

**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

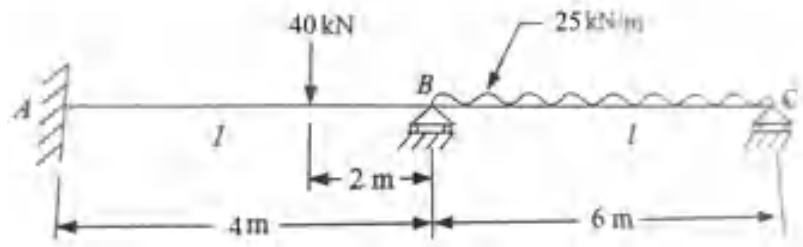
1. A three hinged parabolic arch hinged at springing and crown points has a span of 30 m and a central rise of 8m. It carries a uniformly distributed load of 40 kN/m over the left half of the span together with a concentrated load of 100 kN at the right quarter span point. Find the reactions at the supports, normal thrust and shear at a section 10m from the left support. 12M

(OR)

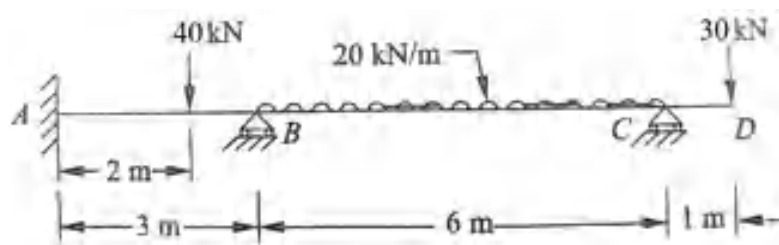
2. A semi-circular arch of radius R is subjected to a uniformly distributed load of w /unit length over the entire span. Assuming EI to be constant, determine the horizontal thrust. 12M

UNIT-II

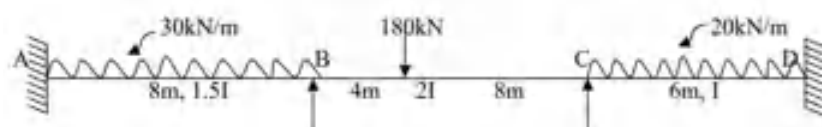
3. Analyse the beam by Slope-Deflection method and draw bending moment diagram. 12M

**(OR)**

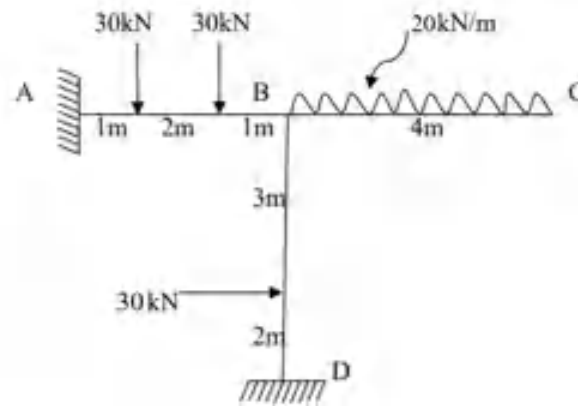
4. Analyse the continuous beam shown in figure by Moment Distribution method, if support B yields by 9 mm. Draw bending moment diagram. Take $EI = 1 \times 10^{12} \text{ Nmm}^2$ throughout 12M

**UNIT-III**

5. Analyse the beam by Kani's Method. Draw Bending Moment Diagram (BMD). 12M

**(OR)**

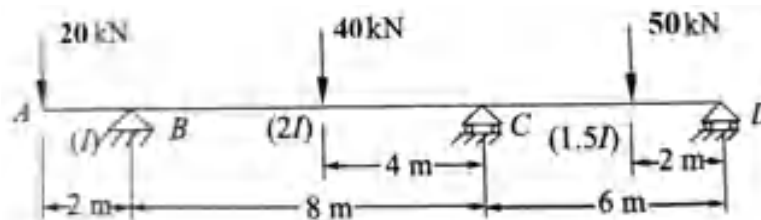
6. Analyse the frame shown by Kani's Method.



12M

UNIT-IV

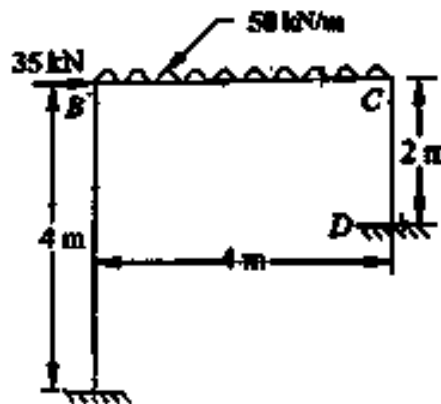
7. Analyse the beam by stiffness matrix method.



12M

(OR)

8. Analyse the portal frame ABCD shown by stiffness matrix method. EI is constant throughout.



12M

UNIT-V

9. Construct the Influence lines for vertical reactions and shear force and bending movement for simply supported beam..

12M

(OR)

10. A Single rolling load of 120 kN moves on a girder of span 20m. Construct the Influence Line Diagram (ILD) for Shear Force and Bending Moment for a section 5m from the left support. Calculate the Maximum Shear Force and Bending Moment at this Section?

12M

AR18

CODE: 18EET313

SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, November-2021

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. a) Derive the expression for the inductance of a 3- Φ line. 6M
- b) A 3-Phase Transmission line of 50 Km long have its conductor of 0.5cm diameter spaced at the corners of an equilateral triangle of 120 Cm side at an average height from the ground of 1000 cm. the line is fed from a star connected transformer with neutral point earthed at 4400 volts between lines. Find the charging current at 50Hz operated frequency 6M

(OR)

2. a) What do you understand by transposition of lines? What is its effect on the performance of the line? 6M
- b) Derive the expression for the Capacitance of a 3- Φ line 6M

UNIT-II

3. a) Derive the ABCD Constants for long Transmission line 6M
- b) Find the ABCD parameters of a 3- Φ , 80 Km 50 HZ Transmission line with series impedance of $(0.15+j 0.78) \Omega/\text{Km}$ and a shunt admittance of $j 5 \times 10^{-4} \text{ Mho/Km}$ 6M

(OR)

