bourdon gauge with a neat sketch
    (b) LVDT

17 (a) Derive the expression for measuring the effective diameter of screw thread by-3 wire method?
    (b) Explain different materials and junctions used in thermocouples.

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FACULTY OF ENGINEERING

B.E. 4/4 (IT) I-Semester (Old) (Backlog) Examination, October 2020

Subject : VSLI Design

Time: 2 hours   **Max. Marks: 75**

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1 Explain the pass characteristics of nFET & PFET.
2 Draw the transmission gate structure of XOR2 & XNOR2.
3 Draw the layout of a non-inverting buffer.
4 Write the steps to prevent latchup.
5 Define rise and fall time of a CMOS inverter. Write the expressions for them.
6 Explain surround and extension design rule of CMOS IC.
7 Draw the CPL structure of AND/NAND, OR/NOR gates.
8 Draw the structure of Domino AND & OR gates.
9 Differentiate between blocking and nonblocking assignments in verilog with an example.
10 Define floor planning of VLSI circuits.

PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

11 a) Draw FET PC model. Derive an expression for the drain resistance Pn. Also explain about capacitances used in the model.
   b) Using the concept of bubble pushing design a CMOS circuit to implement the function $g = \overline{(a + b)(c + d)(e + f)}$

12 a) Explain the layouts of basic structures.
   b) Draw the stick diagram for OAI gate.

13 Explain in detail CMOS process flow with neat diagrams.

14 a) Explain the operation of a basic SPAM cell.
   b) Explain the change sharing problem in a dynamic CMOS circuit.

15 a) Write verilog code for a 4-bit carry look ahead adder using data flow modeling.
   b) Obtain a circuit to model an inter connect line with a series pass FET.

16 a) Explain the effect of change storage on the floating gate.
   b) Explain about barrel shifter.

17 a) Explain VLSI design hierarchy.
   b) Draw the layouts for series and parallel connected PFETs.
   c) Write the expression for scaling factor 'S' and number of stages 'N' required to minimize delay in a cascade of inverters.

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FACULTY OF ENGINEERING

B. E. 4/4 I – Semester (I.T.) (New) (Backlog) Examination, October 2020

Subject: VLSI Design

Time: 2 hours   **Max. Marks: 75**

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1 How pass Transistor is different from Transmission Gate logic?
2 What is the scaling effect on Resistance and frequency of operation?
3 Design NOR_2 logic and its stick diagram using CMOS Logic.
4 Difference between active contact and poly contact.
5 Define rise time and fall time, give its typical equation of two input NAND gate.
6 Design two in put OR/NOR gate using complementary pass Transistor Logic.
7 Write a Verilog code for D-Flip Flop.
8 Specify the Inverter switching characteristics.
9 Explain about Domino logic.
10 Draw the Elmore delay model circuit.

PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

11 (a) Design a 8X1 multiplexer using 2X1 multiplexer, use Transmission Gate logic, give its operation.
   (b) Derive the expression for I_{DSP} of nMOS in linear region.

12 (a) Design and draw the layout structure of a half adder.
   (b) Draw the fabrication steps of CMOS ICS.

13 (a) Define active area and design n+ region, PFET. Draw the typical structure of active contact and poly contact.
   (b) What is Latch up? How to avoid the latch up problem in CMOS technology?

14 (a) With the help of neat sketch, explain DC characteristics of CMOS inverter.
   (b) How to measure the propagarim delay of a CMOS inverter and Two input NAND gate?

15 (a) Design two input EXOR and EXNOR logic using differential cascade voltage switch logic. Explain its operation.
   (b) Differentiate between SRAM and DRAM. Explain the read and write operations of DRAM.

16 (a) Develop Verilog code for 8-bit carry look ahead adder using behavioral model.
   (b) How to model, the inter connect in terms of RC network? Explain about multiple rung ladder circuit.

17 Write short notes on :
   (a) Scaling concepts of MOSFETS
   (b) Design Rules of CMOS
   (c) Blocking and Non-blocking assignment.

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FACULTY OF ENGINEERING

B.E. 4/4 (CSE) I – Semester (Backlog) Examination, Octonber 2020

Subject: Artificial Intelligence

Time: 2 hours   **Max. Marks: 75**

PART – A

Note: Answer any seven questions.   **(7x3 = 21 Marks)**

1. Define search in state space.
2. What is meant by heuristic search? Define a heuristic function for 8-tiles problem.
3. Is Artificial Intelligence our future? Will it save or destroy humanity. Discuss your perception.
4. Express the following statement in predicate logic: "Anwar is a student of Osmania University".
5. Differentiate propositional calculus and predicate calculus.
6. What is situation calculus?
7. What is Information gain?
8. Draw a two-layer feed-forward network with two inputs, two hidden nodes and output nodes.
9. Distinguish between Crisp set and Fuzzy set?
10. List out the applications where NLP is used.

PART – B

Note: Answer any three questions.   **(3x18 = 54 Marks)**

11. Explain A* algorithm and explain advantages of it.

12. Explain resolution in predicate Calculus.

13. What are the various knowledge representation techniques used in expert system.

14. What are 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?

15. Write short notes on:

    (a) Decision tree learning.

    (b) Sugeno style fuzzy inference processing.

16. What is Natural Language Processing? Explain the various phases/steps in NLP?

17. (a) Explain Rule Based Learning.

    (b) Explain perceptron in neural network.

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