FACULTY OF ENIGNEERING
M.E. (Civil-SE) II-Semester (AICTE)(Makeup) Examination, March 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) 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 assume.

1 **Answer any four questions from the following:**   **(4x4=16 Marks)**

   a) The state of stress at a point in a structural member is given by
$$\sigma_x = 2x^2 + 4y^2 \quad \sigma_y = y^2 + 2z^2 \quad \sigma_z = 3z^2 + x^2$$
$$\tau_{xy} = y^2 + z \quad \tau_{xz} = 2z + 3x \quad \tau_{yz} = x + 4y$$
   Find the expressions of the body forces to ensure the equilibrium. Units of stresses are in MPa.

   b) The state of stress with reference to x, y, z axes is given by the tensor
$$\begin{bmatrix} 6 & 3 & 4 \\ 3 & 2 & 5 \\ 4 & 5 & 1 \end{bmatrix} MPa$$
   Find the octahedral normal stress, octahedral shear stress and deviatoric stress tensor.

   c) Show that the fourth order polynomial stress function
$$\varphi_4 = A_4 x^4 + B_4 x^3 y + C_4 x^2 y^2 + D_4 xy^3 + E_4 y^4$$
   will not satisfy the biharmonic equation ($\nabla^4 \varphi = 0$) unless $3A_4 + C_4 + 3E_4 = 0$

   d) Write the stress-strain relations for a plane stress problem in polar coordinates.

   e) Write the general differential equation for torsion in terms of finite differences.

2 a) The state of stress at a point in a loaded member with reference to x, y, z coordinates is given as
$$\begin{bmatrix} 50 & 80 & -40 \\ 80 & 100 & 40 \\ -40 & 40 & 20 \end{bmatrix} MPa$$

   Determine the stresses relative to the x', y' and z' coordinate system obtained by rotating the yz-plane through an angle 30° counter-clockwise about x-axis as shown in Figure 1.   [12]
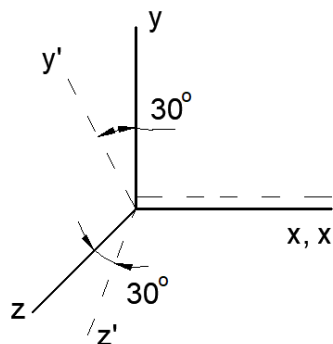

Figure 1

   b) Calculate the volumetric change in a concrete block of dimensions 150 mm x 120 mm x 100 mm subjected to uniform pressure p = 120 MPa acting on all faces. Use μ = 0.20 and E = 2.4 x 10^4 MPa.   [6]

3 a) The state of stress at a point in an element is given as
$$\begin{bmatrix} 1 & 2 & -1 \\ 2 & 0 & 3 \\ -1 & 3 & 1 \end{bmatrix} MPa$$
   Calculate the principal stresses and the direction of maximum principle stress. [10]
   b) Derive the expression for strain energy per unit volume. [8]

4 The stress function for a cantilever beam loaded by a point load P at the free end
   is given as:
   $$\varphi = \frac{A}{6}xy^3 + Bxy$$
   a) Evaluate the constants A and B. [6]
   b) Derive the expressions for the displacements u and v. [12]

5 a) Derive the relations for Airy's stress functions in polar coordinates. [6]
   b) A thin circular disk of outer radius 'b' and inner radius 'a' is given in Figure 2.
      The hole is expanded and a smooth rigid plug of radius (a + δ) is inserted.
      Determine the stresses in the disk, assuming the outer surface of the disk to
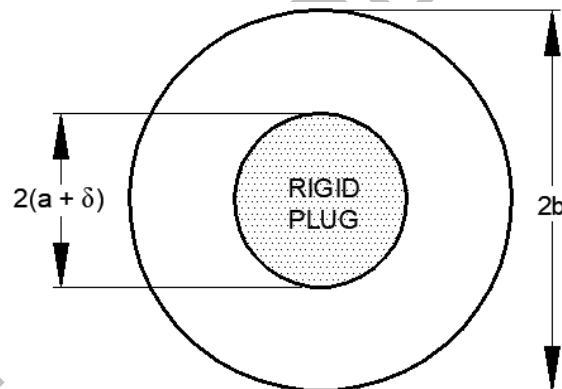   be stress free and considering plane strain condition. [12]

Figure 2

6 a) Using Finite Difference Method, determine the maximum shear stress for a solid
      torsion member subjected to a twisting moment T. The cross-section of the member
      has dimensions a x a. Use mesh dimension of $h = \frac{a}{4}$. [10]
   b) For the torsion of elliptical section, derive the expressions for the shear stress
      τ_{xz} and τ_{yz}. [8]

7 a) At a point in an elastic body, the principal strains ε_1, ε_2, ε_3 are in the ratio 5:4:3.
      The largest principal stress is $\sigma_1 = 180$ MPa. Find the ratio σ_1, σ_2, σ_3 and the
      values of σ_2 and σ_3. Assume Use $\upsilon = 0.30$ and E = 200 GPa. [12]
   b) Write short notes of uniqueness of solution in an elasticity problem. [6]

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FACULTY OF ENGINEERING

M.E(Civil – SE) II -Semester (AICTE) (Make-up) Examination, March 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**.