4. a) Explain the equivalent π method of solution for the performance of long transmission lines? Draw a phasor diagram with the receiving end voltage as reference. 6M
- b) Find the network constants of a long transmission line 3 phase, 50 Hz and 150 km long whose resistance per km is 0.2Ω and inductance per km is 1.5 mH and capacitance per km is $0.008 \mu\text{F}$. Neglect the conductance of the line. 6M

UNIT-III

5. a) Explain the surge impedance loading with necessary expressions. 6M
- b) A 200KV $3\mu\text{s}$, rectangular surge travels on a line of surge impedance of 400 ohms. The line is terminated in a capacitance of 3000pF. Find the expression for voltage across the capacitor. 6M

(OR)

6. a) Discuss the phenomena of wave reflection and refraction. Derive the expression for reflection and refraction coefficients. 6M
- b) Explain the equivalent π method of solution for the performance of long transmission lines? Draw a phasor diagram with the receiving end voltage as reference. 6M

UNIT-IV

7. a) What is corona? Explain the factors which affect corona? 6M
b) A three phase 220KV 50Hz transmission line consists of 1.5cm radius conductor spaced 2m apart in equilateral triangular formation. If the temperature is 40°C and atmospheric pressure is 76cm, calculate the corona loss per KM of the line. Take $m_0=0.85$ 6M

(OR)

8. a) What is Ferranti effect? Deduce a simple expression for the voltage rise of an unloaded line. 6M
b) Explain in detail about the effects of power system transients. 6M

UNIT-V

9. a) Explain the main differences between pin type and suspension type insulators? 6M
b) Derive the expression for the Sag in vertical plane when the conductor is covering ice and wind pressure. 6M

(OR)

10. a) Derive the expression for string efficiency of a string of 3- insulators 6M
b) A string of 4 insulators has a self-capacitance equal to 10 times the pin to earth capacitance. Find (i) Voltage distribution across various units expressed as a percentage of total voltage across the string. (ii) String efficiency. 6M

**MANUFACTURING TECHNOLOGY - II
(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

UNIT-I

1. a) Discuss the purpose of cutting fluids used in metal cutting? 6M
b) Derive expressions to show relationships among the different forces acting on the cutting tool and different parameters involved in metal cutting. 6M

(OR)

2. a) A tool making an orthogonal cut has rake angle 10° . The feed is 0.10 mm the width of cut is 6.35 mm, the speed 2.7 m/sec and dynamometer measures the cutting force to be 1800 N and normal thrust force to be 1540 N. A high speed photograph shows shear angle of 20° . Estimate (i) Chip thickness (ii) coefficient of friction (iii) shearing strain. 6M
b) State the required properties of cutting tool materials. 6M

UNIT-II

3. a) List and explain any two types of lathe attachments. 6M
b) Describe the steps in cutting a V thread on an engine lathe. 6M

(OR)

4. a) Explain bar feeding mechanism with a neat sketch. 6M
b) Explain the working of multi-spindle progressive action automatic lathe. 6M

UNIT-III

5. a) Explain quick return mechanism used in planer. 6M
b) Explain different types of indexing methods with example. 6M

(OR)

6. a) Explain the method of carrying out the following milling operations: 6M
i) Milling flat surface
ii) Straddle milling
iii) Gang milling
b) What is Broaching? Explain the continuous broaching machine with sketch. 6M

UNIT-IV

7. a) Explain the following terms briefly 6M
i) Super finishing
ii) Polishing
iii) Buffing
b) Sketch and describe in brief of a internal centreless cylindrical grinder. 6M

(OR)

8. a) State the merits and demerits of lapping and give some applications of this process 6M
b) Describe gear hobbing process with neat sketch. 6M

UNIT-V

9. a) Explain the difference between tolerance and allowance. 6M
b) Explain Taylor's principle of gauge design. 6M

(OR)

10. a) Define fit. Explain different types of fits with sketches. 6M
b) What is the difference between Unilateral and bilateral tolerance system. 6M

AR18

CODE: 18ECT314

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, November-2021

LINEAR AND DIGITAL IC APPLICATIONS

(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) Draw the Block Diagram of Op-Amp and explain about each Block in Op-Amp. [6M]
- b) Mention the characteristics of Ideal Op-Amp. [6M]

(OR)

2. a) Draw and explain the ideal integrator circuit using Op-Amp. Mention its drawbacks and explain the operation of practical integrator using frequency response. [7M]
- b) Design an Op-amp circuit to give an output $V_O = - (0.2V_1 + 2V_2 + 0.2V_3)$. Assume necessary data. [5M]

UNIT-II

3. a) Derive the expression for output for a Logarithmic Amplifier using Op-Amp. [6M]
- b) Compare Op-Amp as Comparator and Op-Amp as Schmitt Trigger. [6M]

(OR)

4. a) With the help of circuit diagrams and waveform, explain the working of Astable multivibrator using 555 Timer. [7M]
- b) Design a Monostable Multivibrator using IC 555 timer with a gate width of 2 ms. Assume necessary data. [5M]

UNIT-III

5. a) Design a first order Band Pass Filter using Op-Amp with $f_L = 400$ Hz and $f_H = 4$ KHz and Pass Band gain is 4. [6M]
- b) Derive the expression for gain for first order High Pass Filter and draw its frequency response. [6M]

(OR)

6. a) Calculate the output voltage for a 4-bit DAC when input is LSB, 1100 and 1010 with $V_{ref} = 12$ V. [6M]
- b) Explain the working of Parallel comparator ADC with circuit diagram and functional table. [6M]

UNIT-IV

7. a) With the help of circuit diagram and functional table, explain the operation of TTL NAND gate. [6M]
- b) Explain the working of 2 input NOR gate using CMOS logic. [6M]

(OR)

8. a) Design a 16x1 Multiplexer using IC74x151. [6M]
- b) Explain CMOS static state electrical behaviour in detail. [6M]

UNIT-V

9. a) Design a Mod-11 counter using IC74x163. [6M]
- b) Differentiate between Synchronous Counter and Asynchronous Counter. [6M]

(OR)

10. a) Design a Serial in Parallel out shift Register using IC74x74 and explain its working. [6M]
- b) Explain the working of JK Flip-Flop. [6M]

AR18

CODE: 18CST312

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, November-2021

**ARTIFICIAL INTELLIGENCE & MACHINE LEARNING
(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) Define Artificial Intelligence. Explain about turing test. 6M
- b) Differentiate between Depth-first-search and Breadth-first-search including it advantages and disadvantages. 6M

(OR)

2. a) Explain A* algorithm. Discuss the role of heuristic function in heuristic search. 6M
- b) Discuss the characteristics of AI problem. Can Towers of Hanoi problem be considered as AI problem? Justify your answer with suitable discussions. 6M

UNIT-II

3. a) Explain about alpha beta pruning with an algorithm and example. 6M
- b) Write an algorithm to convert into Clause Form with examples. 6M

(OR)

4. Write an algorithm for Resolution and prove that " Marcus was dead" from the following sentences using Resolution. 12M
 - Marcus was a man
 - Marcus was a Pompeian.
 - Marcus was born in 40A.D.
 - All men are mortal.
 - All Pompeians died when the volcano erupted in 79 A.D.
 - No mortal lives longer than 150 years.
 - It is now 2021.
 - Alive means not dead.
 - If someone dies, then he is dead at all later times.

