FACULTY OF ENGINEERING

M.E. (Civil-SE) I Semester (AICTE) (Main) Examination, July 2021

Subject: Advanced Solid Mechanics

Time: 2 Hours   Max. Marks: 70

Note: i) First question is compulsory and answer any three questions from the remaining six questions.
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any, may suitable be assumed.

1. **Answer any four questions from the following.**   **(4 x 4 = 16 Marks)**

    a) Define reciprocal theorem?

    b) Express the relation between stress component and Airy's stress function in Cartesian coordinates?

    c) Express stress Vs strain relation in polar coordinate system?

    d) Differentiate between Cartesian and polar coordinate systems?

    e) Derive the expression for Distortional strain energy?

    f) Calculate the direction cosines on the planes, where axis z is rotated by 30° with original axis, and y is coinciding with original y axis?

    g) Determine the maximum shear stresses developed in the elliptical cross sectioned shaft having semi major axis 25 mm and semi minor axis 15 mm, if it is subjected to a torque of 150N-m?

2. a) Derive equilibrium equations in Cartesian Coordinates for a 3D state of stress in terms of strain components?   (9)

    b) Show that $\phi = \frac{a}{8c^3}\left[x^2\left[y^3 - 3c^2 y + 2c^3\right] - \frac{1}{5}y^3\left[y^2 - 2c^2\right]\right]$ is a valid stress function on a cantilever beam of narrow rectangular section of unit width and depth '2C'?

    (ii) Also identify stress fields using the boundary conditions at y=±c and x≥0?   (9)

3. a) (i) What is Airy's stress function (ii) Generate the Biharmonic equation in terms of stress function 'φ'? (iii) Derive the pure bending case of a beam of narrow rectangular section and depth '2C' using Biharmonic equation?   (9)

b) For the 3 dimensional state of stress, the stress functions $\emptyset_1$, $\emptyset_2$, $\emptyset_3$, which are functions of (x,y,z) are defined as (9)

$$\sigma_x = \frac{\partial^2 \phi_3}{\partial y^2} + \frac{\partial^2 \phi_2}{\partial z^2}, \qquad \sigma_y = \frac{\partial^2 \phi_1}{\partial z^2} + \frac{\partial^2 \phi_3}{\partial x^2}$$

$$\sigma_z = \frac{\partial^2 \phi_1}{\partial y^2} + \frac{\partial^2 \phi_2}{\partial x^2}; \qquad T_{xy} = -\frac{\partial^2 \phi_3}{\partial x \partial y}; \quad T_{yz} = -\frac{\partial^2 \phi_1}{\partial y \partial z}; \quad T_{xz} = -\frac{\partial 2\phi 2}{\partial x \partial z}$$

Show that these stress functions satisfy equations of equilibrium.

4. a) What is the influence of a small central circular hole on stress distribution in a plate in tensions? (9)

   b) Explain the stress field that arises on curved beam subjected to couple at the ends? (9)

5. a) The state of stress on a plane is defined as (9)

$$[\sigma] = \begin{bmatrix} 150 & -100 & 200 \\ -100 & 190 & 135 \\ 200 & 135 & -205 \end{bmatrix} \text{ KPa}$$

   Determine (i) Stress Invariants (ii) Principal Stresses
   (iii) Location of Principal Planes.

   b) Derive the expression of maximum deflection for a Simply supported beam of span 'L', subjected to a U.D.L. of intensity 'w/m run throughout the span? (9)

6. a) Calculate the maximum shear stress for an elliptical shaft of semi major axis 'a', semi minor axis 'b' subjected to torque at ends? (9)

   b) Explain the torsion phenomenon in thin walled tubes? (9)

7. a) Show that compatibility equations for both plane stress and plane strain conditions are one and the same? (9)

   b) Derive maximum shear stress in square shaft of side 'a' using finite difference Method? (9)

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FACULTY OF ENGINEERING

M.E (Civil – SE) I-Semester (Main) (AICTE) Examination, July 2021

Subject : Structural Dynamics

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

**Note: i)**   **First Question is compulsory and answer any Three questions from the remaining six questions.**

    ii) **Answers to each question must be written at one place only and in the same order as they occur in the question paper.**

    iii) **Missing data, if any may suitably be assumed.**


1. Answer any Four Questions from the following   **(4 X 4 = 16Marks)**

    a) Justify why overdamped structure are not preferred in comparison with underd amped Structures.