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1. Answer any Four question from the following   **(4 x 4 = 16 Marks)**

   a) Explain distributed parameter system and generalized displacements.

   b) State any 4 types of damping.

   c) Explain transmissibility and vibration isolation. Why they are required?

   d) What is spectral acceleration, response reduction factor?

   e) Explain the steps involved in mode super position method of MDOF systems.

2. A damped SDOF system is subjected to periodic loading as shown in figure. Derive the expression for displacement. Consider only the first three terms of Fourier series.   18
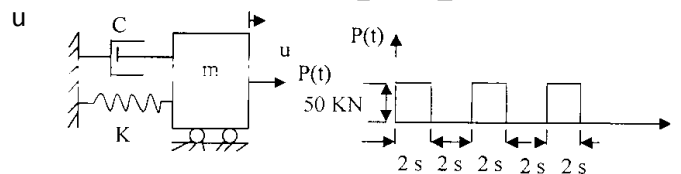
3. A damped 2 DOF system is shown in figure. Determine the damping matrix. The damping ratios corresponding to1st and 2nd frequencies are 0.04 and 0.03. Take m_1 = 3 x 10^5 KN-sec^2/m, m_2 = 1.5m_1 and K_1 = 2 x 10^6 KN/m, K_2 = 4 x 10^6 KN/m.   18
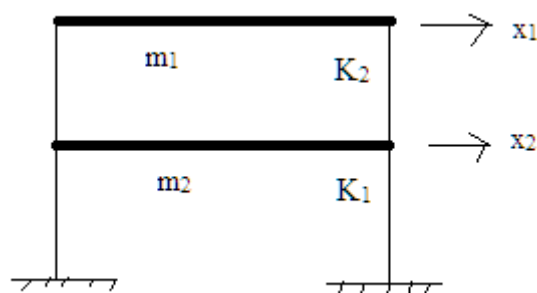
4. An undamped system is shown in figure. Determine the displacement matrix, if it is subjected to forcing functions of $P_1(t)$ = 30sin(30t), $P_2(t)$ = 45sin(45t). Take m_1 = 10^5 KN-sec^2/m, m_2 = 2 x 10^5 KN-sec^2/m and K_1 = 4 x 10^6 KN/m, K_2 = 2 x 10^6 KN/m.   18
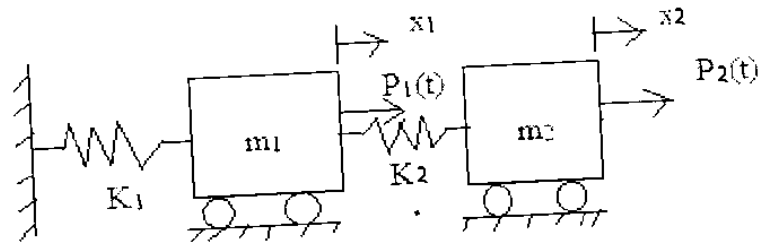
5. Determine the fundamental mode and fundamental frequency for the 2 DOF system shown in figure by Stodola method and verify by Holzer method. Take $m_2 = 3m_1 = 4.5 \times 10^5$ KN-sec^2/m and $K_1 = 3K_2 = 6 \times 10^5$ KN/m.   18
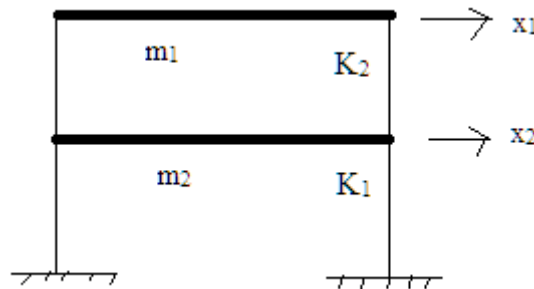
6. Derive the equation of motion for a 2 link mechanism shown in figure using Lagrange's variational approach of generalized displacements. The generalized displacements are q_1 and q_2.   18
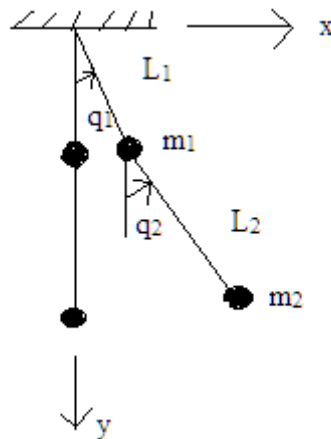
7. a) Derive the equation of motion for beam flexure corresponding to undamped free vibrations of a simply supported beam.   9
    b) Derive the Duhamel's expression for impulse load on a SDOF system.   9

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FACULTY OF ENIGNEERING

M.E. (Civil-TE) II-Semester (AICTE) (Makeup) Examination, March 2021

Subject: Design of Highway Infrastructure

Time : 2 Hours   Max. Marks: 70

Note: (i) First question is compulsory and 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 assume.