UNIT-III

5. a) Explain about semantic network. Construct semantic network using instance based representations for the following sentences. 6M

- Sita is a girl
- Ram is taller than Hari

- b) Write a short notes on Ontologies 6M

(OR)

6. a) Explain the following with example: 6M
 - Simple Relational Knowledge
 - Inheritable Knowledge
 - Inferential Knowledge
- b) Define Frame. Create a frame of the person Ram who has a white Audi car of A3 Model. It has 5 doors. Its weight is 225kg, capacity is 8, and mileage is 15 km /lit. 6M

UNIT-IV

7. a) Define Machine Learning. Identify Task(T), Performance Measure(P) and Training Experience(E) for the following tasks: 6M
- Checkers Learning Problem
 - Robot's Driving Problem
 - Handwriting recognition learning Problem
- b) Describe Find-S Algorithm. What are the properties and complaints of Find S. 6M
- (OR)**
8. a) Write the steps associated with machine learning. 6M
- For 'A Tic-Tac-Toe learning problem' discuss the following
- Choosing the training experience
 - Choosing the target function
 - Choosing a function approximation algorithm.
- b) Define Concept and Concept Learning. With example explain how the Concept Learning task determines the Hypothesis for given target concept. 6M

UNIT-V

9. a) Explain the concepts of entropy and information gain. 6M
- b) What are issues in decision tree learning? Explain briefly How are they overcome? a. Discuss the following issues in detail: 6M
- Avoiding overfitting in Decision Trees
 - Incorporating Continuous valued attributes
 - Handling Training Examples with Missing attribute values.
 - Handling Attributes with Different costs.
- (OR)**
10. a) Find Entropy(S) and InformationGain(S,Outlook) for the following dataset. 6M
- (Note:S represents collection of positive and negative samples)

Day	Outlook	Temperature	Humidity	Wind	PlayTennis
D1	Sunny	Hot	High	Weak	No
D2	Sunny	Hot	High	Strong	No
D3	Overcast	Hot	High	Weak	Yes
D4	Rain	Mild	High	Weak	Yes
D5	Rain	Cool	Normal	Weak	Yes
D6	Rain	Cool	Normal	Strong	No
D7	Overcast	Cool	Normal	Strong	Yes
D8	Sunny	Mild	High	Weak	No
D9	Sunny	Cool	Normal	Weak	Yes
D10	Rain	Mild	Normal	Weak	Yes
D11	Sunny	Mild	Normal	Strong	Yes
D12	Overcast	Mild	High	Strong	Yes
D13	Overcast	Hot	Normal	Weak	Yes
D14	Rain	Mild	High	Strong	No

- b) Discuss Inductive Bias in Decision Tree Learning. Differentiate between two types of biases. 6M

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 arch of span 40m and rise 8m carries concentrated loads of 200Kn and 150Kn at distances of 8m and 16m from the left end and an UDL of 50Kn/m on the right half of the span, find the horizontal thrust. 4M
- b) A parabolic three hinged arch carries a UDL of 30Kn/m on the left half of the span it has a span of 16m and a central rise of 3m. Determine the resultant reactions at the support find the bending moment, normal thrust and radial shear at xx, 2m from left support 10M

(OR)

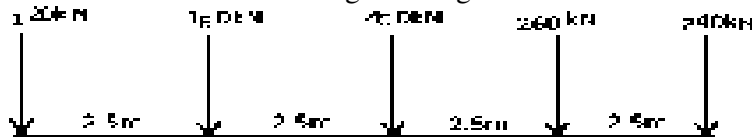
2. a) Explain the different types of arches with diagram 4M
- b) A parabolic arch hinged at the ends has a span of 60m and a rise of 12m. A concentrated load of 8kN acts at 15m from the left hinge. The second moment of area varies as the secant of the inclination of the arch axis. Calculate the horizontal thrust and the reactions at the hinge. Also calculate the net bending moment at the section. 10M

UNIT-II

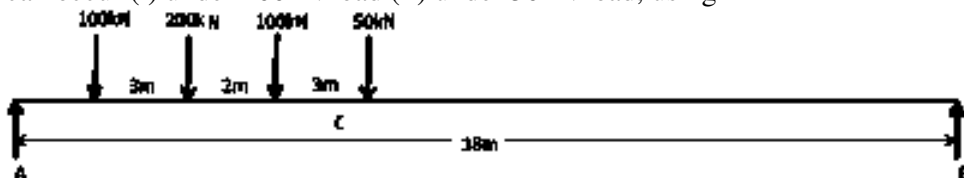
3. a) Draw the ILD for shear force and bending moment for a section at 5m from the left hand support of a simply supported beam, 20m long. Hence, calculate the maximum bending moment and shear force at the section, due to an uniformly distributed rolling load of length 8m and intensity 10kN/m run. 4M
- b) A single rolling load 100kN moves on a girder of span 20m. (a) Construct the influence lines for (i) shear force and (ii) bending moment for a section 5m from the left support. (b) Construct the influence lines for points at which the maximum shears and maximum bending moments develop & determine these maximum values. 10M

(OR)

4. a) Find the resultants of loads for the given diagram 4M

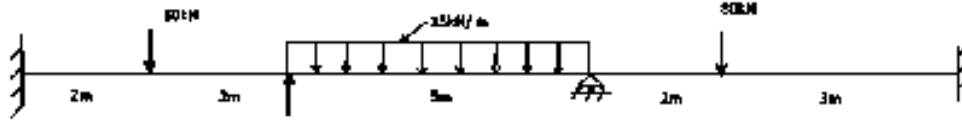


- b) A girder having a span of 18m is simply supported at the ends. It is traversed by a train of loads shown in figure, the 50kN loading. Find the maximum B.M which can occur (i) under 200kN load (ii) under 50kN load, using ILD 10M