    b) Calculate natural frequency of vibration of a torsional pendulum of length 1m, diameter of the rod is 5mm and diameter of rotor 0.2m, mass of motor is 2kg and shear modulus $G=0.82 \times 10^{11} N/mm^2$

    c) What is Magnification Factor?

    d) Differentiate between short term pulse and long term pulse load

    e) Write the characteristic equation for free vibration of undamped system

    f) Draw the plot showing response of the structure to damped free vibration explaining salient features involved

    g) State and Explain Hamilton's principle

2. a) A mass of 2 kg is suspended by a spring having a stiffness at 700 N/m. The mass is displaced downward from its equilibrium position by a distance of 0.02 m. Estimate equation of motion, normal frequency, the response of the system and total energy   **9**

    b) The successive amplitudes from a free vibration test for a structure are 0.9, 0.46, 0.3 and 0.12 units respectively. Determine the damping ratio (assuming it to be very small) of the system considering (i) each cycle separately and (ii) considering them all together.   **9**

3. a) An SDOF system consists of a mass of 20 kg, a spring of stiffness 2.2 KN/m and a dash pot with a damping co-efficient of 60 N-s/m is subjected to a harmonic excitation of F = (200 sin 5t) N. show the complete solution of the equation of motion   **9**

b) A sensitive instrument with weight 500N is to be installed at a location where Vertical acceleration is 0.1g and at frequency = 10Hz. This instrument is mounted on a rubber pad of stiffness 12800 N/m and damping such that the damping factor is 0.1. (a) What acceleration is transmitted to the instrument? (b) If the instrument can tolerate only an acceleration of 0.005, suggest a solution assuming that the same rubber pad is used.   9

4. An SDOF system is subjected to a periodic load as shown in figure write down the expression for displacement considering three terms of Fourier series if damping ratio is 0.03, m= 2.5×10^5 kNsec^2/m and k=1.5×10^6 kN/m (t)   18
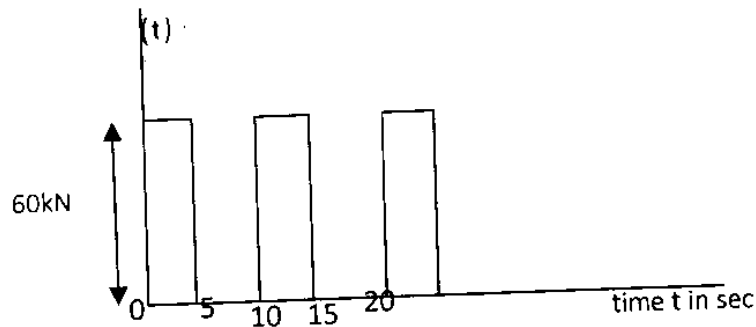

5. For the 3_DOF system shown in figure 4 determine the dynamic displacement if K1=2k2=3k3=1×10^8 kN/m, m1=10^6 kN-sec^2/m , m2=1.5×10^6 kN-sec^2/m and m3=2×10^6 kN-sec^2 /m   18
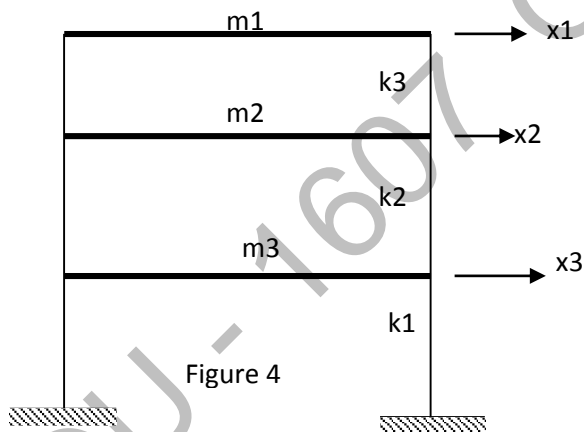
Figure 4