1 Answer any four questions from the following: (4x4=16 Marks)

   a) Explain any four characteristics of driver.
   b) What is design speed of a highway? Give standard design speed values for NH and SH.
   c) Write any four basic form of intersection with neat sketches.
   d) What is Skid number and Riding number?
   e) Summarize the guidelines for provision of cycle tracks.
   f) What are the functions and requirements of subway and foot over bridges?
   g) What are features of channelising island?

2 a) Describe the various design controls which influences the geometric design of Highway system.   [9]
   b) Explain the factors on which amount of camber to be provided depends specifying the recommended ranges of camber of different types of pavement surfaces.   [9]

3 a) Derive an expression for calculating the overtaking sight distance of two way traffic and two lane highways. Find the overtaking sight distance for a highway having design speed of 90kmph, Assume all the data suitably as per IRC.   [9]
   b) Explain the objective and need for providing transition curves.   [9]

4 a) Explain grade separated intersection, the advantages and limitations.   [9]
   b) Explain various design factors that are to be considered in rotary intersection design.   [9]

5 a) What are the general principle Of longitudinal pavement markings. Draw a figure showing centre line and lane Marking for six lane divided urban road.   [9]
   b) Explain the importance and guidelines for the provision of road signs.   [9]

6 a) Explain common methods of on street parking.   [9]
   b) With a neat sketch of busbays, Explain the guidelines for the location of bus stops.   [9]

7 a) What are deleneators? Briefly discuss different types of roadway deleneators which are used for enhancing road safety.   [9]
   b) What are the various types of traffic islands used, explain the uses of each. [9]

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FACULTY OF ENIGNEERING
M.E. (Civil-CEM) II-Semester (Makeup) (AICTE) Examination, March 2021

Subject: Construction Safety Management

Time : 2 Hours　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Note: (i) First question is compulsory and 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 assume.

1　**Answer any four questions from the following:**　　　　　　**(4x4=16 Marks)**

　　a)　Define construction safety.
　　b)　Safety management function.
　　c)　Safety administration.
　　d)　Accidents in construction
　　e)　First aid on site.
　　f)　Define Case based reasoning.
　　g)　Define systems safety analysis.

2　a)　Explain the function and importance of safety in the construction industry.　[9]
　　b)　List out the safety organizations in construction. Explain the roles and responsibilities of safety administrator in construction industry.　[9]

3　a)　List out the work related hazards in construction projects. Explain any ten construction hazards.　[9]
　　b)　Explain the causes prevention and investigation of an accident on construction site. [9]

4　a)　What are the basic guidelines for equipment safety? Explain the most common types of crane accidents in construction.　[9]
　　b)　What are the safety measures to be taken on working platforms at height? Explain the different types of Mobile Elevated Working Platforms (MEWPs).　[9]

5　a)　List out the laws related to construction industry. Explain any five important construction laws.　[9]
　　b)　What are the difference between an audit and an inspection? Explain the step by step process of safety audit.　[9]

6　a)　Explain the life cycle process system of Case Based Reasoning (CBR).　[9]
　　b)　What is fault tree analysis diagram? Explain the principle of fault tree analysis.　[9]

7　a)　Explain the design failure mode and effects analysis.　[9]
　　b)　What are the fire safety measures? Explain the different types of fire extinguishers. [9]

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FACULTY OF ENGINEERING

M.E. (EEE-P.E/PES) II-Semester (AICTE) (Make-up) Examination, March 2021

Subject : Machine Modeling and Analysis

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 question from the following**   **(4 x 4 = 16 Marks)**
   a) Draw the block diagram of electromechanical system and give the energy relation expressions

   b) Draw the basic two pole machine of three phase induction machine
   c) Draw the basic two pole machine representation of a synchronous machine with and without damper winding
   d) Explain the term 'invariance of power' as applied to electrical machines
   e) Explain about transfer function formulation in electrical machines

2. Develop the impedance matrix when transformation takes place from stationary d-q axes to stationary real axis reference frame   18

       7
3. Develop the connection matrix for dc shunt motor. Derive the transient and steady state equation for the same   18

