AR20

CODE: 20CEE311 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Regular Examinations, January, 2023

ADVANCED STRUCTURAL ANALYSIS

(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

		Marks	CO	Blooms Level
	UNIT-I			
1.	A continuous beam shown in fig.1. Take E = 2 x 10^5 N/ mm^2, I = 2 x10^9 mm^4. Analysis the beam by slope deflection method. Draw the bending moment diagram.	10 M	1	4

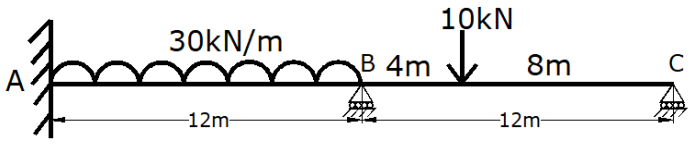


Fig. 1

(OR)

2.	Analysis the frame shown in fig. 2 by slope deflection method. Draw the bending moment diagram.	10 M	1	4

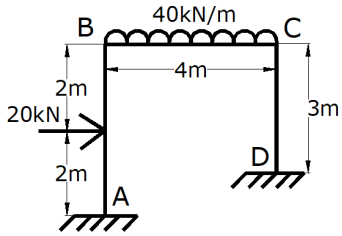


Fig. 2

UNIT-II

3.	Analysis the continuous beam shown in fig. 3 by moment distribution method. Draw the bending moment diagram.	10 M	2	4

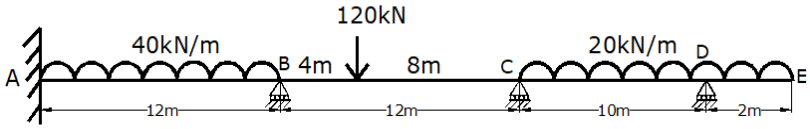


Fig.3

(OR)

4. Analysis the frame shown in fig. 4 by moment distribution method. Draw the bending moment diagram. 10 M 2 4

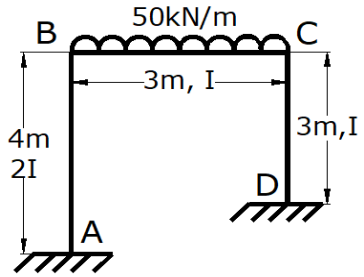


Fig.4

UNIT-III

5. Analysis the continuous beam shown in fig. 5 by Kani's method. Draw the bending moment diagram. 10 M 3 4

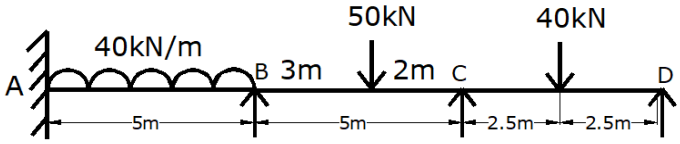


Fig.5

(OR)

6. Analysis the portal frame shown in fig. 6 by Kani's method. Draw the bending moment diagram. 10 M 3 4

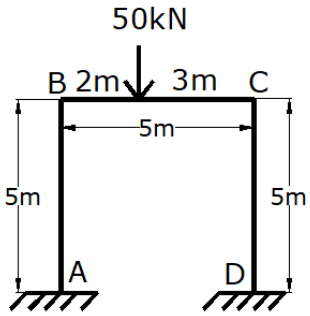


Fig. 6

UNIT-IV

7. Analysis the continuous beam shown in fig. 7 by stiffness matrix method. Draw the bending moment diagram. 10 M 4 4

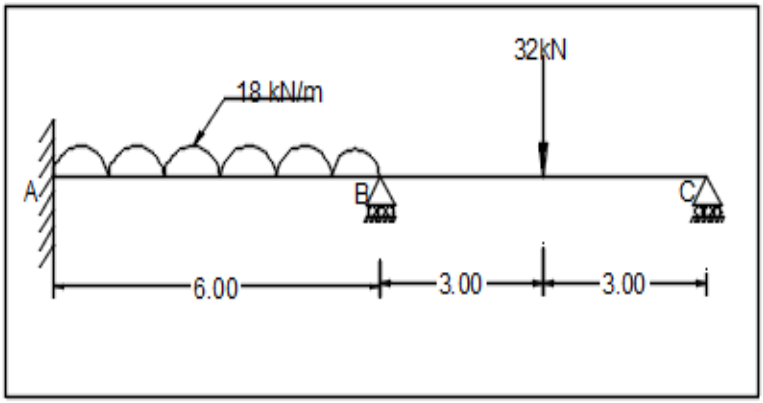


Fig.7

(OR)

8. Analysis the frame shown in fig. 8 by stiffness matrix method . Draw the bending moment diagram. 10 M 4 4

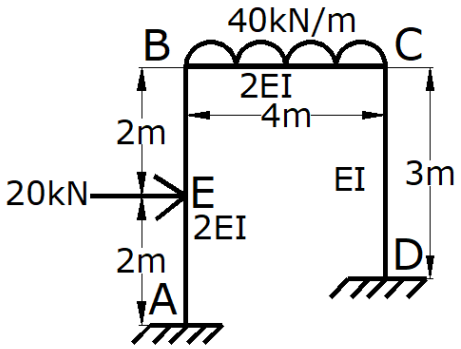
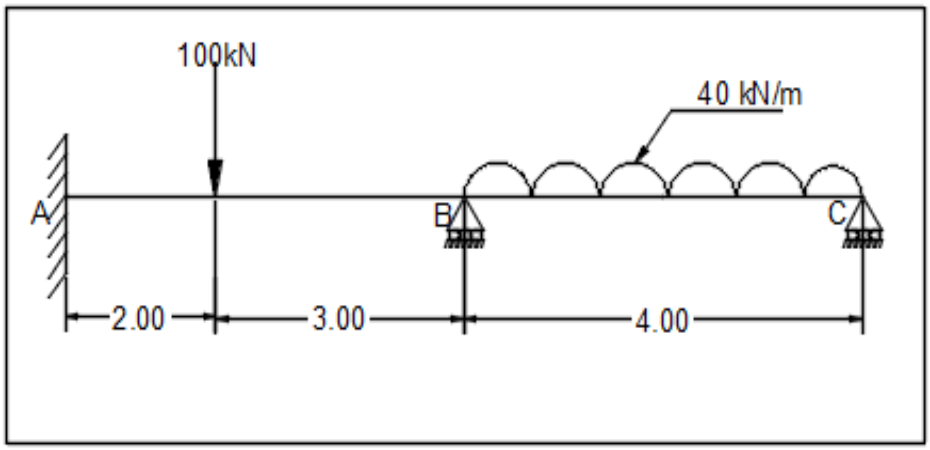