The initial conditions of vibrations at time t for the system may be taken as

$$x(0)= \begin{bmatrix} 0.5 \\ 0.4 \\ 0.3 \end{bmatrix} m \qquad x(0)= \begin{bmatrix} 0 \\ 9 \\ 0 \end{bmatrix} m/sec$$

..3

6. Find the lowest natural frequency of the system shown in figure 5 using Stodla's method also plot its mode shape $k1= 6 \times 10^3$ N/m & $m1= 10^6$ N sec^2/m   18

x1   m1

1.5m1   k1N/m

x2

2k1 N/m

2m1

x3

3k1 N/m
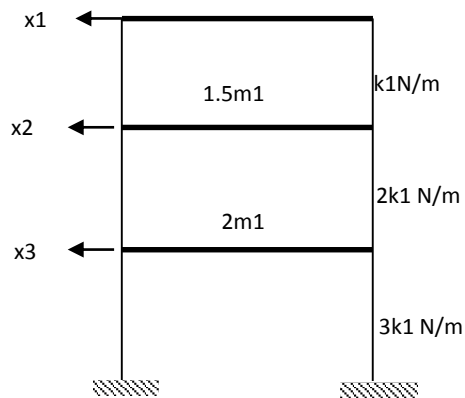
7. a) Derive partial differential equation governing the motion of the beam with distributed mass and elasticity subjected to external dynamic forces   9

    b) Considering distributed mass and elasticity from fundamentals, derive expressions for first three natural frequencies and draw mode shapes for a Simply Supported beam   9

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FACULTY OF ENGINEERING
M.E.(Civil-TE) I Semester (AICTE) (Main) Examination, July 2021

Subject: Urban Transportation System Planning

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

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.
      ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
      iii) Missing data, if any may suitably be assumed.

1 **Answer any four questions from the following.**   **(4 x 4 = 16 Marks)**
   (a) Define Transportation system?
   (b) Define study area?
   (c) Write the salient features of Garin Lowry model?
   (d) Write short note on Toronto transit model?
   (e) Define mobility and accessibility?
   (f) List out various assumptions made for category analysis?
   (g) Define trip assignment?

2 (a) Discuss levels of urban transportation planning. Explain with sketch   [9]
   (b) What are the characteristics of long range and short range planning?   [9]

3 (a) Define zoning. Discuss the points to be kept in mind while doing zoning?   [9]
   (b) What is sampling? Discuss various types of samplings?   [9]

4 (a) What are the factors affecting Trip Generation? Explain in brief?   [9]
   (b) Define modal split and explain in brief the factors affecting modal split?   [9]

5 (a) Enumerate factors influencing mode choice. Draw the flow chart showing the steps involved in different types of mode split model?   [9]
   (b) What are the various trip distribution methods? Discuss about any one of them?   [9]

6 (a) List the various assignment techniques and explain any two methods?   [9]
   (b) Explain the applications of traffic assignment?   [9]

7 (a) Write short note on opportunity models?   [9]
   (b) Discuss the points for selection of land – use transport model?   [9]

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FACULTY OF ENGINEERING
M.E.(Civil-CM) I Semester (AICTE) (Main) Examination, July 2021

Subject: Construction Project Administration

Time: 2 Hours   Max. Marks: 70

Note: i) First Question is compulsory. Answer any three questions from the remaining six questions.
ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any, may suitably be assumed.

1 **Answer any four questions from the following.**   **(4 x 4 = 16 Marks)**
(a) What is administration?
(b) Define the terms quality and quality control.
(c) Explain the terms certainty and uncertainty.
(d) What do you understand by tolerances in specifications?
(e) What is the nature of risk and how do you identify it?
(f) What are the IS specifications used in construction projects?
(g) Explain term bidding documents and bonds.