4. Derive the transformations of stationary circuit variables to the arbitrary reference frame   18

5. Derive the voltage equations of two-pole three phase star connected salient pole synchronous machine in stationary reference frame. Derive the inductance matrices.   18

6. A basic 3-phase 2-pole synchronous machine of the salient pole type has the following inductances   18
   $La = 0.9+0.2\cos\theta$
   Mutual between phase A and field winding F, $Maf=8\cos\theta$.
   Mutual between phase B and phase C $Mbc= -0.4 +0.2\cos2\theta$
   Where θ is the angle measured from d-axis to the axis of phase A.
   a) Write the expressions for all the self and mutual inductances in terms of θ
   b) Determine L_d, L_q and L_o for salient type rotor synchronous machine
   c) Determine L_d, L_q and L_o for cylindrical type rotor synchronous

7 Derive the small displacement equations of an induction machine with flux linkages per second as state variable. Express the equations in fundamental form.   18

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FACULTY OF ENIGNEERING
M.E. (EEE-PE/PES)(AICTE) II-Semester (Makeup) Examination, March 2021

Subject: Power Electronics Applications to Renewable Energy

Time : 2 Hours   Max. Marks: 70

Note: (i) First question is compulsory and 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 assume.

1 **Answer any four questions from the following:**   (4x4=16 Marks)
   (a) Enumerate the list of storage systems.
   (b) Differentiate buck boost and Cuk converters.
   (c) With reference to frequency spectrum, list out the differences between unipolar and bipolar switching.
   (d) Comment on constant frequency wind generation systems.
   (e) Give the classification of DC microgrids with appropriate ranges.
   (f) Photo voltaic cell is considered as current source. Justify the statement.
   (g) Discuss about redundancy in Modular multi-level inverter.

2 (a) Explain P-V and I-V characteristics of Photo voltaic cell.   9
   (b) Write a detailed note on standalone operation of photo voltaic system.   9

3 (a) With neat circuit diagrams and wave forms, explain the operation of boost converter.   10
   (b) Explain the advantages of bi directional converters used in solar PV applications.   8

4 (a) Explain the working of HERIC invertor topology used in grid connected inverters.   11
   (b) What is islanding operation? List out the advantages of it.   7

5 (a) Draw and explain the general structure of variable speed wind energy conversion system for stand alone system.   10
   (b) Explain the pitch angle control adopted in variable speed wind turbines.   8

6 (a) Explain the role of back to back power electronic converters used in DFIG wind energy systems.   10
   (b) Discuss the merits and demerits of PMSG for wind energy conversion system.   8

7 (a) What is meant by Maximum Power Point Tracking? Discuss the method of incremental conductance method.   8
   (b) Explain the operation of multilevel neutral clamped Inverter.   10

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FACULTY OF ENIGNEERING
M.E. (ECE-DS) (AICTE) II-Semester (Makeup) Examination, March 2021

Subject: Digital Signal Processors

Time : 2 Hours   Max. Marks: 70

Note: (i) First question is compulsory and 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 assume.

1 **Answer any four questions from the following:**   (4x4=16 Marks)
   a) Compare FIR and IIR filters.
   b) What is a Compensating Filter?
   c) Draw & explain the MAC unit.
   d) List the On-Chip peripherals of TMS 320C54XX processor.
   e) List the features of McBSP.
   f) Explain Gibb's Phenomenon.

2 a) Design an ideal FIR High Pass filter with a frequency response given by
       $H_d(e^{jw}) = 1$, $\pi/4 \leq |w| \leq \pi$
       $= 0$, $|w| < \pi/4$ for N=11, using Hamming Window.   [12]
   b) Explain the Need for Multirate Signal Processing.   [6]

3 a) Explain In detail the various sources of errors in DSP implementation.   [9]
   b) Explain the format used for fixed point and floating point representation in digital signal processor.   [9]

4 a) Explain and draw the DSP Computational building blocks of the programmable DSP devices.   [12]
   b) Explain importance of "ON-Chip memory" in DSP devices.   [6]

5 a) Explain the Architecture of TMS320C54XX Processor with a neat diagram.   [12]
   b) Compare Fixed point DSP's with Floating point DSP's.   [6]

6 a) Explain the Direct Memory access (DMA) in detail.   [9]
   b) Explain CODEC interface circuit.   [9]

7 Write notes on the following:
   a) Warping Effects   [4]
   b) Compare Butterworth and Chebyshev filters   [5]
   c) Special Addressing Modes   [9]

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FACULTY OF ENIGNEERING
M.E. (ECE-ES, ES & VLSI) (AICTE) II-Semester (Makeup) Examination, March 2021

Subject: IOT Applications and Communication Protocols

Time : 2 Hours   Max. Marks: 70

Note: (i) First question is compulsory and 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 assume.