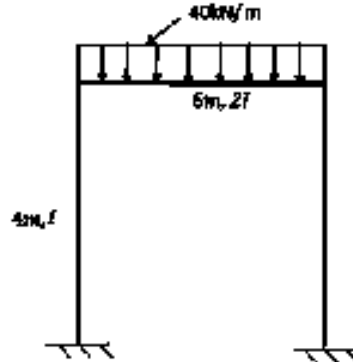
UNIT-III

5. a) Analyse the continuous beam shown in fig by moment distribution method 14M



(OR)

6. a) Analyse the fig shown in fig and draw BMD (Slope deflection method) 14M

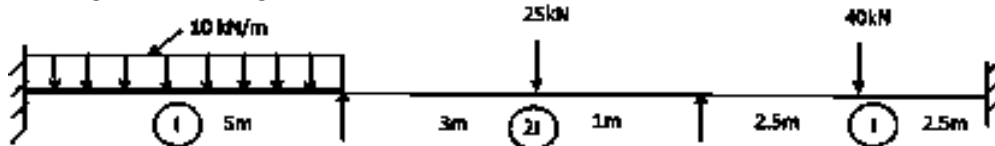


UNIT-IV

7. a) Define joint rotation 4M
b) Explain kani's iteration procedure for beams 10M

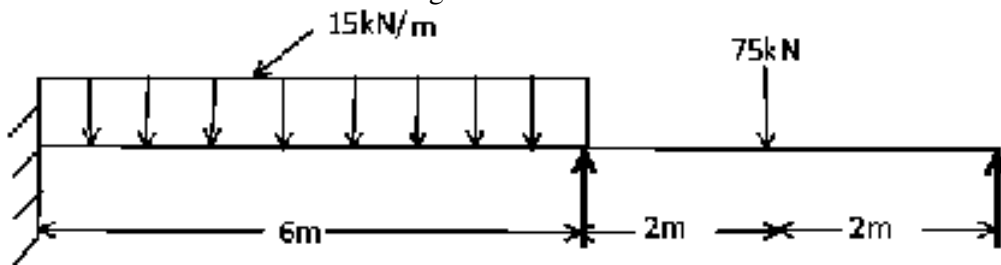
(OR)

8. a) Analyse the continuous beam loaded as shown in fig by kani's method. Sketch the bending moment diagram 14M

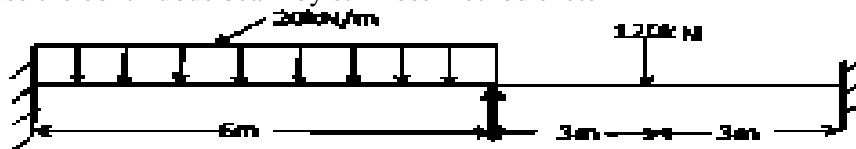


UNIT-V

9. a) Draw the fixed end moments diagram for fixed beam with UDL, fixed beam with point load at centre, fixed beam with moment at centre (clockwise or anticlockwise) 4M
b) Analyse the continuous beam shown in figure by stiffness method, draw bending moment. Assume EI constant throughout the beam 10M



10. a) Find the degree of indeterminacy for fixed beams, cantilever, propped cantilever 4M
b) Analyse the continuous beam by stiffness method sketch BMD 10M



AR16

CODE: 16EE3014

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, November-2021

POWER SYSTEMS-III

(Electrical and Electronics 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) Describe Current Chopping Phenomena [6M]
- b) In a 220 KV power system the series inductive reactance and capacitance per phase up to the location of circuit breaker is 6Ω and $0.02\mu F$ respectively. A resistance of 500Ω is connected across the contacts of circuit breaker. Determine the following when the circuit breaker opens: (i) Natural frequency of transient oscillations. [8M]
(ii) Damped frequency of oscillations (iii) Critical value of damping resistance, which will give no transient oscillation.

(OR)

2. a) Distinguish clearly between recovery voltage and Restriking voltage and explain the significance of RRRV in the operation of circuit breaker. [8M]
- b) A circuit breaker interrupts the magnetizing current of a 100 MVA transformer at 220 kV. The magnetizing current of the transformer is 8% of full load current. Determine the maximum voltage which may appear across the gap of the breaker when the magnetizing current is interrupted at 70% of its peak value. The stray capacitance is $2700\mu F$ and the inductance is 28 H [6M]

UNIT-II

3. a) Mention the function of impedance relay and describe its operating principle. [8M]
- b) A percentage differential relay has a 0.1A minimum pick-up and 10% slope. A high resistance ground fault occurred near the grounded neutral end of the generator winding while generator is carrying load. As a consequence, the currents $I_1=400+j0A$ and $I_2 = 150+j0A$ are flowing at each end of the winding. Assuming CT ratios of 500/5 A, analyze will the relay operate to trip the breaker. [6M]

(OR)

4. a) Draw a neat sketch of an induction disc relay and demonstrate its operating principle. [8M]
- b) List out the advantages and disadvantages of static relays. [6M]

UNIT-III

5. a) "100% of winding of alternator cannot be protected using Merz -Price circulating current protection scheme with earthing resistance to limit the fault current"- Justify with proper reason. [7M]
- b) An 11kV, 100MVA generator is grounded through a resistance of 6ohms. The CTs have a ratio of 1000/5. The relay is set to operate when there is an out of balance current of 1A. What percentage of the generator winding will be protected by the percentage differential scheme of protection? [7M]

(OR)

6. a) Discuss the problems arising in differential protection in power transformer and how are they overcome? [7M]
b) A 3-phase transformer having line-voltage ratio of 0.4kV/11kV is connected in star-delta and protective transformers on the 400V side have side have a current ratio of 500/5. What must be the ratio of the protective transformers on the 11kV side? [7M]

UNIT-IV

7. Briefly explain the need of carrier system of protection with a neat sketch and discuss how the phase comparison scheme is incorporated for protecting a feeder. [14M]

(OR)

8. a) Describe the differential pilot wire method of protection of feeders. [7M]
b) Explain the need of differential protection for busbars [7M]