2 (a) Explain the design build contracts in project administration.   [9]
(b) Discuss the responsibility of coordination of trades in construction projects.   [9]

3 (a) Explain the organizational structure of the lines of authority with help of sketches.   [9]
(b) Discuss in detail familiarization with construction documents.   [9]

4 (a) Explain reasons for risks and also explain the different types of risks in construction projects.   [9]
(b) Discuss the investment decisions and also decision tree concepts in construction projects and its advantages.   [9]

5 (a) Explain in detail the roles of engineers and architects in construction management.   [9]
(b) Discuss the CSI specifications and the municipal regulations and approvals required for construction projects.   [9]

6 (a) Explain briefly tender opening procedures and documentations during pre-construction operations.   [9]
(b) Explain limitations and advantages of pre-construction operations.   [9]

7 (a) Discuss the conflicts due to drawings and specifications in construction administration.[9]
(b) Explain quality assurance aspects of the projects and its monitoring procedures.   [9]

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FACULTY OF ENGINEERING

M.E. (EEE-PE/PES) I Semester (AICTE) (Main) Examination, July 2021

Subject: Digital Control of Power Electronic and Drives

Time: 2 Hours   Max. Marks: 70

Note: i) First question is compulsory and answer any three questions from the remaining six questions.
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any, may suitable be assumed.

1. **Answer any four questions from the following.**   **(4 x 4 = 16 Marks)**

    a) Indicate the size of the 8051 timer for the following modes:

      (i) Mode 0 (ii) Mode 1   (iii) Mode 2

    b) What is RS-232 standard and its importance?

    c) Enumerate the basic performance and architectural features of DSP

    d) What are the advantages of DSP Processors over conventional processor?

    e) How many Event Managers does LF2407C have? What is their purpose

    f) Explain bit reversed addressing with an example

    g) What is the need for PWM in DPS?

2. a) What is an Interrupt? List the steps of Interrupt Service Routine (ISR)?   (5)

    b) Indicate which mode and timer of 8051 are selected by each of the following instruction:

      (i) MOV TMOD,#01H (ii) MOV TMOD,#20H   (iii) MOV TMOD,#12H.   (8)

    c) Write 8051 assembly language program to continuously send out to port 0 alternatively value 55H and AAH?   (5)

3. a) List the difference between PIC and ARM Microcontrollers?   (6)

    b) How many Register Modes does ARM Microcontroller have. Explain their functions with their structure diagram?   (12)

4. a) i. Explain the four types of indirect addressing options of C2xx?   (9)

      ii. Explain the various operands that are available for use with instructions while using indirect addressing mode considering LT Instruction.

    b) Draw the functional block diagram of C2xx Processor and i. explain the role of each component ii. How external devices are mapped to C2xx Processor?   (9)

..2

5. a) Discuss 'Capture units' of LF2407 controller? (9)

   b) What is the function of the following: (9)

   (i) Joint Test Action Group (JTAG)

   (ii) Phase Locked Loop (PLL) Clock Module.

6. a) What is FPGA? List and explain its advantages and applications? (9)

   b) Draw and explain the Program Memory Map of LF2407C and detail the two

   factors that determine the configuration of program memory? (9)

7. a) Draw the diagram of interfacing an LCD with 8051 Microcontroller and explain

   the steps of operation i. To initialize ii. Send a command to LCD? (9)

   b) List and explain the application of microcontroller and microprocessors in

   Electric Drives? Draw diagrams? (9)

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FACULTY OF ENGINEERING

M.E (ECE-DS) I-Semester (Main) (AICTE) Examination, July 2021

Subject : Digital System Design

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

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.

ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.

iii) Missing data, if any may suitably be assumed.

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1. Answer any Four Questions from the following   **(4 X 4 = 16Marks)**

   a) Distinguish Mealy and Moore models

   b) What is the difference between characteristic table and excitation table?

   c) Differentiate Races, Cycles and Hazards

   d) Draw the State diagram and ASM chart for T Flip flop

   e) Define Fault Modeling in combinational circuits

   f) Explain transition check approach

   g) What is the importance of signature Analysis?

2. a) Implement Half adder, full adder, half subtrator and full subtractor using PLA   9

   b) What is the difference between PAL and PLA programming models.   9

3. a) Obtain the set of maximal compatibles using Merger Graph method, for the sequential machine given below   9

PS	I_1	Ns I_2	I_3
A	C,0	E,1	-
B	C,0	E,-	-
C	B,-	C,0	A,-
D	B,0	C,0	E,-
E	-	E,0	A,-

   b) Explain the procedure for analysis of pulsed mode asynchronous sequential circuits   9

