AR16

Code No: 16MTE1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018

ADVANCED HEAT AND MASS TRANSFER
(Thermal Engineering)

Time : 3 Hours **Max Marks: 60**

Answer any FIVE questions
All questions carry equal Marks

NOTE: HEAT AND MASS TRANSFER DATA BOOK – BY CP KODANDARAMAN

MUST BE SUPPLIED IN THE EXAMINATION HALL.

1. (a) Briefly discuss about Initial and Boundary conditions used in solving Heat transfer problems. [4M]

   (b) Derive three dimensional conduction equation in Cylindrical coordinate system. [8M]

2. A short iron cylinder (k = 60 W/(m ^{0}C), $\alpha = 1.6 \times 10^{-5}$ m^2/s) of diameter D = 5 cm and height H = 4 cm is initially at a uniform temperature T_i = 225 ^{0}C. Suddenly the boundary surfaces are exposed to an ambient at T_∞ = 25 ^{0}C with a heat transfer coefficient h = 500 W/(m^2-^{0}C). Calculate the centre temperature T_0 at t = 2 min after the start of cooling. Use product solution concept. [12M]

3. (a) Consider the steady state heat conduction in a slab of thickness L, in which energy is generated at a constant rate of q W/m^3. The boundary surface at x = 0 is maintained at a constant temperature T_0, while the boundary surface at x = L dissipates heat by convection with a heat transfer coefficient h into an ambient at temperature T_∞. Dividing the region into 5 equal sub regions, write the finite difference formulation of this heat conduction problem. [8M]

   (b) A hot water pipe with diameter D = 10 cm and L = 8 m long is buried horizontally in the earth (k= 0.9 W/(m-^{0}C) at a depth z = 0.6m from the surface. The pipe is at a uniform temperature T_1= 80^0 C and the earth surface is at T_2 = 10^0 C. Calculate the heat loss from the pipe. [4M]

4. (a) Write a short note on how you are using Explicit and Implicit methods to solve transient heat conduction problems. [6M]

   (b) Distinguish between Forced and Natural convections and show by means of dimensional analysis Nu = f(Re, Pr) for forced convection. [6M]

5. Air at 20 ^{0}C and at a pressure of 1 bar is flowing over a flat plate at a velocity of 3 m/s. If the plate is 280 mm wide and at 56 ^{0}C Calculate the following quantities at x = 280 mm given that properties of air at the bulk mean temperature of 38 ^{0}C are $\rho = 1.134$ kg/m^3; k = 0.02732 W/(m ^{0}C); C_p = 1.005 kJ/kg K; ν = 16.768 x 10^{-6} m^2/s; Pr = 0.7 [12M]
(i) Boundary layer thickness (ii) Local friction coefficient (iii) Average friction coefficient (iv) Shearing stress due to friction (v) Thickness of thermal boundary layer (vi) Local convective heat transfer coefficient (vii) Average convective heat transfer coefficient (viii) Rate of heat transfer by convection (ix) Total drag force on the plate and (x) Total mass flow rate through the boundary.

6. (a) Briefly explain the significance of the following dimensionless numbers used in convection heat transfer (i) Grashoff number (ii) Nusselt number (ii) Prandtl number [6M]

(b) The human body considered as a cylinder of 300 mm diameter and 1.6m height is maintained at a constant temperature of 36.5 ^{0}C. The surrounding temperature is 13.5 ^{0}C. Find out the amount of heat to be generated by the body per hour if $\rho = 1.025$ kg/m^3; k = 0.0892 kJ/(m hr ^{0}C); C_p = 0.96kJ/kg ^{0}C; ν = 15.06 x 10^{-6} m^2/s; $\beta = \frac{1}{298}\ k^{-1}$. Assume Nu = 0.12 (Gr. Pr)$^{1/3}$ (The symbols have their usual meaning) [6M]