Fig.8

UNIT-V

9. Analysis the beam shown in fig. 9 by flexibility matrix method . Draw the bending moment diagram EI is constant. 10 M 5 4



(OR)

10. Analysis the beam shown in fig. 10 by flexibility matrix method . Draw the bending moment diagram. 10 M 5 4

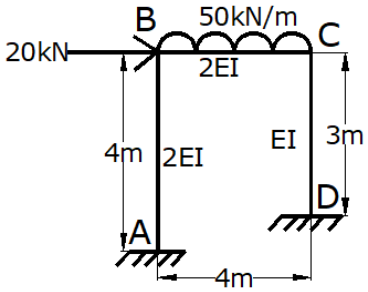


Fig.10

UNIT-VI

11. a) Define shape factor. Find the shape factor for rectangular section. 4M 6 1

b)	Determine the collapse load for the beam shown in fig. 11	6M	6	3

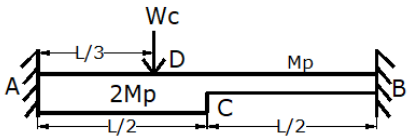
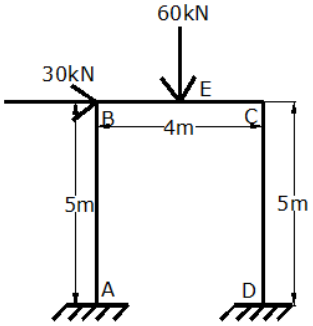


Fig. 11

(OR)

12.	Determine plastic moment capacity of the section required the frame shown in fig. 12. The loads shown in fig are working loads. Take the load factor is 1.75. Assume same same plastic moment capacity for all the members.	10M	6	3



AR20

CODE: 20EEE313 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
III B.Tech I Semester Regular Examinations, January-2023
SWITCHING THEORY AND LOGIC DESIGN
(Electrical and Electronics Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Convert the following: (i) $(4057.06)_8 = (\ )_{10}$ (ii) $(B9F.AE)_{16} = (\ )_8$	5 M	1	L3
	b)	Explain about Self-complementing codes with example and express the decimal numbers 0-5 any of the self-complementing code.	5 M	1	L3
		(OR)			
2.	a)	Perform the following operations using 8-bit 2's complement (i) Add -75 to +26 (ii) Subtract 14 from 46	5 M	1	L3
	b)	Convert the following into Gray number: (i) $(3A7)_{16}$ (ii) $(527)_8$	5 M	1	L3
		UNIT-II			
3.	a)	Construct Ex-OR gate and Ex-NOR gates using NAND gates only.	5 M	2	L3
	b)	Solve the following function using K-map and obtain the minimal expression in POS form. F= $\sum$ m (5,6,7,8,9,12,13,14)	5 M	2	L3
		(OR)			
4.	a)	Simplify the following expression using Boolean theorems and implement with AOI Gate circuit. F= AB' +ABD+ABD' +A'C'D' +A'BC'	5 M	2	L3
	b)	Evaluate the Complement and Dual of the given function and reduce it to a minimum number of literals in each case F= [(AB)'A][(AB)'B]	5 M	2	L4
		UNIT-III			
5.	a)	Design a 4-bit binary adder circuit using full adders and explain its operation.	5 M	3	L4
	b)	Realize a full subtractor using two half subtractors.	5 M	3	L4
		(OR)			
6.	a)	Explain the operation of a Half-Adder with necessary logic diagram.	5 M	3	L2
	b)	Design a BCD adder circuit and explain its operation.	5 M	3	L4
		UNIT-IV			
7.	a)	What is multiplexer? Construct 4x1 multiplexer with logic gates and truth table.	5 M	4	L4
	b)	Construct LED 7 segment display decoder circuit.	5 M	4	L3
		(OR)			
8.	a)	What is an Encoder? Design an Octal to Binary Encoder with necessary truth table.	5 M	4	L3
	b)	Design a 1-line to 8-line Demultiplexer circuit and explain its operation with necessary truth table.	5 M	4	L3
		UNIT-V			
9.	a)	What is race around condition? How it can be minimized in J-K flip-flop?	5 M	5	L3
	b)	Convert T-flip-flop to a SR flip-flop.	5 M	5	L3
		(OR)			
10.	a)	Obtain the characteristic equation for D Flip flop and T Flip Flop	4 M	5	L3
	b)	Draw the logic diagram of SR- Flip Flop and explain its operation with timing diagram.	6 M	5	L3
		UNIT-VI			
11.	a)	Design a 3-bit Synchronous Up -counter.	5 M	6	L4
	b)	Explain about 4-bit Parallel In and Serial Out shift register.	5 M	6	L3
		(OR)			
12.	a)	Explain the operation of 4-bit ring counter with circuit diagram and timing diagrams.	5 M	6	L3
	b)	Explain the operation of Universal Shift Register.	5 M	6	L3

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CODE: 20MEE311 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Regular Examinations, January, 2023