UNIT-V

9. a) What are causes of over voltages arising on a power system? Why is it necessary to protect the lines and other equipment of the power system against over voltages? [8M]
b) Explain the phenomenon of 'Arcing grounds'. [6M]

(OR)

10. a) Describe the need of Peterson coil earthing of a generator. [7M]
b) In a 60 Hz overhead line, the capacitance of one line to earth was 1.2 micro farad. It was decided to use an earth fault neutralizer. Calculate the reactance to neutralize the capacitance of 90% length of line. [7M]

AR16

CODE: 16ME3016

SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B. Tech I Semester Supplementary Examinations, November-2021

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) Draw the schematic diagram of chassis along with four wheels? Explain the Functions of different components. 8M
b) What are the factors, which control the formation of oxides of Nitrogen? 6M
(OR)
2. a) What is scavenging? Explain its working principle in two stroke engine with Suitable diagrams. 6M
b) (i) How two stroke engines are being lubricated, (ii) List the parts of any type of engine lubricating system 8M

UNIT-II

3. a) What are the limitations of simple carburettor? 6M
b) How the starting difficulty with simple carburettor can be overcome? 8M
(OR)
4. a) Explain the various types of injector nozzles. 7M
b) What are the requirements of a diesel injection system? 7M

UNIT-III

5. a) What are the requirements of a cooling system? 6M
b) Explain the working of Forced circulation cooling system. 8M
(OR)
6. a) Briefly discuss the various factors which will affect the ignition timing. 6M
b) Explain the working of thermosiphon cooling system. 8M

UNIT-IV

7. a) Explain the working of oil pressure indicator. 7M
b) Name the various electrical components used in an automobile & give their Functions. 7M
(OR)
8. a) Describe the constructional features of a clutch disc. 7M
b) Explain the working of a Hoatch kiss drive diagram. 7M

UNIT-V

9. a) What requirements are expected in a good steering system? 7M
b) What are the types of suspension system? 7M
(OR)
10. a) Explain the working of wheel cylinder. 7M
b) Explain the various steering troubles and suggest their remedies. 7M

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****III B. Tech I Semester Supplementary Examinations, November-2021****LINEAR IC APPLICATIONS****(Electronics and Communication 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) Calculate the operating points of the differential amplifier with $R_C = 3.9 \text{ Kohms}$, $R_E = 3.3 \text{ Kohms}$, $V_{CC} = 9\text{V}$ and $-V_{EE} = -9\text{V}$? 4M
 - b) Derive the expression for voltage gain, input resistance and output resistance for dual input and balanced output differential amplifier using AC analysis 10M
- (OR)**
2. a) List and compare the different configurations of differential amplifier 8 M
 - b) What is level translator? Explain the necessity of level translator stage in cascading differential amplifiers. 6 M

UNIT-II

3. a) A 1 kHz square wave with a swing of + 5V and -5V. Determine maximum output Voltage swing and minimum required slew rate. Draw the output waveform 7 M
 - b) For 741 op-amp, the parameters given are, $I_{CQ} = 10\mu\text{A}$ $C_c = 33\text{pf}$. The input voltage $V_{pp} = 12\text{V}$. Estimate the slew rate and maximum possible frequency of input voltage that can be applied to get undistorted output 7 M
- (OR)**
4. a) Elaborate the significance of CMRR in the differential amplifier and give methods to improve CMRR. 8 M
 - b) Discuss how OP-AMP acts as a differentiator? 6 M

UNIT-III

5. a) Discuss any two applications of V-I converters using Op-amp 6 M
 - b) Explain the operation of zero crossing detector in detail 8 M
- (OR)**
6. a) Explain the operation of logarithmic amplifier using IC 741 8 M
 - b) Outline the applications of Comparator and distinguish the comparator with Schmitt trigger 6 M

UNIT-IV

7. a) A 12-bit ADC has a step size of 8mv. Determine the full scale output voltage and percentage resolution. Also find the output voltage for the input of 010101101101? 8 M
 - b) Design a second order high pass Butterworth filter having a cutoff frequency of 5KHz. 6 M
- (OR)**
8. a) Discuss the operation of flash type ADC 6 M
 - b) Design a bipolar 8 bit D/A convertor with a monolithic $\mu\text{A}741$ IC. The value current for 1LSB is $8\mu\text{A}$. Determine the output voltage for all ones and zeroes inputs. 8 M

UNIT-V

9. a) Derive the expression for total time period in the monostable multivibrator using 555 timer 7 M
 - b) Produce the element values to generate $T = 5\text{ms}$ time delay, using 555 timer as a monostable multivibrator 7 M
- (OR)**
10. a) Design a 555 timer based square wave generator to produce a symmetrical square wave of 2 kHz, if $V_{cc} = 12\text{V}$, draw the voltage across timing capacitor and output. 7 M
 - b) Outline features of switching voltage regulators over linear voltage regulators. 7 M

AR16

CODE: 16CS3014

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, November-2021

DESIGN AND ANALYSIS OF ALGORITHMS

(Common to CSE & IT)

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) Describe various asymptotic notations. 7M
- b) Explain the necessary steps for analyzing the efficiency of recursive algorithms. 7M

(OR)

2. a) Write an algorithm for finding maximum element of an array. Analyze best, worst and average case complexity with appropriate order notations. 7M
- b) Briefly explain about order of growth with an example. 7M

UNIT-II

3. a) Write and explain algorithm for Quick sort with an example. 7M
- b) Consider a set of given jobs as shown in the following table. Find a sequence of jobs, which will be completed within their deadlines and will give maximum profit. 7M

Job	J ₁	J ₂	J ₃	J ₄	J ₅
Deadline	2	1	3	2	1
Profit	60	100	20	40	20

(OR)

4. a) Sort the following elements using Merge sort. 7M
45,22,88,23,78,46,84,44,21,34.
- b) Explain Single Source Shortest Path Problem using Greedy Approach with a simple example. 7M