7. (a) Draw the Pool boiling curve with different flow regimes and briefly discuss about them. [6M]

(b) State the assumptions made in the Nusselt's theory of film condensation. [6M]

8. (a) Two black square plates of size 1.0 m by 1.0 m are placed to each other at the distance of 0.4 m. One plate is maintained at a temperature of 900 ^{0}C and the other at 400 ^{0}C. Find the net exchange of energy due to radiation between the two plates. [6M]

(b) Briefly explain the following terms related to mass transfer (i) molar concentration (ii) mole fraction (iii) mass diffusion velocity [6M]

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Code No: 16MPE1003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018

POWER ELECTRONICS CONTROL OF DC DRIVES

(Power Electronics and Drives)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Deduce the transfer functions $\omega_m(s)/V(s)$ and $\omega_m(s)/T_l(s)$ from fundamentals for a separately excited DC Motor? [6M]
   (b) A separately-excited dc motor with parameters: R_a=0.5Ω, L_a=0.003H, and K_b=0.8V/rad/sec, is driving a load of J=0.0167kg-m^2, B_l=0.01 Nm/rad/sec with a load torque of 100N-m. Its armature is connected to dc supply voltage of 220V and is given the rated field current. Find the speed of the motor. [6M]

2. (a) Explain the effect of source inductance on the operation of a single phase controlled rectifier in steady state when connected with RL type load with neat diagrams and hence derive the expression for overlap angle μ. [6M]
   (b) Explain how power factor can be improved by using a 1-Φ semi-converter over a 1-Φ full- converter? [6M]

3. (a) Explain the implementation of control circuit for a three phase thyristor converter. [6M]
   (b) Explain the operation of three phase semi converter when connected to a separately excited DC motor for continuous mode of operation. [6M]

4. Draw and explain about the control schematic of a two quadrant converter-controlled separately-excited DC motor drive. [12M]

5. Draw the overall block diagram of a dc motor drive with speed controller and current controller and explain the steps for the design of current and speed controllers. [12M]

6. What is the principle of operation of a chopper and Explain the operation of a chopper for the first, second, third and fourth quadrant operations with all relevant diagrams? [12M]

7. (a) Explain about model of the chopper, input to the chopper and rating of the devices? [6M]
   (b) Explain about steady state analysis of chopper controlled DC motor drive for discontinuos current conduction? [6M]

8. (a) Draw the speed controlled DC motor drive block diagram and explain the operation of pulse width modulated current controller? [6M]
   (b) Explain about the modelling of current controllers ? [6M]

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CODE: 16MCS1003 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018

COMPUTER NETWORKS
(Computer Science & Engineering)

Time: 3 Hours Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	Explain the OSI reference model in detail	6M
	(b)	What is ARPANET? Explain in detail.	6M
2.	(a)	Explain the guided and unguided physical media	5M
	(b)	What is ISDN? What are the types of ISDN, explain	7M
3.	(a)	Explain the different design issues of data link layer	6M
	(b)	Explain the elementary stop and wait protocol.	6M
4.	(a)	Explain about CSMA and different protocols used in it	6M
	(b)	What is a bridge, what are the different types of bridges? Explain	6M
5.	(a)	Explain shortest path algorithm with an example	7M
	(b)	Explain about broadcast and multicast routing in detail	5M
6.	(a)	Explain about ATM AAL layer protocol.	6M
	(b)	Explain the function of network layer in ATM networks	6M
7.	(a)	Explain about DNS in detail	6M
	(b)	What is SNMP? Explain in detail	6M
8.	(a)	Describe the three way handshaking of TCP connection with a neat diagrams.	6M
	(b)	Describe routing for mobile Hosts	6M