CAD/CAM

(Mechanical Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

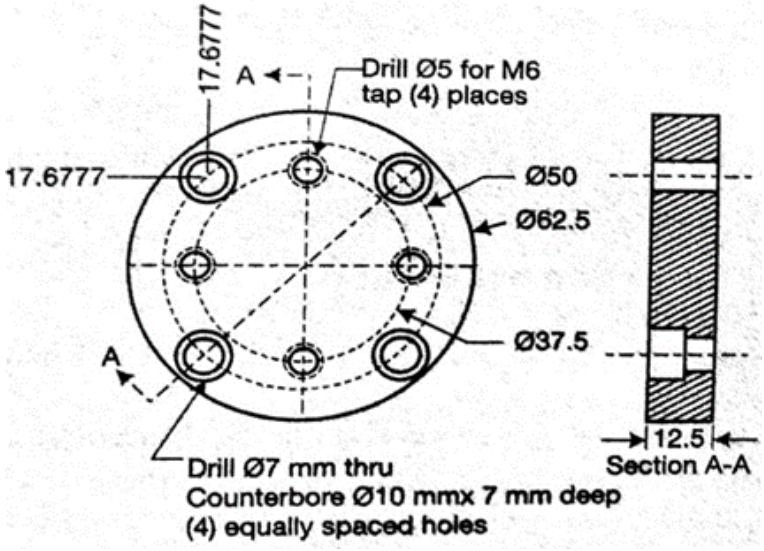
			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Explain about Raster scanning.	[5]	CO1	K2
	b)	State the benefits of CAD/CAM.	[5]	CO1	K2
		(OR)			
2.		Explain the basic principle of (i) the DDA, and (ii) Bresenham's algorithms for the linear interpolation for graphics terminals (no derivation of the relations). Explain the relative advantages of the methods.	[10]	CO1	K2
		UNIT-II			
3.	a)	Give a classification of the different surfaces that can be used in geometric modelling applications.	[4]	CO2	K2
	b)	A cubic Bézier curve is defined by the control points as (30, 30), (50, 80), (100, 100), and (150, 30). Find the equation of the curve and its midpoint.	[6]	CO2	K3
		(OR)			
4.	a)	Give a brief description about the spline curves.	[5]	CO2	K2
	b)	Write down the implicit and parametric form of circle with centre at (50, 50) and a radius of 100 mm.	[5]	CO2	K3
		UNIT-III			
5.	a)	Apply the following geometric transformations on a 1x1 unit square: Rotation, Scaling, Mirroring, Translation and Shear.	[5]	CO3	K3
	b)	Explain the characteristics of CSG in solid modelling.	[5]	CO3	K2
		(OR)			
6		Show that transformation matrix for a reflection about the line Y= +X is equivalent to a reflection relative to the X-axis, followed by a counter clockwise rotation of 90°.	[10]	CO3	K3
		UNIT-IV			
7.	a)	What are the applications where numerical control is most suitable?	[5]	CO4	K2

b) Explain the concept of 'floating datum' and 'set point' with reference to CNC part programming. What is their relationship? [5] CO4 K2

(OR)

8. a) Explain the advantages to be gained by using CNC compared to NC. [4] CO4 K2

b) A complete part program using the ISO codes for the following component for the different holes present in the component shown in the adjacent figure: [6] CO4 K3



UNIT-V

9. a) Briefly explain the methodology to be followed for developing a generative type of computer-aided process planning system. [5] CO5 K2

b) Explain the OPITZ coding systems as used in group technology. [5] CO5 K2

(OR)

10. a) Give a brief description about the retrieval type of computer-aided process planning method. [5] CO5 K2

b) Explain different types of cell designs that are used in group-technology cells. [5] CO5 K2

UNIT-VI

11. a) Give the classification of various rapid prototyping techniques. [4] CO6 K2

b) What are the various types of layouts used in FMS design? Explain briefly about their applications. [6] CO6 K2

(OR)

12. Explain the features you normally look in the machining centres to be suitable for including in FMS. Show how these features help with flexibility desired. [10] CO6 K2

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CODE: 20ECE312 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Regular Examinations, January-2023

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(Electronics and Communication Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Define (i) Sensitivity (ii) Resolution (iii) Accuracy (iv) Precision?	5M	CO1	L1
	b)	Discuss about DC voltmeter with neat diagrams?	5M	CO1	L2
		(OR)			
2.	a)	Following readings were obtained in respect of measurement of a capacitor 1.003, 0.998, 1.001, 1.009, 1.005, 0.996, 0.997, 1.008 and 0.994 μF. Calculate (i) Arithmetic mean (ii) Deviation from the mean (iii) Average deviation (iv) Standard deviation?	5M	CO1	L3
	b)	Illustrate in detail about series type ohmmeter and derive the expression for series resistance?	5M	CO1	L2
		UNIT-II			
3.	a)	Outline the principle of operation of spectrum analyser?	5M	CO2	L2
	b)	Explain the operation of sine and square wave oscillators?	5M	CO2	L2
		(OR)			
4.	a)	Elaborate in detail about harmonic distortion?	5M	CO2	L2
	b)	Discuss in detail about the working of harmonic distortion analyser?	5M	CO2	L2
		UNIT-III			
5.	a)	Explain the digital readout oscilloscopes?	5M	CO3	L3
	b)	Discuss briefly about sampling oscilloscope with block diagram?	5M	CO3	L2
		(OR)			
6.	a)	Elaborate in detail about the working of an oscilloscope with help of block diagram?	5M	CO3	L2
	b)	Illustrate in detail about the working of storage oscilloscope?	5M	CO3	L2
		UNIT-IV			
7.	a)	Derive the equation to find out the unknown capacitance using Wein Bridge?	5M	CO4	L2
	b)	Illustrate the operation of Wheatstone bridge and derive the bridge balance equation?	5M	CO4	L2
		(OR)			
8.	a)	Outline the theory of Maxwell bridge for the measurement of an unknown inductance?	5M	CO4	L2
	b)	Compare between DC and AC bridges?	5M	CO4	L2
		UNIT-V			
9.	a)	Discuss in detail about different types of resistive transducers?	5M	CO5	L2
	b)	Explain in detail about the working of a thermistor?	5M	CO5	L2
		(OR)			
10.	a)	Illustrate in detail about the working of resistive position transducer?	5M	CO5	L2
	b)	Derive the equation for the gauge factor of a resistive strain gauge in terms of poisson's ratio?	5M	CO5	L2
		UNIT-VI			
11.	a)	With neat diagram explain the construction of a thermocouple and mention its disadvantages?	5M	CO6	L2
	b)	Illustrate how pressure can be measured using LVDT?	5M	CO6	L3
		(OR)			
12.	a)	Discuss in detail about the operation of piezo electric transducer?	5M	CO6	L2
	b)	Outline the principle of operation of capacitive pressure transducer?	5M	CO6	L2