                                                                           ..2

4. a) Explain rules to construct ASM block and draw ASM chart of a JK flip flop   8

    b) Using following state diagram to describe a sequence detector that detects a sequence of 101. Draw an SM chart and Design the control unit using JK flip-flop   10
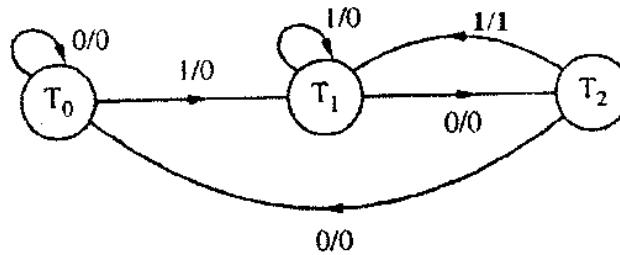
5. a) Illustrate path sensitization method and describe its limitations   9

    b) How to detect faults in digital circuits? Explain about fault redundancy   9

6. a) Explain the procedure how to find fault detection and location in sequential circuits   9

   b) Give the detailed procedure of circuit test approach of sequential circuits   9

7. Write a short note on   18
    a) Sequence detector
    b) Boolean difference method
    c) Incompletely specified machines

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FACULTY OF ENGINEERING

M.E (ECE-ES) I-Semester (Main) (AICTE) Examination, July 2021

Subject : Smart Sensors and Internet of Things

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

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any may suitably be assumed.

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1. Answer any Four Questions from the following   **(4 X 4 = 16Marks)**
  a) Draw the basic block diagram of smart sensor.
  b) Write the differences between the WSN and IoT.
  c) What is the difference between shielded and unshielded sensors.
  d) Write the applications of Resistive sensors.
  e) What is the need of SiO_2 Deposition during Fabrication.
  f) Explain about the piezoelectric effect.
  g) What is the purpose of Sample and Hold circuit in smart sensor.

2. a) Discuss various parameters to be considered for selecting a sensor for practical application   9
  b) Discuss in detail about various smart sensors required for monitoring of industrial environment   9

3. a) Explain in detail about the constant phase element method   9
  b) Explain in detail about the impedance spectroscopy   9

4. a) Discuss in detail about Capacitive Sensors and its applications   9
  b) Explain in detail about principle and applications of surface acoustic wave sensors with neat sketches   9

5. a) Discuss in detail about the sensor, integrated sensor and integrated intelligent sensors with block diagrams   9
  b) Explain in detail about the basic fabrication steps to design a Bio-sensors   9

6. a) Explain with an example about interfacing the smart sensor with Microcontroller   9
  b) Discuss one application of IoT and smart Sensor for COVID-19 treatment   9

7. a) Explain the process of Physical and chemical Vapor deposition   9
  b) Write short Notes on future research scope of IoT and smart sensors   9

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FACULTY OF ENGINEERING

M.E. (ECE – ES & VLSI Design) I Semester (AICTE) (Main) Examination,

July 2021

Subject: Digital IC Design

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

Note: *i) First question is compulsory and answer any three questions from the remaining six questions.*
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any, may suitable be assumed.

1. **Answer any four questions from the following.**   **(4 x 4 = 16 Marks)**

   a) Express the Switching threshold affect in the Static Behavior of CMOS inverter

   b) Explain about the secondary effects in MOS transistors

   c) Judge about Static CMOS design style

   d) Examine an approach to optimize sequential circuits and explain its operation

   e) Determine the procedure to reduce the power in standby mode

   f) Plan the short notes on memory yield

   g) Give the specifications in speed and power trade off in data path operators.

2. a) Assess the role of Computing Capacitor in the Dynamic behavior of CMOS Inverter.   (9)

   b) Explain about interconnect parameters used in CMOS design process.   (9)

3. a) Analyze the manufacturing steps involved in the design of CMOS integrated circuits.   (9)

   b) Write the Quality Metrics involved in Digital Circuit Design.   (9)

4. a) Using Complimentary CMOS logic Synthesis the complex CMOS gate whose function $F = (D+A. (B+C))'$.   (9)

   b) Explain the monostable sequential circuits with suitable Circuits.   (9)

5. a) Elaborate about the types of parasitic effects.   (9)

   b) Examine how to reduce the glitching through path balancing.   (9)

6. a) Discuss briefly about the Barrel Shifter.   (9)

   b) Give the importance of design time power reduction techniques.   (9)