1 Answer any four questions from the following: (4x4=16 Marks)
   a) Draw the basic architecture of the sensor.
   b) What are the sensor communication protocols?
   c) What is the basic difference between LOS and NLOS?
   d) What is IoT and explain?
   e) What are the applications of Zwave?
   f) What is the need of Configuring the RF Modules?
   g) How can we utilize the Ayla Libellium platform?

2 a) Discuss in detail about sensor communication protocols.   [9]
   b) Discuss about various IoT enabling Technologies.   [9]

3 a) Write short notes on different Zigbee Chips.   [9]
   b) Describe the importance of Power Consumption, Reliability, LoS and QoS in
      wireless Protocols.   [9]

4 a) Discuss the various Sensors, RF Modules, preferable Network topology required for
      home automation system.   [9]
   b) An industry site is located 3kms away from the office at NLOS location. The Manager
      wants to transmit the temperature data from industry site to office. Describe a
      systematic solution using simple XBees as communication module and other
      components of your choice.   [9]

5 a) Discuss in detail about the differences between FPGA and ASIC design.   [9]
   b) Explain in detail about multi-layer PCB design.   [9]

6 a) Discuss about protocol stack of Mobile app platform for IoT enabled system.   [9]
   b) Write in detail about Axeda and Xively Platforms.   [9]

7 a) Discuss about the Energy optimization in home.   [9]
   b) Explain in detail about the Cloud based IoT platforms.   [9]

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FACULTY OF ENGINEERING

M.E (ECE-ES & VLSI, ES&VLSI D) II-Semester (AICTE) (Make-up)

Examination, March 2021

Subject : Analog and Mixed signal 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 suitably be assumed.

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1. Answer any Four question from the following   (4 x 4 = 16 Marks)

   a) Draw the small signal model of MOS Transistor

   b) Define Gain Margin and Phase margin

   c) What are charge injection errors? Explain

   d) Define quantization noise?

   e) Explain the advantages of Oversampling ADCs over Nyquist rate ADCs

   f) What is the purpose of using CMFB circuit in OPAMPs.

2. a) Obtain the expression for voltage gain of CS Amplifier with source degenerated current mirror.   10
    b) Explain about widlar current source   8

3. a) Explain the operation of folded casode OPAMP with neat diagram and relevant expressions   10
    b) Also derive the expression for its voltage gain   8

4. a) Explain the operation of Track and Latch comparator with neat diagram   12
    b) Also derive the expression for its Latch time constant   6

5. a) Explain the operation of parasitic insensitive integrator with neat diagram and obtain the expression for transfer function.   10
    b) Also explain how the above integrator is parasitic insensitive   8

6. a) Explain the operation of a sample and hold circuit which eliminates charge injection errors.   8
    b) Draw the circuit diagram of thermo meter code D/A converter and explain its operation   10

7. a) Explain the operation of 3-bit pipeline ADC with an example.   9
    b) Derive the expression for SNR max of First order noise shaped sigma delta modulator.   9

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FACULTY OF ENGINEERING

M.E (Mech CAD/CAM) II – Semester (AICTE) (Make-up) Examination, March 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 question from the following**   **(4 x 4 = 16 Marks)**
   a) State the principle of virtual work

   b) Differentiate between Essential boundary condition and natural boundary condition

   c) Define Bandwidth?

   d) What do you mean by Aspect Ratio?

   e) Define Shape Function?

   f) Write a short note on Galerkin's method?

   g) Define general finite elemental equation?

   h) What is the difference between weak formulation vs strong formulation?