UNIT-III

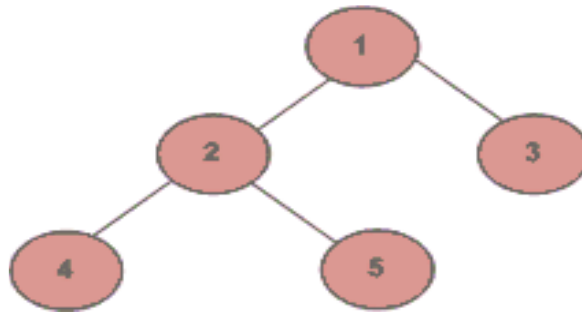
5. Compute $w(i,j)$, $c(i,j)$, $r(i,j)$ for the identifier set $n = 4$, $(a_1, a_2, a_3, a_4) = \{do, if, int, while\}$ with $P(1:4) = \{3, 3, 1, 1\}$ and $q = \{2, 3, 1, 1, 1\}$. Using the $r(i,j)$ s construct the optimal binary search tree. 14M

(OR)

6. a) Explain 0/1 knapsack problem with respect to dynamic programming. 7M
- b) Write an algorithm for Matrix Chain Multiplication. 7M

UNIT-IV

7. a) Give the BFS result for the following graph and write algorithmic steps for it. 7M



- b) What is Graph Coloring? Explain Graph Coloring Problem by illustrating with an example. 7M

(OR)

8. a) Define articulation point and explain with an example. 7M
b) Solve the following instance of sum of subsets problem using backtracking. 7M
 $W = (5, 7, 10, 12, 15)$; $M = 15$.

UNIT-V

9. a) Write short notes on least cost search. 7M
b) State Cook's theorem and explain. 7M
(OR)
10. a) Write short notes on FIFO branch and bound. 7M
b) Write the pseudo code for Nondeterministic sorting. 7M

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

III B. Tech I Semester Supplementary Examinations, November-2021

STRUCTURAL ANALYSIS -II

(Civil Engineering)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Justify which is more economical: beam or an arch.
b) What is the necessity and advantages of approximate analysis?
c) Write slope deflection equations for with effect of sinking.
d) What are the joint equilibrium equations for single bay single story portal frame without sway?
e) What are the fixed end moments developed due to the effect of sinking? Show it with neat sketch.
f) What is the stiffness factor for intermediate support?
g) If distribution factor in moment distribution method is 0.5 then what is rotation factor and displacement factor in kani's method?
h) Define stiffness coefficient K_{ij} .
i) Why stiffness matrix method is called displacement method?
j) For a two-hinged arch, if one of the supports settles down vertically, then the horizontal thrust will be ?

PART-B

Answer one question from each unit

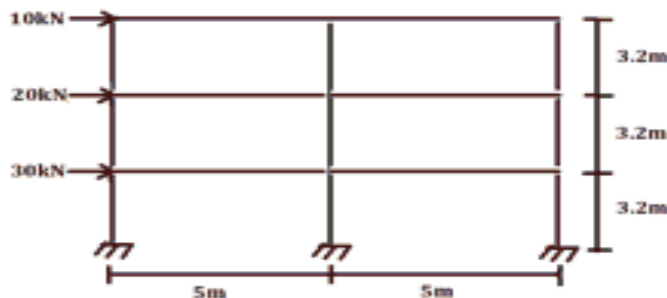
[5x12=60M]

UNIT-I

2. a) A two hinged parabolic arch of span 30m and rise 6m carries two points loads each 60kN acting at 7.5m and 15m from the left end respectively. Determine the horizontal thrust and moment at crown point. (225) 6M
b) Determine the horizontal thrust in a two hinged parabolic arch subjected to uniformly distributed load of w per unit length over a length 'a' from the left support. (229) 6M

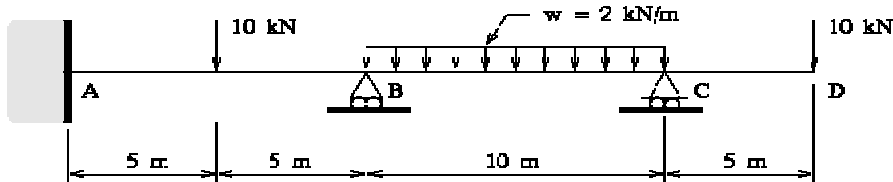
(OR)

3. a) List the assumptions made in cantilever method? 2M
b) Analyse the frame shown below by using portal method. 10M



UNIT-II

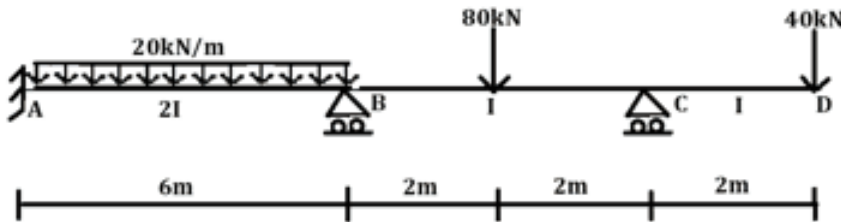
4. Analyse the continuous beam shown in figure by slope deflection method when support B is settled down by 15mm. (Take $EI = 100\text{kN-m}^2$)



12M

(OR)

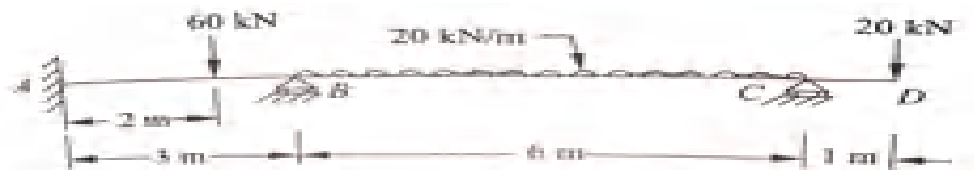
5. Analyse the continuous beam shown in figure by slope deflection method and draw the BMD.