AR20

CODE: 20CSE311 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Regular Examinations, January-2023

UNIX INTERNALS

(Computer Science and Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Explain with a figure ,the kernel and shell relationship in unix operating system	5	1	2
	b)	Explain the following commands. i) mkdir ii) cat iii) wc iv) od	5	1	2
		(OR)			
2.	a)	Discuss the following basic Unix commands i) echo ii) who iii) ls	5	1	2
	b)	Discuss in detail the file organization in Unix.	5	1	2
		UNIT-II			
3.	a)	Discuss in detail the absolute file permission changing method.	5	2	2
	b)	Explain grep command? List its options with its significance	5	2	2
		(OR)			
4.	a)	What are wild card characters? Explain shell wild card characters with example?	5	2	2
	b)	Discuss briefly about standard files.	5	2	2
		UNIT-III			
5.	a)	Explain briefly about Environment variables in Shell Programming.	5	3	2
	b)	What is a shell script? Explain the following statements with syntax and examples i) if ii) while	5	3	2
		(OR)			
6.	a)	Discuss briefly about command line arguments in shell programming.	5	3	2
	b)	Write a shell script to find sum of n nos.	5	3	3
		UNIT-IV			
7.	a)	Discuss i) Vfork ii.wait	5	4	2
	b)	Explain about exec functions.	5	4	2
		(OR)			
8.	a)	Discuss different functions used for memory allocation.	5	4	2
	b)	Explain the UNIX kernel support for process considering parent – child process.	5	4	2
		UNIT-V			
9.	a)	Explain The sigsetjmp and siglongjmp Functions with examples.	5	5	2
	b)	Discuss how error logging is done by daemon process with suitable diagram.	5	5	2
		(OR)			
10.	a)	Discuss briefly about UNIX kernel support for signals.	5	5	2
	b)	Explain Client –server model with diagram.	5	5	2
		UNIT-VI			
11.	a)	Explain briefly about Message queue	5	6	2
	b)	Explain briefly about Semaphores.	5	6	2
		(OR)			
12.	a)	Write a note on (i) Process accounting (ii) Process Times.	5	6	3
	b)	Explain popen and pclose functions.	5	6	2

AR20

CODE: 20ITE311 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Regular Examinations, January,2023

DATA MINING

(Information Technology)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

			Marks	CO	Blooms Level
		UNIT-I			
1.	a)	Write about applications of data mining	5	CO1	K3
	b)	Explain about measures of similarity and dissimilarity	5	CO1	K2
		(OR)			
2.	a)	What are the types of data? Write about data quality.	5	CO1	K2
	b)	Write notes on data pre-processing	5	CO1	K2
		UNIT-II			
3.	a)	Explain about data warehouse architecture	5	CO2	K2
	b)	What are the differences between OLAP and OLTP?	5	CO2	K3
		(OR)			
4.	a)	Write notes on data generalisation and summarisation	5	CO2	K2
	b)	Write notes on discriminating between different classes	5	CO2	K2
		UNIT-III			
5.	a)	Explain market basket analysis with example	5	CO3	K2
	b)	Explain about association rule mining with example.	5	CO3	K2
		(OR)			
6.	a)	Why frequent itemsets need to be mined?	2	CO3	K3
	b)	Explain Apriori algorithm for	8	CO3	K3

TID	ITEMSETS
T1	A, B
T2	B, D
T3	B, C
T4	A, B, D
T5	A, C
T6	B, C
T7	A, C
T8	A, B, C, E
T9	A, B, C

Given: Minimum Support= 2, Minimum Confidence= 50%

		UNIT-IV			
7.	a)	What are the various evaluation measures for classification? Explain in detail about them.	5	CO4	K3
	b)	Explain decision tree algorithm	5	CO4	K2
		(OR)			
8.	a)	What are the applications of classification and prediction?	5	CO4	K2
	b)	What is rule based classifier? How rule based classifier works?	5	CO4	K3
		UNIT-V			
9.	a)	Explain K-means algorithm with a neat diagram	6	CO5	K3
	b)	Write notes on binary and categorical variables	4	CO5	K2
		(OR)			
10.	a)	Explain any one hierarchical clustering algorithm	5	CO5	K2
	b)	Write notes on K-medoids clustering.	5	CO5	K2
		UNIT-VI			
11.	a)	Explain statistical distribution-based outlier detection method	5	CO6	K2
	b)	Explain density based Local outlier detection method	5	CO6	K2
		(OR)			
12.	a)	What are outliers? Explain distance-based outlier detection method.	5	CO6	K3
	b)	Explain Deviation based outlier detection method	5	CO6	K2

AR18

CODE: 18CET313 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January,2023

STRUCTURAL ANALYSIS-II

(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) State and prove Eddy's theorem 4M

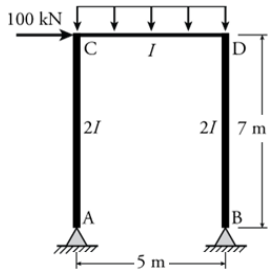
   b) A three hinged segmental arch of horizontal span 40m and central rise 8m is hinged at the springings and crown. It carries a UDL of 20kN/m over the left half of the span together with a point load of 100kN at 10m from right support. Find the Support reactions and Normal thrust and radial shear at 10m from the left 8M

(OR)

2. A two hinged parabolic arch of span 36 m and central rise 8 m carries a uniformly distributed load of 32 kN/m over the left half of the span. Determine the position and value of maximum bending moment. Also find the normal thrust and radial shear at the section. Assume that the moment of inertia at a section varies as secant of the slope at the section. 12M