7. a) Explain briefly about array structured memory organization.   (9)

   b) Discuss the Read and Write operations of SRAM cell with layout.   (9)

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FACULTY OF ENGINEERING

M.E (Mech- CAD/CAM) I-Semester (Main) (AICTE) Examination, July 2021

Subject :   Finite Element Techniques

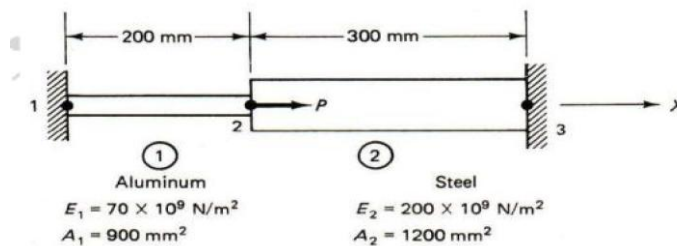**Time : 2 Hours**   **Max. Marks: 70**

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any may suitably be assumed.

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1. Answer any Four Questions from the following   **(4 X 4 = 16Marks)**

   a) How do you calculate the size of the global stiffness matrix?

   b) How does the hermite shape functions used in FEA?

   c) What do you mean by boundary condition?

   d) Define shape function?

   e) Define global stiffness matrix?

   f) Differentiate between beam and bar?

   g) What do you mean by post processing?

2. a) Discuss the basic steps involved in FEM and explain in detail?   9
   b) Determine the displacements and the support reactions for the uniform bar shown in figure. Given P=300KN?   9

1
2
3

200 mm 300 mm
P
x

① Aluminum
$E_1 = 70 \times 10^9$ N/m²
$A_1 = 900$ mm²

② Steel
$E_2 = 200 \times 10^9$ N/m²
$A_2 = 1200$ mm²

3. a) For the 2-D body shown in figure, determine the temperature distribution. The edges on the top and bottom of the body are insulated. Assume. Use three element models.   9


T = 180°C
0.3 m   K = 1.5 w/m °C
h = 50 w/m² °C
$T_\infty = 25°C$
0.6 m
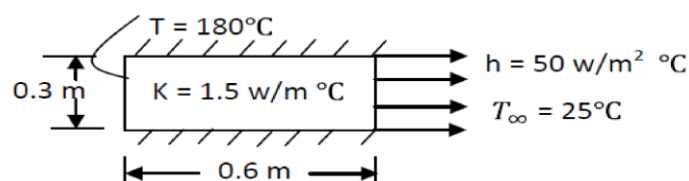
   b) Explain 2-D finite element formulation in heat transfer analysis   9

..2

4. a) Distinguish between consistent mass matrix and lumped mass matrices 9
   b) Obtain the natural frequency of flexural vibration of a fixed beam of uniform
      cross-section. Use two element idealizations. 9

E, A, ρ
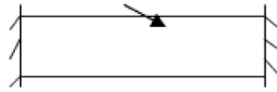
5. a) Discuss the importance of semi-automatic meshing and auto mesh along with the
      practical applications. 9
   b) Calculate nodal displacement and element stresses for the truss shown in figure.
      Take E= 70 GPa and cross sectional area A=2 cm^2 for all truss members. 9
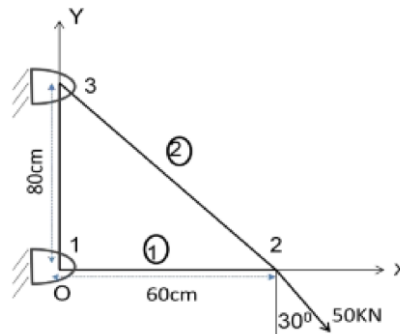
6. a) Derive the shape function for four noded Quadrilateral Element? 9
   b) Determine the nodal displacements and slopes at the position of one-fourth
      distance from the support of shaft: Take E=200 GPa,,I=6 x 104mm4. The shaft is
      simply supported at A and B. 9