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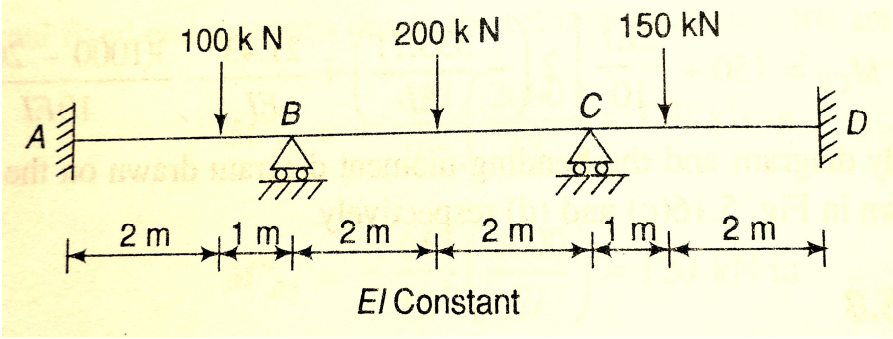
ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. I Semester Regular & Supplementary Examinations, December-2018

MATRIX ANALYSIS OF STRUCTURES
(Structural Engineering)

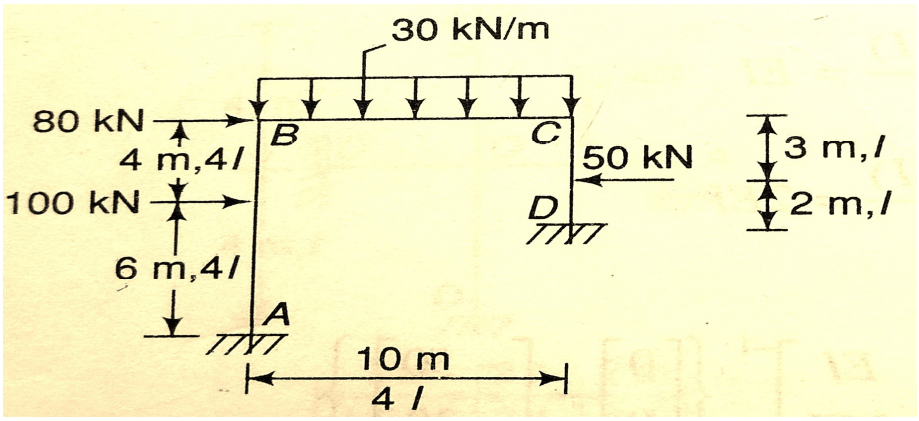
Time: 3 Hours Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

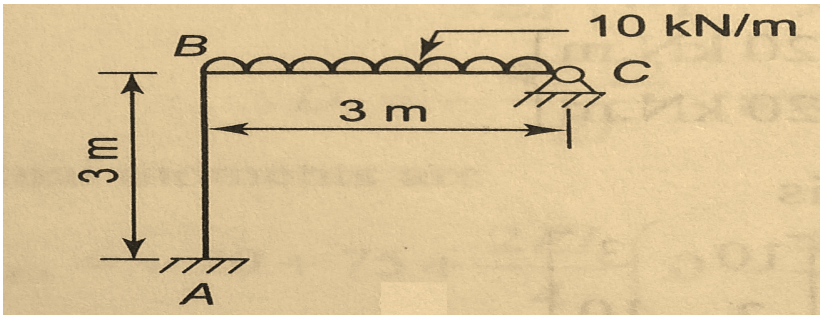
1. (a) Differentiate between static indeterminacy and kinematic indeterminacy with examples 5M
   (b) Write the step wise procedure for flexibility method 7M
2. Analyse the three span continuous beam shown in fig by stiffness method. 12M