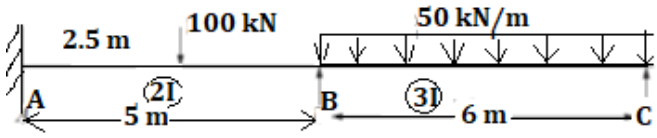
UNIT-II

3. For the beam shown use the slope deflection method to determine all the moments at the supports.Draw BMD.



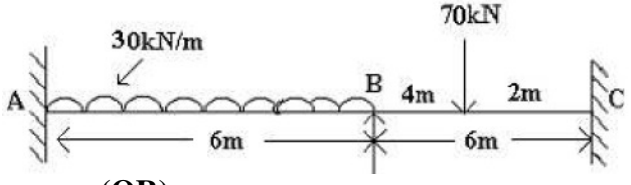
(OR)

4. For the beam shown use the moment distribution method to determine all the moments at the supports. Draw BMD. 12M



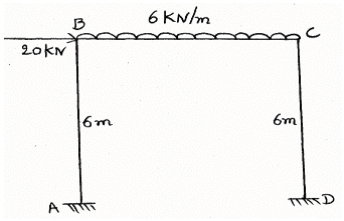
UNIT-III

5. Using Kani's method, analyse the two-span continuous beam loaded as shown in Figure if the moment of inertia of span AB = 3 I, while that of BC= 2I.Sketch B.M.D. 12M



(OR)

6. Determine the joint moments for the portal frame shown in fig. by Kani's method. Sketch B.M.D. 12M

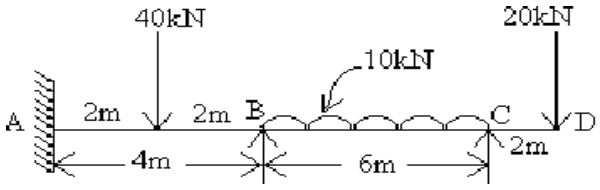


UNIT-IV

7. A two-span continuous beam ABC, having equal spans AB = BC= L, is fixed at A and support at B and C. If the support A permits an anti-clockwise rotation, θ = 0.004 radian and the support B settles by $\delta = \frac{L}{100}$. Using stiffness or displacement method. Find the reaction at C. 12M

(OR)

8. Analyze the continuous beam loaded as shown in Figure, by the displacement method if the support B sinks by 10mm.Take E = 200 GN/m^2 and I =10 × 10^4 mm^4. Sketch the B.M.D. 12M



UNIT-V

9. A uniform load of 30kN/m, 5m long, crosses a girder 20m span. Calculate the maximum +ve and –ve S.F at a section 8m from the left support as well as B.M at a section 8m from the left support. Also find absolute maximum shear force and absolute maximum bending moment in the beam. 12M

(OR)

10. a) Draw the ILDs for shear force and bending momentfor a cantilever beam of length 'L' carrying a point load 'W' at mid span. 6M

    b) Draw the ILDs for shear force and bending moment for a simply supported beam of length 'L' carrying a point load 'W' at quarter span. 6M

AR18

CODE: 18EET313 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January,2023

POWER SYSTEMS – II

(Electrical and Electronics Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.		Calculate the inductance of 3-phase Overhead transmission line, when the conductors are placed in symmetrically and unsymmetrical spacing	12M
		(OR)	
2.	a)	Derive the expression for capacitance of an unsymmetrical three phase system regularly transposed	6M
	b)	A 3-phase, 50 Hz, 132 kV overhead line has conductors placed in a horizontal plane 4 m apart. Conductor diameter is 2 cm. If the line length is 100 km, calculate the charging current per phase assuming complete transposition.	6M

UNIT-II

3.	a)	Deduce an expression for the voltage regulation of a short transmission line with the help of a vector diagram.	6M
	b)	A short 3-φ transmission line with an impedance of (6 + j 8) Ω per phase has Sending and receiving end voltages of 120 kV and 110 kV respectively for some receiving end load at a p.f. of 0·9 lagging. Determine (i) power output and (ii) sending end power factor	6M
		(OR)	
4.		Explain the behaviour of Long transmission line by Rigorous method.	12M

UNIT-III

5.	a)	Explain concept of travelling waves?	6M
	b)	Explain the surge impedance with necessary expressions?	6M
		(OR)	
6.	a)	A 3-phase transmission line 200km has the following constants. Resistance/ph/ km = 0.16 ohm; reactance/ ph/km = 0.25 ohm. Shunt admittance/ph/km = 1.5×10 -6 mho. Calculate by rigorous method the sending end voltage and current when the line is delivering a loadPower-20MW at 0.8 p. f lagging. The receiving end voltage is kept constant at 110 kV.	12M

UNIT-IV

7.	a)	Derive reflection and refraction coefficient of transmission line when terminated through a resistance.	6M
	b)	Explain in brief about Skin and Proximity effects	6M
		(OR)	
8.		What is corona and explain the factors affecting corona loss?	12M

UNIT-V

9.	a)	Explain the various methods for improving the string efficiency in a string of Insulators?	6M
	b)	In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find(i) the distribution of voltage over 3 insulators and (ii) string efficiency.	6M

(OR)

10.	a)	Derive the sag expression for a transmission line at equal level supports.	6M
	b)	An overhead transmission line has a span of 220m, the conductor weighing 804 kg/km. Calculate the maximum sag, if the ultimate tensile strength of the conductor is 5,758 kg. Assume safety factor 2.	6M

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AR18

CODE: 18MET308 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech., I Semester Supplementary Examinations, January,2023

HEAT AND MASS TRANSFER

(Mechanical Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

NOTE: HEAT AND MASS TRANSFER -C.P.KOTHANDARAMAN Data book must be supplied in the exam hall