5KN

(1)   (2)
|—— 1m ——|—— 1m ——|
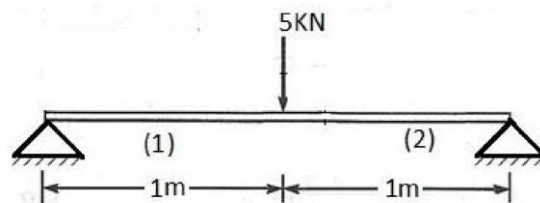
7. a) Define Iso-parametric, Super Parametric and Sub-Parametric elements? 9
   b) The Cartesian global coordinates of the corner nodes of an iso-parametric
      quadrilateral element are given by (1,0), (2,0), (2.5, 1.5) and (1.5,1). Find its
      Jacobian matrix 9

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FACULTY OF ENGINEERING

M.E (Mech – Cad / Cam) I-Semester (Main) (AICTE) Examination, July 2021

Subject : Computer Integrated Manufacturing

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

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.
  ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
  iii) Missing data, if any may suitably be assumed.

_____

1. Answer any Four Questions from the following   **(4 X 4 = 16Marks)**
  a) Classify different types of Manufacturing and explain about them.
  b) Explain about Product Life Cycle.
  c) List the various types of data definition language commands used in SQL.
  d) What are the desirable features of Data Base Management Systems?
  e) Distinguish between Upper Bound and Lower Bound Approach.
  f) Write briefly about different types of Networks.
  g) List the four functions of Lean Manufacturing.

2. a) With the help of a neat diagram explain the important features of CASA – SME CIM Wheel.   9
  b) What is meant by Concurrent Engineering? Distinguish between concurrent and sequential Engineering approaches. Enlist characteristics and benefits.   9

2. a) What is meant by SQL? Explain how SQL can be used as a knowledge based query language.   9

  b) Write an SQL statement for retrieving information regarding feed per tooth for Aluminium material from a mill-data table consists of columns material, process and cutting. The process is end milling and cutting operation is rough turning.   9

4. a) What are the different methods of work transport? Explain Walking Beam Method with sketch.   9
  b) Distinguish between the effectiveness of an automated flow line with and without buffer storage with necessary equations.   9

5. a) Briefly explain about MAP & TCP/IP network protocols.   9
  b) Describe with a neat diagram Siemens Model of CIM.   9

6. a) What is Lean Manufacturing? Explain the concept of 5S in Lean Manufacturing.   9
  b) What is Agile Manufacturing? Discuss the benefits of Agile Manufacturing.   9

7. a) What are the 3 M's of Lean Manufacturing?   9
  b) Define PDM. Discuss the features of PDM which helps in speedy product development.   9

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FACULTY OF ENGINEERING

M.E (Mech- HVAC) I-Semester (Main) (AICTE) Examination, July 2021

Subject : Air Conditioning

Time : 2 Hours   Max. Marks: 70

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any may suitably be assumed.
iv) Steam Tables & Refrigeration tables are permitted

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1. Answer any Four Questions from the following   (4 X 4 = 16Marks)

   a) Define specific humidity, relative humidity and dew point temperature?

   b) Write a short note on sling psychrometer with a neat sketch?

   c) What is air washer and represent it with schematic diagram?

   d) Explain ASHRAE summer and winter comfort zones?

   e) Distinguish between heat gain due to Infiltration and heat gain due to ventilation?

   f) Give your opinion on Summer, Winter and Year round air conditioning system selection?

   g) Compare temperature and effective temperature?

2. a) A quantity of air having a volume of 300 m^3 at 30ºC dry bulb temperature and 25ºC wet bulb temperature is heated to 40ºC dry bulb temperature. Estimate the amount of heat added, final relative humidity and wet bulb temperature. The air pressure is 1.01325 bar.   9

   b) Atmospheric air with dry bulb temperature of 28ºC and a wet bulb temperature of 17ºC is cooled to 15ºC without changing its moisture content. Find (i) Original relative humidity, (ii) Final relative humidity and (iii) Final wet bulb temperature.   9

3. a) The readings from a Sling psychrometer are as follows, dry bulb temperature 30ºC, wet bulb temperature 20ºC, barometric reading 740mm of Hg, Using steam tables, Evaluate dew point temperature, relative humidity and specific humidity.   9

   b) On a particular day, the atmospheric air was found to have a dry bulb temperature of 30ºC and a wet bulb temperature of 18ºC. The barometric pressure was observed to be 756 mm of Hg. Using the table of psychrometric properties of air, determine the relative humidity, the specific humidity and the dew point temperature.   9