12M

UNIT-III

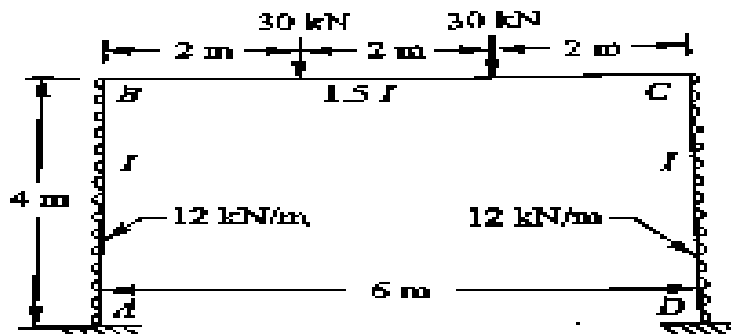
6. Analyse the continuous beam shown in figure by moment distribution method, if support B yields by 9mm. Take $EI = 1 \times 10^{12} \text{ Nmm}^2$ throughout. Draw BMD



12M

(OR)

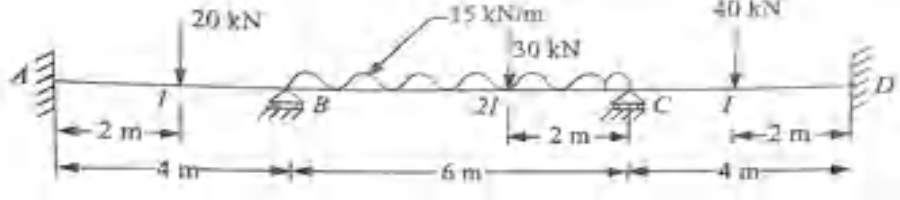
7. Analyse the portal frame shown in figure by moment distribution method.



12M

UNIT-IV

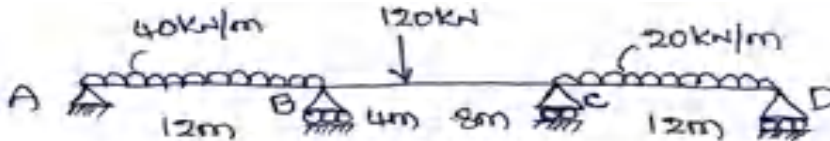
8. Analyse the continuous beam shown in figure by rotation contribution method.



12M

(OR)

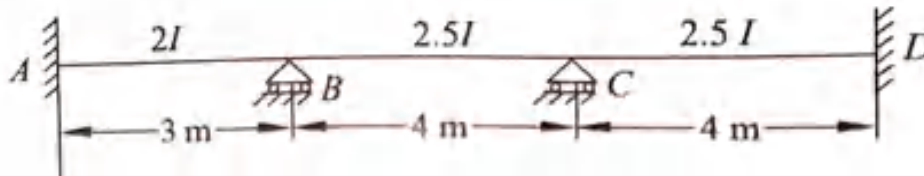
9. Analyse the continuous beam shown in figure, by compatibility method. Take EI constant throughout.



12M

UNIT-V

10. Analyse the continuous beam shown in figure if the support B sinks by 10mm. Use stiffness matrix method. Take $EI = 6000 \text{ kN-m}^2$

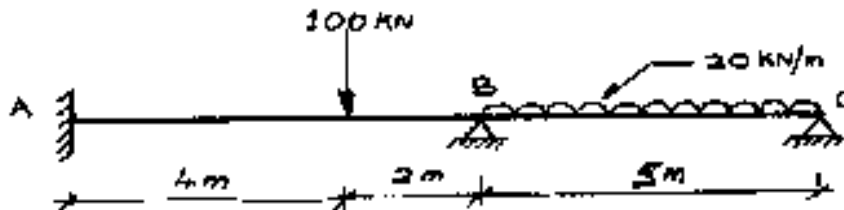


12M

(OR)

11. a) Differentiate between equilibrium and compatibility methods.
b) Analyse the beam by Stiffness matrix method.

4M



8M

Time: 3 Hours**Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Define Ferranti effect in Transmission line?
b) List the different types of grading of cables
c) Showcase the effect that is caused by Internal flux linkages in Overhead Transmission Line
d) Define the Maximum Stress in Cable
e) List the various factors those affecting Skin Effect?
f) Explain SAG in Overhead transmission line
g) List the causes of Insulation failure in Insulators
h) Utilization of same size of insulators disc is used in Overhead transmission line for a particular voltage level, why?
i) List any 2 factors that affects corona
j) List any two types of insulators

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. List the Various Components in Over Head Transmission line 12
- (OR)
3. Derive the expression for Inductance calculation for 1-phase 2 wire system. 12

UNIT-II

4. Derive the Expression for Medium Transmission Line using π - network with Phasor diagram. 12
- (OR)
5. 3-phase, 50 Hz transmission line 100 km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of the line per phase per km are 0.2Ω and 0.4Ω respectively, while capacitance admittance is 2.5×10^{-6} siemen/km/phase by using nominal T method. Calculate the current and voltage at the sending end. 12

UNIT-III

6. A 132 kV, 50 Hz, 3-phase transmission line delivers a load of 50 MW at 0.8 p.f. lagging at the receiving end. The generalised constants of the transmission line are : $A = D = 0.95 \angle 1.4^\circ$; $B = 96 \angle 78^\circ$; $C = 0.0015 \angle 90^\circ$
Find the regulation of the line and charging current. 12
- (OR)
7. Derive the Expression for ABCD parameters of long transmission line by Rigorous methods. 12

UNIT-IV

8. Define Proximity Effect, Phenomena by neat sketch in Transmission line and list the factor affecting proximity effect. 12
- (OR)
9. Define travelling wave in transmission line with a neat diagram 12

UNIT-V

10. Derive the expression for Sag calculation when supports are at equal heights 12
- (OR)
11. Explain the working of Strain Insulator with neat sketch diagram and state the safety factor and derive expression for string efficiency. 12

**CAD/CAM
(Mechanical Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Define Windowing? **CO1**
- b) Define raster scan graphics system? **CO1**
- c) What do you understand by Geometric transformation? Write any three common transformations used in computer graphics. **CO1**
- d) Enumerate the basic geometric commands. **CO2**
- e) State the common surface models used in geometric modeling? **CO2**
- f) Abbreviate NC, CNC and DNC? **CO3**
- g) Define group technology? **CO4**
- h) Define cellular manufacturing? **CO4**
- i) Write any two important material handling systems with its applications. **CO5**
- j) What is the difference between flexible manufacturing system and flexible manufacturing cell? **CO5**

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) With block diagram explain the design related tasks performed by modern computer? **6M**
- b) Explain 3-D scaling, rotation, reflection and translation with suitable example? **6M**
- (OR)**
3. a) Explain with a suitable example the difference between working and screen coordinate systems **4M**
- b) A rectangle has corner co-ordinates (10,20) (40,20), (40,40), (10,40). This rectangle is rotated by 30° anticlockwise about (i) origin and (ii) about the point (40,20). Compute the new co-ordinates in both cases. **8M**