UNIT-I

1. a) State Fourier's law of heat conduction. Explain the importance of each parameter. 4m
   b) The wall of a cold room is composed of three layers. The outer layer is brick 30 cm thick. The middle layer is cork 20 cm thick, the inside layer is cement 15 cm thick. The temperature of the outside air is 25^0C and on the inside air is -20^0C. The film coefficient for outside air and brick is 55.4 W/m^{2}K. Film coefficient for inside air and cement is 17 W/m^{2}K. Find heat flow rate. 8m
   Take: 'k' for brick = 2.5 W/mK
   'k' for cork = 0.05 W/mK
   'k' for cement = 0.28 W/mK

(OR)

2. a) A composite plane wall has three layers of different materials and have convective boundaries on both sides. Using standard notation derive an expression for heat transfer rate across the composite system. 6m
   b) What is the critical radius of insulation and discuss its importance? Derive an expression for it in the case of a cylinder. 6m

UNIT-II

3. a) Derive an expression for temperature distribution and heat transfer rate for a short fin with an end insulated case. 6m
   b) Aluminium fins 1.5 cm wide and 10mm thick are placed on a 2.5 cm diameter tube to dissipate the heat. The tube surface temperature is 170^0C. The ambient temperature is 20^0C. Calculate the heat loss per fin. Take h = 130 W/m^{2}C and k = 200 W/m C for aluminium. 6m

(OR)

4. a) What is meant by lumped system analysis? Derive an expression for temperature distribution for a solid body having an infinite thermal conductivity. 4m
   b) An egg with a mean diameter of 4 cm is initially at 25 ^{0}C. It is placed in boiling water for 4 minutes and found to be a consumer taste. For how long should a similar egg for the same consumer be boiled when taken from the refrigerator at 2 ^{0}C? Use lumped system analysis and take thermo-physical properties of egg as k =12 W/m K, h=125 W/m^{2}K, C =2000 J/kg K, ρ =1250 kg/m^3. 8m

UNIT-III

5. a) Distinguish between Forced and Natural convections and give examples for each. 4m
   b) A thin 80cm long and 8cm wide horizontal plate is maintained at a temperature of 130^0c in a large tank full of water at 70^0c. Estimate the rate of heat input into the plate to maintain the temperature of 130^0C 8m

(OR)

6. a) Explain the Natural convection phenomena over a hot vertical plate with the help of temperature and velocity profiles. 4m
   b) Find the rate of heat loss from a human body by convection to surrounding air. The body can be approximated as a vertical cylinder of 25 cm in diameter and 175 cm in height. The air is at 13 ^{0}C and the body is at 37^0 C. 8m

UNIT-IV

7. a) Classify Heat exchangers based on four factors. 4m
   b) Find the length of the tube required for the following heat transfer where air is heated by exhaust gases. Q(heat transfer)=8000W, inside diameter(d_i) and outside diameter (d_0) of tubes are 5cm and 6cm respectively. Inside heat transfer coefficient, airside (h_i=100W/m^2K, outside heat transfer coefficient, gas side (h_0)=160 W/m^2K, T_{hi} = 35 C, T_{h0}=150 C, T_{ci}=50 C, T_{c0} = 100 C. Neglect the tube resistance and assume flow arrangement is parallel (ii) If the flow is made counter then what is the percentage saving in the tube length**?** 8m

(OR)

8. a) Stating the assumptions made and derive an expression of LMTD for a parallel flow heat exchanger. 6m
   b) Water (Sp. Heat = 4kJ/kg K) enters a cross-flow exchanger at 15^0C at the rate of 7.5 kg/sec. It cools air (C_p= 1 kJ/kg K) flowing at the rate of 10kg/s from an inlet temp of 120^0C. For an overall heat transfer coefficient of 780 kJ/m^2 hr K and an exchanger surface area of 240m^2, determine the total heat transfer and the outlet temperature of the air. How these results would be affected if a one-shell pass and ten-tube pass heat exchanger is employed? 6m

UNIT-V

9. a) What is the intensity of radiation? 2m
   b) A black body emits radiation at 2250K. Calculate (i) the Monochromatic emissive power at 1.25 μm wavelength (ii) Wavelength at which the emission is maximum (iii) the maximum emissive power and (iv) the total emissive power**.** 10m

(OR)

10. a) State fick's law of diffusion in mass transfer. 4m
    b) A vessel contains a binary mixture of O_2 and N_2 with partial pressures in the ratios 0.21 and 0.79 at 25^0C. The total pressure of the mixture is 1.5 bar. Calculate the following: (i) Molar concentrations, (ii) Mass densities, (iii) Mass fractions, (iv) Molar fractions of each species. 8m

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AR18

CODE: 18ECE301 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January-2023

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(Electronics and Communication Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain the following Static characteristics of an instrument. i) Accuracy ii) Resolution iii) Precision iv) Expected value	6M
	b)	List the dynamic characteristics of measuring systems. Explain?	6M
		(OR)	
2.	a)	List out different AC voltmeters and explain the working of any one voltmeter in detail.	6M
	b)	Explain the working of series type and shunt type ohm meter with neat diagrams.	6M

UNIT-II

3.	a)	Discuss about an AF square wave signal generator with a neat block diagram?	6M
	b)	Illustrate the operation of function generator with neat diagram.	6M
		(OR)	
4.	a)	Describe the working of spectrum analyzer with neat diagram.	6M
	b)	Explicate the working of harmonic distortion analyzer with neat diagram.	6M

UNIT-III

5.	a)	With a neat sketch explain the operation of storage oscilloscope?	6M
	b)	Give the relationship between the period of the waveform and its frequency? How is an oscilloscope used to determine frequency?	6M
		(OR)	
6.	a)	Explain the operation of dual trace oscilloscope with neat diagram.	6M
	b)	With a neat sketch explain the operation of digital storage oscilloscope?	6M

UNIT-IV

7.	a)	Explain the operation of wheat stone bridge with derivations.	6M
	b)	Discuss the operation of Wien Bridge and derive the expression for bridge balance.	6M
		(OR)	
8.	a)	Draw the circuit diagram of Maxwell's bridge and derive conditions of balance.	6M
	b)	List out different sources of errors and explain the precautions and elimination methods in AC bridges.	6M