2 a) Compute the element matrix and vectors for the element shown in the **Figure- 2a** when the
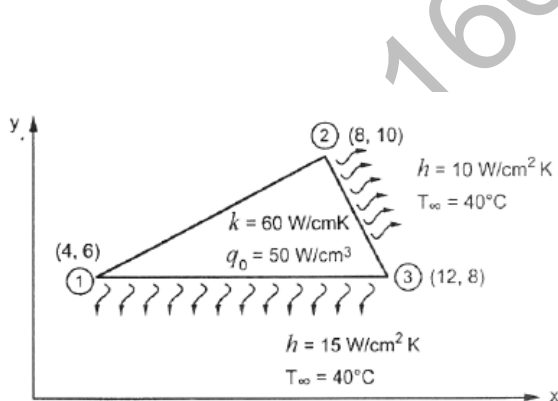   edges 2-3 and 3-1 experience heat loss.   9
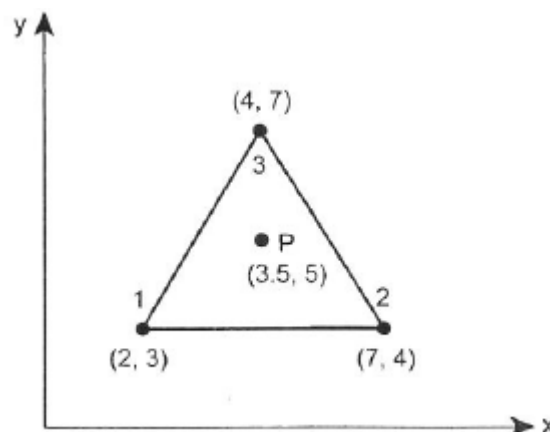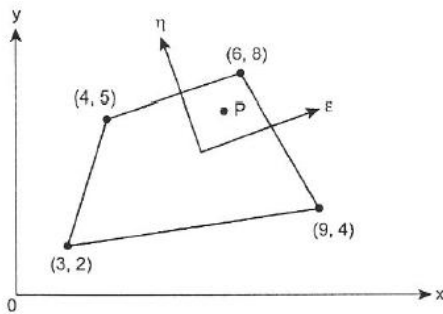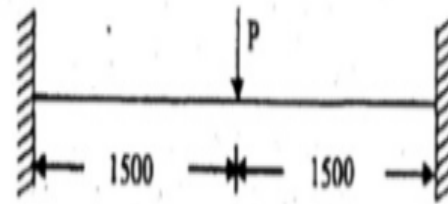

fig 2 a   fig 2 b

..2

b) Calculate the nodal displacements and forces if the element stiffness of the truss is 10 kN/mm Determine the shape functions N1, N2 and N3 at the interior point P for the triangular element shown in the **Figure-2b**.　　9

3 a) Evaluate the Cartesian coordinate of the point Pwhich has local coordinates $\varepsilon=0.6$ and $\eta=0.8$ as shown in **Figure - 3a**.　　9


3.(a)　　　　　　　　　　　**3 .(b)**

b) A concentrated load P = 50 kN is applied at the centre of a fixed beam of length 3 m, depth 200 mm an width 120 mm. Calculate the deflection at midspan by using Rayleigh –Ritz method and compare with exact solution see **Figure – 3b.**　　9

4 a) The loading and other parameters for a two bar truss elements is shown in **Figure- 4a** Determine (i) the element stiffness matrix for each element
(ii) global stiffness matrix (c) nodal displacement. Assume E = 200 GPa　　9
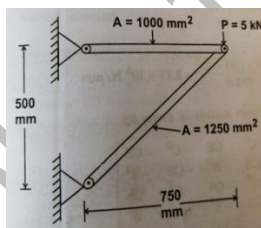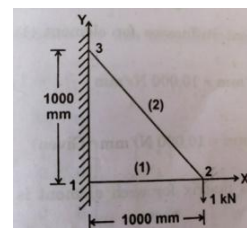
4.(a)　　　　　　　　　　　**4.(b)**

b) Truss structure is subjected to a load of 1kN as shown in **figure-4b.** Calculate the nodal displacements and forces if the element stiffness of the truss is 10kN/ m　　9

..3

5 a) Evaluate natural frequencies for the stepped bar shown fig 5 a in axial vibration take E=200 GPa and Density = 7850 $\frac{kg}{m^3}$. b) Draw mode shapes and determine Eigen vector .Take $A_1 = 400mm^2$ and $A_2 = 200mm^2$. **Figure - 5a**   9
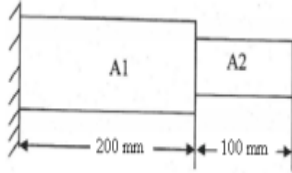

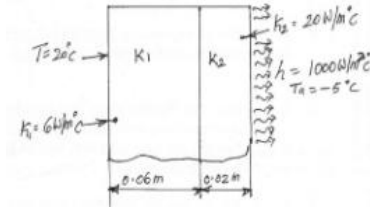**fig 5 a**   **fig 5 b**

b) Determine the temperature distribution through the composite wall subjected to convection heat loss on the right side surface with convection heat transfer coefficient as shown in Fig. The T_a = -5 °C , T= 20 °C , K_1 = 64 W/m °C, K_2 = 64 W/m °C, h = 1000 W/m^2 °C, t_1=.06 m, t_2=.02 m . **Figure - 5b**   9

6 a) An axial load P=300X10³N is applied at 20⁰ C to the rod as shown in **Figure - 6a** below. The temperature is the raised to 60⁰ C .
i. Assemble the K and F matrices.
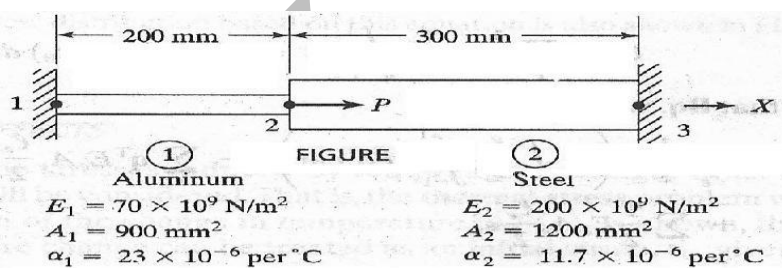ii. Determine the nodal displacements and stresses.   9