4. a) What are the factors which affect comfort air conditioning?   9
   b) An air conditioning plant is required to supply 60 cubic meter of air per minute at
      a DBT of 21°C and 55% relative humidity. The outside air is at DBT of 28°C and
       60% RH. Determine the mass of water drained and capacity of the cooling coil.
      Assume the air conditioning plant first to dehumidify and then to cool the air.   9

5. a) Explain in detail about Unitary air conditioning system with diagram?   9
   b) A room has a sensible heat gain of 24KW and a latent heat gain of 5.2KW and it
      has to be maintained at 26°C DBT and 50% relative humidity. 180 m³/min of air is
      delivered to the room. Determine the state of supply air.   9

6. a) Derive an expression for Solar heat gain (Sensible) through outside walls and
      roofs?   9
   b) Explain the various industrial applications of air conditioning system?   9

7. a) What is the importance of quality and quantity of air?   9
   b) What are the factors affecting optimum effective temperature?   9

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FACULTY OF ENGINEERING

M.Tech (CSE-CSE) I-Semester (AICTE) (Main) Examination, July 2021

Subject : Advanced Data Structure:

Time : 2 Hours   Max. Marks: 70

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.

  ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.

  iii) Missing data, if any may suitably be assumed.

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1 Answer any Four Questions from the following   (4 X 4 = 16Marks)

  a) Define rehashing?

  b) What is meant by splay tree?

  c) Distinguish between region based k-D tree and point based k-D tree?

  d) What are Red Black Trees?

  e) List the text processing techniques?

  f) Define dictionaries?

  g) What is Priority Search Tree?

2. a) Detail out Collision Resolution Techniques in Hashing?   9

  b) Illustrate the Knuth-Morris-Pratt execution by a simple input string?   9

3. a) Define AVL Tree. Explain algorithm of Single Rotation with the help of suitable example?   9

  b) With suitable example, Illustrate the probability analysis of skip list?   9

4. a) Write the performance analysis of one dimensional range searching?   9

  b) Write the algorithm for pattern matching in a suffix trie?   9

5. a) Differentiate the Computational Geometry techniques?   9

  b) Explain Recent Trends in Hashing?   9

6. a) Explain the concept of Applying Dynamic Programming to the LCS Problem?   9

  b) Construct Binary search tree with the suitable examples?   9

7. a) Write the Huffman Coding Algorithm? Explain with suitable example?   9

  b) Implement the different types of Dictionaries in the data structures?   9

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FACULTY OF ENGINEERING
M.Tech. (CSE-CSE) I Semester (AICTE) (Main) Examination, July 2021

Subject: Advanced Algorithm

Time: 2 Hours   Max. Marks: 70

Note: i) First Question is compulsory and answer any Three questions from the remaining six questions.
ii) Answers to each question must be written at one place only and in the same order as they occur in the question paper.
iii) Missing data, if any may suitably be assumed.

1 **Answer any four questions from the following.**   **(4 x4 =16 Marks)**
   (a) Discuss Graphs?
   (b) What do you mean by Time and Space Complexity?
   (c) Explain augmenting paths in Graph Matching?
   (d) Discuss Shortest Paths by BFS?
   (e) Explain inverse of a Triangular Matrix?
   (f) Explain Discrete Fourier Transform [DFT]?
   (g) Write about various Searching Techniques?

2 (a) Explain about various Sorting Techniques?   [9]
   (b) Discuss shortest paths in Edge-weighted case by Dijkstra's method?   [9]

3 (a) Write an algorithm to compute maximum matching?   [9]
   (b) Explain Floyd-Warshall algorithm with suitable example?   [9]

4 (a) Discuss Interpolation problem?   [9]
   (b) Give examples of Dynamic Programming?   [9]

5 (a) Write about correctness proof of algorithms?   [9]
   (b) Explain about conversion of base-representation and modulo-representation?   [9]

6 (a) Explain Advanced Number Theoretic Algorithm?   [9]
   (b) Discuss recent trends in problem solving using Searching and Sorting techniques? [9]

7 (a) Write about Schonhage-Strassen Integer Multiplication algorithm?   [9]
   (b) Explain LUP-decomposition?   [9]

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