UNIT-V

9.	a)	Explain the working of potentiometric transducer with neat diagram.	4M
	b)	Describe the construction and working of LVDT.	8M
		(OR)	
10.	a)	What is Piezo- electric effect? Explain the operation of piezo electric transducer.	6M
	b)	Explain the working of capacitive transducer with neat diagram.	6M

AR18

CODE: 18CSE312 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January,2023

ADVANCED COMPUTER ARCHITECTURE

(Common to CSE & IT)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a)	Explain evolution of Computer Architecture?	6M
	b)	Determine how MIPS rate of a given computer is directly proportional to the clock rate and inversely proportional to the CPI.	6M
		(OR)	
2.	a)	Describe briefly about the generations of computer architecture	6M
	b)	Explain about Flynn's classification of parallel processors.	6M

UNIT-II

3.	a)	Explain First Optimization: Small and Simple First-Level Caches to Reduce Hit Time and Power?	6M
	b)	Which block should be replaced on a block miss?	6M
		(OR)	
4.	a)	Illustrate about the Basics of Memory Hierarchies?	6M
	b)	Explain how Pipelined Cache Access Increases Cache Bandwidth?	6M

UNIT-III

5.	a)	Explain the Synchronous Model of linear pipeline processor?	6M
	b)	Explain reservation and latency analysis of nonlinear pipeline processor?	6M
		(OR)	
6.	a)	Explain clocking and timing control, speedup, efficiency and throughput of linear pipeline processor?	6M
	b)	Outline the different Instruction Execution Phases?	6M

UNIT-IV

7.	a)	Explain in detail Hierarchical Bus Systems for multiprocessor system interconnects?	6M
	b)	Describe how multiport memories used in multistage networks?	6M
		(OR)	
8.	a)	Explain the Multistage Omega Network?	6M
	b)	Explain the Fetch & Add operation?	6M

UNIT-V

9.	a)	What are the causes of cache inconsistency? Explain the mechanisms used for handling cache inconsistencies?	6M
	b)	Describe the snoopy protocol used to ensure cache coherence in multiprocessor systems?	6M
		(OR)	
10.	a)	How can the I/O operations bypassing cache result in cache coherence problem? Also, suggest a solution for preventing it?	6M
	b)	What is the Advantage of Directory based over Snoopy bus protocol ?	6M

AR18

CODE: 18ITE311 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January-2023

OBJECT ORIENTED ANALYSIS AND DESIGN

(Information Technology)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. Explain basic building blocks of UML 12M

(OR)

2. a) Elaborate UML Architecture. 6M
   b) Discuss in detail Requirement Workflow. 6M

UNIT-II

3. Describe the following with suitable example 12M
   a. Dependency
   b. Inheritance
   c. Polymorphism

(OR)

4. Explain class diagram in detail and Write in details about UML Class diagram for school information system. 12M

UNIT-III

5. What is a Dynamic Model? Discuss about any two Dynamic /Behavioural UML Diagram with a suitable example system. 12M

(OR)

6. What is Interaction diagram? Draw an Interaction diagram for Withdrawal operation of the Net Banking application. 12M

UNIT-IV

7. Describe about the following 12M
   a. Interface 4M
   b. Component 4M
   c. Timing diagram 4M

(OR)

8. Explain Multiplicity relationship and cardinality with suitable examples. 12M

UNIT-V

9. Explain about Implementation diagram with an example. 12M

(OR)

10. Draw a state Transition diagram for customer object in Net banking application. 12M

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AR16

CODE: 16CE3012 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January-2023

Structural Analysis – II

(Civil Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) A three hinged parabolic arch is of span 30 m and has its supports at depths of 4 m below the crown 'C'. The arch carries a load of 100 kN at a distance of 5 m to the left of crown 'C'. Determine the reactions at the supports and the bending moment under the load. 10M

   b) State Eddy's theorem 4M

(OR)

2. a) A Two-hinged parabolic arch of span 30 m and rise 6 m carries two point loads, each 60 kN acting at 7.5 m and 15 m from the left end respectively. The moment of Inertia varies as the Secant of slope of the rib axis. Determine the horizontal thrust and maximum positive moment in the arch rib. 7M

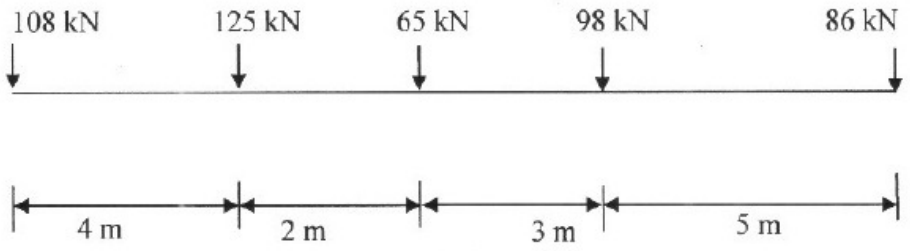
   b) A Two-hinged Semi-circular arch of radium 'R' carries a concentrated load W at the crown. Show that the horizontal thrust at each support is $\frac{W}{\pi}$. Assume Flexural Rigidity. 7M

UNIT-II

3. A simply supported beam has a span of 15 m. A UDL of 40 kN/m and 5 m long crosses the girder from left to right. Draw the influence line diagram for shear force and bending moment at a section 6 m from left end. Use these diagrams to calculate the maximum shear force and bending moment at this section. 14M

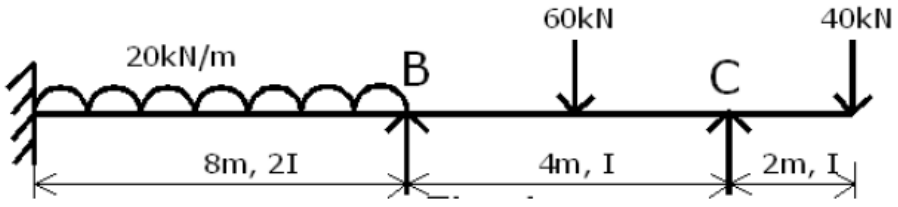
(OR)