UNIT-II

4. a) Describe briefly surface modeling method with a Bezier surface. **6M**
- b) Distinguish between 2-D and 3-D wire frame models. **6M**
- (OR)**
5. a) Discuss in detail about CSG schemes. **6M**
- b) Explain sweep operation in solid modelling? **6M**

UNIT-III

6. a) Discuss the salient features of machining centres. **6M**
- b) Distinguish between point-to-point control and continuous path control in NC system **6M**

(OR)

7. a) Discuss the difficulties encountered in using conventional numerical control. 6M
b) Write the major specifications of a 3 axis CNC milling machine. 6M

UNIT-IV

8. a) State the three general methods to group parts into families? Explain anyone. 6M
b) Explain briefly the MICLASS system of codification. 6M

(OR)

9. a) Discuss the different stages of a group technology plan. 6M
b) Describe various steps involved in Production Flow Analysis. 6M

UNIT-V

10. a) Discuss the following types of layouts in the design of FMS: (i) Linear layers (ii) Loop layers 6M
b) Explain briefly any two material handling systems. 6M

(OR)

11. a) How the information flow takes place in a retrieval type computer aided process planning system. 6M
b) Explain CAPP with example. 6M

PART-A**ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Define Time Complexity?
- b) What is meant by Bi-connected component in a graph?
- c) Derive the time complexity for Strassen's matrix multiplication
- d) Define Minimum spanning tree?
- e) What is meant by feasible solution?
- f) State the Principle of Optimality
- g) Define Chromatic Number?
- h) Define Dead node?
- i) What are the searching methods that are commonly used in branch and bound method?
- j) Differentiate between Backtracking and Branch & Bound techniques

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. a) What is Pseudo code? Briefly discuss the rules of Pseudo code for expressing algorithms. 6M
- b) What do you mean by performance analysis? Give the algorithm for matrix multiplication and find the time complexity of the algorithm using step-count method. 6M

(OR)

3. a) Explain Depth First Search Tree with an example and List out its applications? 6M
- b) Explain the following operations on Sets 6M
UNION, FIND, INSERT and DELETE

UNIT-II

4. a) Write the Control abstraction for Divide and Conquer Problem? 4M
- b) Describe binary search in detail and provide time complexity analysis with an example. 8M

(OR)

5. a) Explain Kruskal's Minimum cost spanning tree algorithm with a suitable example. 6M
- b) State the Job – Sequencing with deadlines problem. Find an optimal sequence to the n=5 Jobs where profits (P1, P2, P3, P4, P5) = (20,15,10,5,1) and deadlines (d1,d2,d3,d4,d5) = (2,2,1,3,3) 6M

UNIT-III

6. a) Give the control abstraction of Dynamic Programming strategy? 4M
- b) Estimate the minimum no. of operations required for the following chain matrix multiplication using dynamic programming. 8M
A(30,40) * B(40,5) * C(5,15) * D(15,6).

(OR)

- | | | | |
|----|----|--|----|
| 7. | a) | Write and explain an algorithm to compute the all pairs shortest path using dynamic programming. | 4M |
| | b) | Calculate the reliability of the three stage system where $c_1=30, c_2=15, c_3=20, c=105, r_1=0.9, r_2=0.8, r_3=0.5, u_1=2, u_2=3, \text{ and } u_3=3$ | 8M |

UNIT-IV

- | | | | |
|----|----|--|----|
| 8. | a) | Solve the 4-Queen problem with the help of Backtracking. Show the complete set of possible cases in this approach. | 6M |
| | b) | Explain in detail about sum of subsets problem. | 6M |
- (OR)**
- | | | | |
|----|----|---|----|
| 9. | a) | Briefly explain Hamiltonian cycles using backtracking | 6M |
| | b) | Explain the Graph-Coloring problem and draw the state space tree for $m=3$ colors and $n=4$ vertices graph. | 6M |

UNIT-V

- | | | | |
|-----|----|---|----|
| 10. | a) | List out different branch-and-bound approaches. | 6M |
| | b) | Generate FIFO branch and bound solution for the given knapsack problem, $m = 15, n = 3, (P_1, P_2, P_3) = (10, 6, 8)$ and $(w_1, w_2, w_3) = (10, 12, 3)$. | 6M |
- (OR)**
- | | | | |
|-----|----|---|----|
| 11. | a) | Briefly Explain the concepts of NP-Complete Problems? | 6M |
| | b) | Explain about Cooks-theorem. | 6M |

AR13

CODE: 13EC3019

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

III B. Tech I Semester Supplementary Examinations, November-2021

MICROPROCESSORS AND MICROCONTROLLERS

(Information Technology)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) What are control bits of 8086?
b) What is pipelined architecture?
c) What are the internal devices of 8255 ?
d) What are the functional units available in 8086 architecture?
e) What is the need for interrupt controller?
f) What are the different segment registers of 8086?
g) What is effective address?
h) What is the use of 8251A USART?
i) Explain the 16-bit registers DPTR and SP of 8051.
j) Draw the flag register of 8051.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a) Explain about the physical address formation in 8086 microprocessor 6M
b) Discuss about the Maximum mode pins of 8086 microprocessor. 6M
(OR)
3. a) Draw the architecture of 8086 Microprocessor. 6M
b) Discuss about the addressing modes 6M

UNIT-II

4. a) Explain about Shift and Rotate Instructions. 6M
b) Write short notes on MACROS and PROCEDURE. 6M
(OR)
5. a) Explain about the instruction set of 8086. 6M
b) Explain in detail about the interrupt structure of 8086 microprocessor. 6M

UNIT-III

6. a) Explain the use of each of the following registers of 80386. Segment descriptor registers (ii) Control registers 6M
b) Explain any six instructions of 80386 microprocessor 6M
(OR)
7. Draw and explain the architecture of 80386 micro processor with neat sketch? 12M

UNIT-IV

8. a) Differentiate between memory mapped I/O and peripheral I/O? 6M
b) Draw the pin configuration of 8255A PPI and explain. 6M
(OR)
9. a) Explain about the architecture of 8279. 6M
b) Draw the pin configuration of 8257 DMA controller and explain. 6M

UNIT-V

10. a) Explain 8051 controller with the general block diagram 6M
b) Discuss about the memory organization of 8051 microcontroller 6M
(OR)
11. Explain the following special function registers 12M
1. TCON 2. PCON 3. IP 4. IE