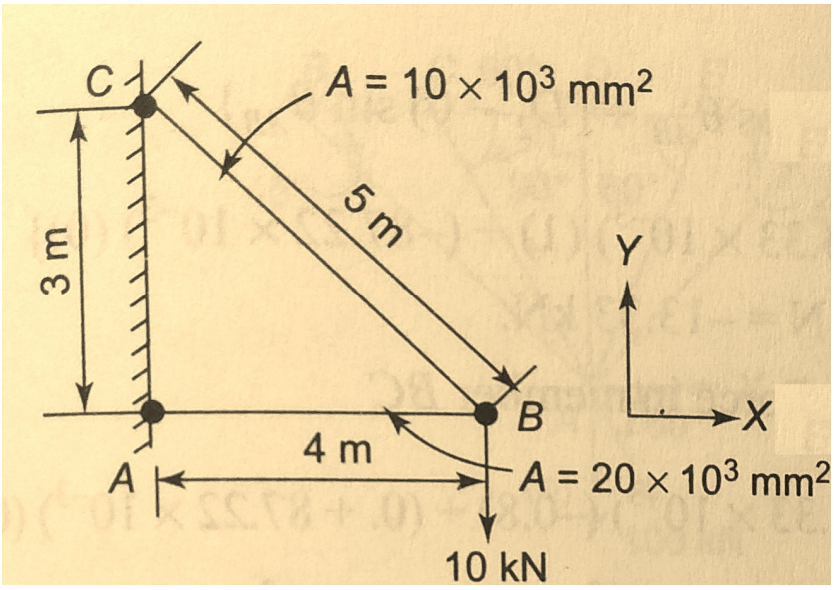
3. Analyse the frame shown in fig by stiffness method. 12M



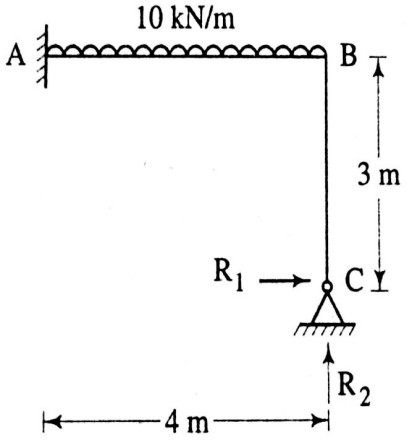
4. Analyse and draw B.M.D for portal frame as shown in fig by using stiffness method. EI is constant. 12M



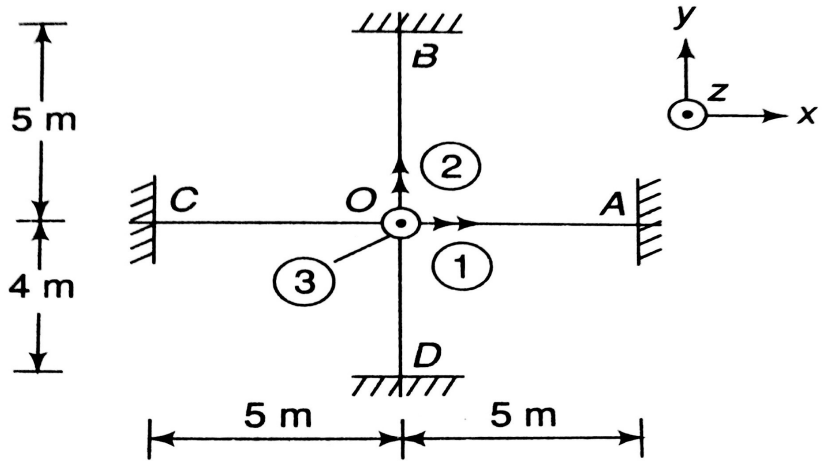
5. Analyse a truss shown in fig using stiffness method. 12M



6. Analyse the frame by using flexibility method. 12M



7. Determine the degree of freedom of the grid shown in fig. Hence select a suitable system of coordinates and develop the stiffness matrix. The mebers are 300 mm in width and 600 mm in depth. Take E = 12 kN/mm^2 and G = 5 kN/mm^2. 12M



8. (a) Explain the necessity of using shear wall in multi storied structures 6M
   (b) Describe briefly about the behavior of large frames with and without shear walls 6M