Figure – 6a

b) For the beam shown in Figure below, determine the following:Slopes at nodes 2 and 3.Vertical deflection at the mid-point of the distributed load. Consider all the elements have E=200GPa, I=5X10⁶ mm⁴. See **Figure – 6b**   9
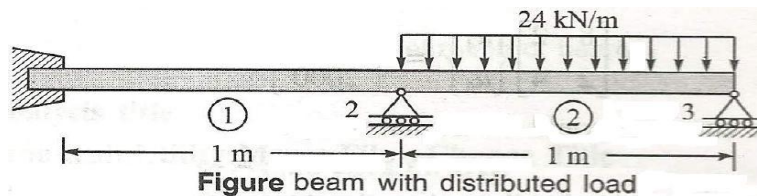

Figure-6b

..4

7 a) A beam fixed at one end and supported by a roller at the end, has a 20KN concentrated load applied at the centre of the span, as shown in fig. calculate the deflection under the load and construct shear force and bending moment diagram for the beam. Take E = 20 x 10^6 N/c,[2,] I=2500 cm^4. See **Figure- 7a**   9
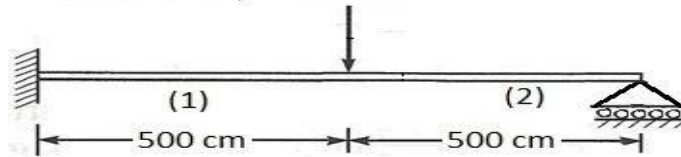
Figure -7a

b) A four node quadrilateral element is shown in **Figure -7b** the co-ordinates of each node are given in cm. The element displacement vector is given as [q]=[0 0 0.2 0 0.15 0.10 0 0.05] cm. find (i) the x, y co-ordinates of a point P whose location at ξ =0.5,$\acute{\eta}$=0.5 (ii) the displacement of point P(u,v) (iii)the jacobian at P Evaluate the Integral I= $\int_{-}^{1}$ (3ξ^2+ξ^3) dξ using Gaussian quadrature method.   9

Figure - 7b

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FACULTY OF ENGINEERING

M.E. (Mech-CAD/CAM) II-Semester (AICTE) (Make-up) Examination, March 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.
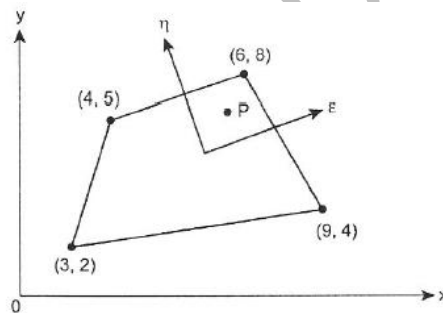iii) Missing data, if any may suitably be assumed.

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1. **Answer any Four question from the following**   (4 x 4 = 16 Marks)
   a) Classify different types of manufacturing

   b) What are the benefits of CIM?

   c) What are the various database models?

   d) Mention the advantages of PDM.

   e) What is an automated production line?

   f) What is network topology?

   g) Define the terms Lean, Agile, and Web-based manufacturing

   h) What is the relation between waste and profit?

2. a) With a neat diagram, explain the CIM wheel   9
   b) What is a concurrent engineering? Explain its role in reducing product development time.   9
       7

3. a) What are different types of database models? Explain RDBMS with an example   9
   b) Illustrate creation and manipulation of a Manufacturing Database.   9

4. a) Explain different methods of work part transfer mechanism.   9
   b) What are the control functions of a production line?   9

5. a) With a neat diagram explain the working of Siemens, ESPRIT-OSA, and IBM concepts of CIM.   9
   b) Discuss various hardware elements of CIM   9

6. a) Discuss about four functions of Lean Manufacturing, Mention the benefits of Lean manufacturing   9
   b) What is Agile manufacturing? Mention the characteristics of Agile manufacturing, explain how it is different from Lean manufacturing   9

7 a) What is SQL? Give an example of the use of SQL to access a manufacturing database.   9
   b) Differentiate between sequential and concurrent engineering   9

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FACULTY OF ENIGNEERING

M.E. (Mech-HVAC) (AICTE) II-Semester (Makeup) Examination, March 2021

Subject: HVAC Systems Design

Time : 2 Hours   Max. Marks: 70

Note: (i) First question is compulsory and 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 assume.