4. A train of wheel loads shown in fig crosses a span of 36 m. Calculate the maximum positive and negative shear at mid-span of the beam. Also calculate the absolute maximum bending moment. 14M



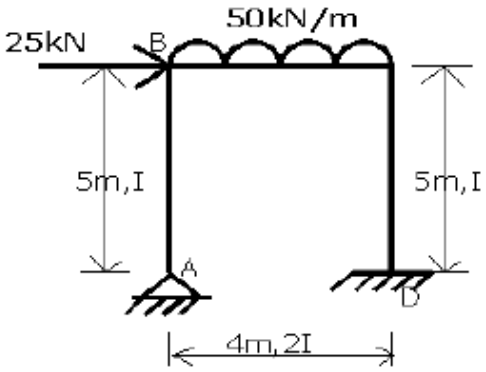
UNIT-III

5. Analyse the continuous beam shown in fig. by Moment Distribution Method. Draw BMD. 14M



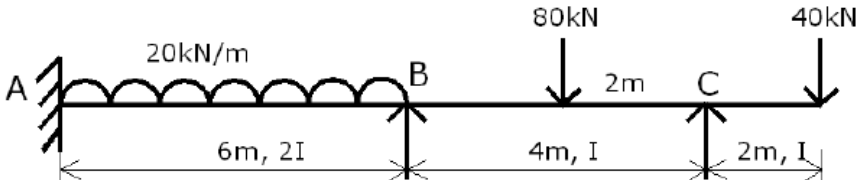
(OR)

6. Analyse the portal frame shown in fig. by slope deflection method. Draw BMD. 14M



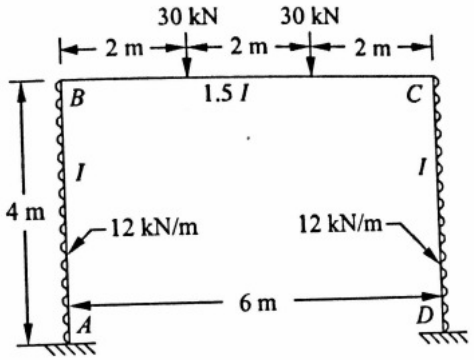
UNIT-IV

7. Analyze the continuous beam shown in figure by Kani's method and also draw the bending moment and shear force diagram. 14M



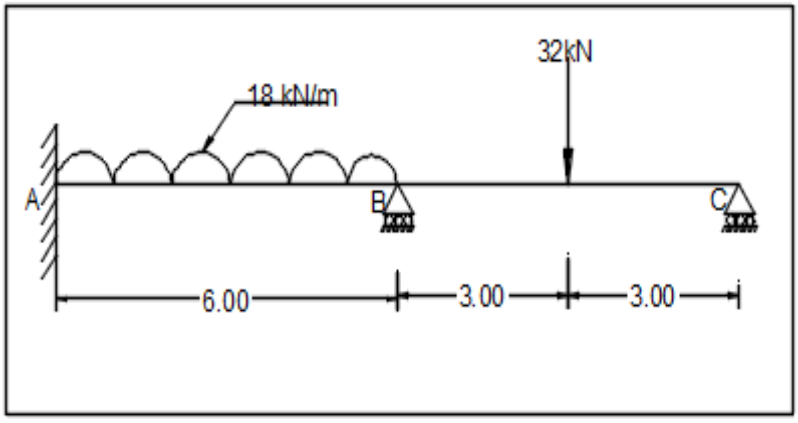
(OR)

8. Analyze the symmetric portal frame shown in figure by Kani's method. Draw the bending moment diagram. 14M



UNIT-V

9. a) Develop the flexibility matrix for the beam shown in fig. 10M



b) State the properties of Flexibility matrix. 4M

(OR)

10. A two span continuous beam PQR has the end P a fixed end and the end R a simply supported end. The span PQ is of length 6 m and carries a central concentrated load of 240 kN. The span QR is 10 m and carries a central concentrated load of 120 kN. Analyze the beam by displacement method. 14M

AR16

CODE: 16ME3016 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

III B.Tech I Semester Supplementary Examinations, January,2023

AUTOMOBILE ENGINEERING

(Mechanical Engineering)

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

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1.	a)	Compare and contrast super charging and turbo charging in Automobile Engines.	6
	b)	Explain construction and working principle of pressure lubrication system with neat diagram.	8
		(OR)	
2.	a)	Explain 3 way catalytic convertor with a neat sketch?	8
	b)	What is meant by crank case dilution? Explain how it is prevented by crank case ventilation	6

UNIT-II

3.	a)	Explain the components of fuel supply system for petrol engine.	6
	b)	Explain about simple carburettor. What are its limitations?	8
		(OR)	
4.	a)	Give the diametrical sketch of Common Rail injection System and explain its operation.	8
	b)	Explain the working principle of an Electrical fuel pump.	6

UNIT-III

5.	a)	Explain the necessity of engine cooling. Discuss different methods of engine cooling.	6
	b)	Explain the battery ignition system with neat sketch.	8
		(OR)	
6.	a)	What are the essential qualities of anti-freeze additives?	6
	b)	Draw a neat line diagram of the ignition and distributor system and describe how it works.	8

UNIT-IV

7.	a)	Explain the working principle of Bendix drive mechanism.	8
	b)	With a simple line sketch describe the gear shift mechanism in a car gear box.	6
		(OR)	
8.	a)	Describe the working of the generator and the storage battery in supplying the electrical energy in an automobile.	8
	b)	Explain about components of transmission system in detail.	6

UNIT-V

9.	a)	Describe Ackerman and Davis steering mechanisms. What are their relative merits?	10
	b)	Describe the functions of the rear axle in an automobile.	4
		(OR)	
10.	a)	Explain the construction of rigid axle suspension system with sketch.	8
	b)	Explain different types of steering mechanisms used in an automobile.	6