1 **Answer any four questions from the following:**   **(4x4=16 Marks)**

   a) Explain Decrement factor.
   b) List various heat losses from building space.
   c) What is the difference between grills and registers?
   d) What are the different types of Ventilation systems?
   e) What are Primary and Secondary water loops?

2 a) Explain how a closed space gains heat through glass.   [9]
   b) Estimate the thermal resistance of a brick of a wall of length 5m, height 4 m and thickness 0.25m , if the temperature of wall surfaces are maintained at 110° C and 40° C respectively. Take k for brick wall is equal to 0.70 W/m K. [9]

3 a) Explain various components in calculating winter heating load.   [9]
   b) Explain the methods for estimating energy requirements for heating.   [9]

4 a) Mention the types of Fans. Explain with sketches.   [9]
   b) Discuss the methods for determining duct size.   [9]

5 a) Discuss about the space heating systems.   [9]
   b) Explain direct contact heat and mass transfer in HVAC systems.   [9]

6 a) Explain Constant air volume and Variable air volume systems.   [9]
   b) Discuss methods for vibration isolation.   [9]

7 a) Define Infiltration, stack effect and wind effect.   [9]
   b) Explain in detail different types of air filters used in HVAC systems.   [9]

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FACULTY OF ENGINEERING

M.Tech (CSE-CSE) II-Semester (AICTE) (Make-up) Examination, March 2021

Subject : Artificial Intelligence

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 question from the following**   **(4 x 4 = 16 Marks)**

   a) Discuss the problems of Hill climbing?

      3

   b) Show that S=$\{\sim (A \vee B), (B \to C), (A \vee C)\}$ is consistent using the tableau method.

   c) Define Measure of Belief and Measure of Disbelief

   d) State and Prove Bayes theorem

   e) Draw the architecture of neuron with 'm' inputs and one output

   f) Generate parse tree for the following sentence: The girl saw a man in the park with a cat.

2. a) Explain the A* algorithm with an example. When A* is admissible?   10

   b) Solve the following crypt arithmetic puzzle:
      BASE + BALL = GAMES
      Write constraint equations and find one solution using DFS. Show the steps involved in finding solution   8

3. a) Consider the following set of sentences   12
      1) Paul likes all kinds of food
      2) Apples are food
      3) Anything anyone eats and is not killed by is food
      4) James eats peanuts and is alive
      5) Sue eats everything that James eats.
      (i) Convert the sentences into clausal form of predicate logic
      (ii) Prove that Pual likes peanuts using Resolution refutation method.

   b) Draw a semantic network representing the following knowledge: 6
      Every human and animals are living things who can breathe and eat. Every man and women are human. James is a man. All animals have skin and can move. A giraffe is an animal and has long legs and is tall.

4. a) Explain the various phases in building an Expert system.   9
   b) Explain Bayesian Belief Network with an example.   9

5. a) What are decision trees? Using a suitable example, illustrate the construction
   of a decision tree 9
   b) Explain about the supervised and Unsupervised learning methods. 9

6. a) Explain different types of parsers in detail. 9
   b) Write about the Dempster- shafer theory 9

7. Explain the following
   a) Alpha Beta pruning 6

   b) Recurrent Networks 6

   c) Truth Maintenance System 6

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FACULTY OF ENIGNEERING
M.Tech. (CSE-CSE) II-Semester (AICTE) (Makeup) Examination, March 2021

Subject: Advanced Data Structures

Time : 2 Hours   Max. Marks: 70

Note: (i) First question is compulsory and 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 assume.

1 **Answer any four questions from the following:**   **(4x4=16 Marks)**

  a) Define rehashing.
  b) What is matrix chain product in dynamic programming?
  c) What is meant by splay tree?
  d) Define Deterministic Skip Lists.
  e) Distinguish between region based k-d tree and point based k-d tree.
  f) What is Binary Search Tree?

2 a) Define linear probing. With suitable example explain insertion and find
     operation in linear probing.   [12]
   b) Detail out Collision Resolution Techniques in Hashing.   [06]

3 a) Write the algorithm of Kunth Morris Pratt.   [10]
   b) Illustrate the Kunth Morris Pratt execution by a simple input string.   [08]

4 a) Define AVL Tree. Explain algorithm of Single Rotation with the help of
     suitable example.   [09]
   b) Define Red Black Tree. Explain Top Down insertion algorithm in Red Black
     Tree with the help of suitable example.   [09]

5 a) With suitable example, illustrate the probability analysis of skip list.   [12]
   b) Write the needs for Randomizing Data Structures and Algorithms.   [06]

6 a) Write the algorithm for one dimensional range searching.   [10]
   b) Write the performance analysis of one dimensional range searching.   [08]

7 a) Write the algorithm for pattern matching in a suffix trie.   [10]
   b) Explain suffix trie with a suitable example.   [08]

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