

Q.P. Code: 255212

SET - 2

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Remote Sensing & GIS (CE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Explain the spectral reflectance curves with diagram? 8M
(b) Describe the physics remote sensing 6M

(OR)

2. (a) Explain the interaction of Electro Magnetic Radiation (EMR) with Earth's atmosphere? 8M
(b) Define Remote Sensing and explain the stages of Remote Sensing? 6M

UNIT – II

3. Explain various characteristics of sensors? 14M

(OR)

4. Explain briefly about the spectral characteristics of IRS Series? 14M

UNIT – III

5. (a) Explain the term “Visual Image Interpretation”? Give notes on various elements of Visual Interpretation? 10M
(b) Explain the following terms 4M
(i) Pixel (ii) Bands of a Digital Image

(OR)

6. Explain Enhancement techniques in detail? 14M

UNIT – IV

7. Define Raster data and Vector data? Explain the advantages and disadvantages of Raster data and Vector data formats? 14M

(OR)

8. (a) Explain in detail about functions of GIS? 10M
(b) What is 4M's Law? 4M

UNIT-V

9. Explain the applications of Remote Sensing in drought assessment? 14M

(OR)

10. Explain the applications of Remote Sensing in Irrigation management? 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Transportation Engineering - I (CE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Discuss briefly about the objectives of highway planning. 3M
(b) Write down the classification of roads by Nagpur road plan. 8M
(c) What is meant by Reconnaissance? 3M

(OR)

2. (a) Explain about the four most important recommendations made by the Jayakar committee 7M
(b) Write a note on the road patterns 7M

UNIT – II

3. (a) Derive an expression for extra widening on horizontal curves. 3M
(b) Find out the length of transition curve length for the following data. Radius of horizontal curve = 400m. Design speed = 100kmph, length wheel base = 6.2m, number of lanes = 2 8M
location at the rain fall = heavy, terrain condition = hilly, superelevation is introduced by rotating the edges with reference to centre line and the rate of introduction of superelevation is 1 in 150. Width of highway is 7m.
(c) Explain grade compensation and critical length of grade. 3M

(OR)

4. (a) Explain the elements of highway geometric design 9M
(b) For a highway with design speed of 100kmph, determine the safe OSD (assume acceleration as 0.50 m/s², and reaction time = 2.0s) 5M

UNIT – III

5. (a) Write a note on the common methods of on-street parking? 7M
(b) What are the functions of traffic signs? 7M

(OR)

6. (a) What the objectives and application are of spot speed studies? 7M
(b) What are the advantages and disadvantages of traffic signal? 7M

UNIT – IV

7. (a) Present the different types of islands and their functionality in reducing the conflicts. 7M
(b) Present the design procedure of rotary as traffic Control Island. 7M

(OR)

8. (a) What are the requirements of at grade intersection? 5M
(b) Present on different types of intersections. 5M
(c) Draw typical conflict points in an intersection and suggest different types of treatments 4M

UNIT-V

9. (a) Write the construction process of bitumen pavement. 7M
(b) Discuss about various failures of rigid pavements 7M

(OR)

10. (a) What are the various types of flexible pavement failures? Explain briefly. 7M
(b) What are requirements of filler and sealer materials for using them in the construction of cc pavements? 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Water Resources Engineering - I (CE)

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

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Discuss in brief various methods of surface irrigation. 7M
(b) What is 'duty' of water? How can duty be improved? 7M

(OR)

2. (a) A water course has culturable commanded area of 1200 hectares. The intensity of Irrigation for crop A is 40% and for B is 35%, both the crops being Rabi crops. Crop A has a kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of the water course if the kor depth for crop A is 10 cm and for B it is 16 cm. 7M
(b) Explain the various types of irrigation efficiencies. 7M

UNIT – II

3. (a) Explain the classification of canals. 7M
(b) Using Lacey's silt theory, design an irrigation channel for the following data:
Discharge (Q) = 50 m³/s. Silt factor (f) = 1.00, side slopes = ½ : 1 7M

(OR)

4. (a) Compare Kennedy's and Lacey's silt theories. Why is Lacey's conception superior to that of Kennedy's? 7M
(b) Explain the advantages and disadvantages of canal lining. 7M

UNIT – III

5. (a) Describe, in brief, various types of weirs. Distinguish clearly between a weir and a barrage. 7M
(b) Discuss in brief various causes of failure of weirs and their remedies. 7M

(OR)

6. (a) Explain the design of impervious floor for sub-surface flow using Bligh's creep theory 7M
(b) Explain the Khosla's method of independent variables. How do you apply correction for (i) thickness of floor (ii) inclination of floor and (iii) interference of piles? 7M

UNIT – IV

7. (a) Explain the factors on which selection of site for a dam depends. 7M
(b) What is a reservoir? Explain the various types of reservoirs. 7M

(OR)

8. (a) What are the various methods used for the control of silting of reservoirs? 7M
(b) What do you understand by mass flow curve and how is it prepared? What do you understand by demand curve? 7M

UNIT-V

9. (a) Discuss in brief various modes of failure of a gravity dam. 7M
(b) What do you understand by the elementary profile of a gravity dam? 7M
Derive expressions for determining base width of such a dam based on (i) stress criterion and (ii) sliding criterion.

(OR)

10. (a) What are criteria for safe design of earth dam? 7M
(b) Explain the method of plotting phreatic line for an earth dam with horizontal filter at down stream. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021*****SUB: Design & Detailing of Reinforced Concrete Structures-I (CE)*****Time: 3 Hours****Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Explain different methods of R.C.C. design methods. 7M
(b) Draw the stress strain diagram for concrete and state the assumptions in the working stress methods. 7M

(OR)

2. (a) Discuss the different limit state to be considered in reinforced concrete design. 7M
(b) Derive stress block parameters for limit state method. 7M

UNIT – II

3. A Tee beam slab floor of an office comprises of a slab 150 mm thick spanning between ribs spaced at 3 m c/c. The effective span of the beam is 8 m. Service live load on floor is 4 kN/sq.m. Using M 20 grade concrete and Fe 415 HYSD bars, design one of the intermediate tee beam. Sketch the details of reinforcement. 14M

(OR)

4. Design a cantilever beam with a clear span of 2.20 m which carries a superimposed load of 22 kN/m and the beam is monolithic with R.C.C. Column 300 mm wide and 450 mm deep. M 25 grade concrete and Fe 415 steel are used. Sketch the reinforcement details. 14M

UNIT – III

5. (a) Sketch the various types of shear reinforcement normally provided in practice. 4M
(b) A R.C.C. beam 250 mm wide and 450 mm deep, is reinforced with 3 Nos of 20 mm diameter bars of grade Fe 415, on the tension side with an effective cover of 50 mm. If the shear reinforcement of 2 legged 8 mm diameter stirrups at a spacing of 160 mm c/c is provided at a section, determine the design strength of the section. Assume M 20 grade concrete is used. 10M

(OR)

6. (a) Illustrate the basic concepts of shear and bond in R.C.C. sections with respect to (i) Flexure bond, (ii) Development length. 4M
(b) A reinforced concrete beam of rectangular section 350 mm wide is reinforced with 4 bars of 20 mm diameter at an effective depth of 550mm out of which 2 bars are bent up near the support section where a factored shear force of 400 kN is acting. Using M-20 grade concrete and Fe-415 grade HYSD bars design suitable shear reinforcement at the support section. 10M

UNIT – IV

7. Design a R.C. slab for a hall 5 m wide and 6 m long. The slab is simply supported on all the four edges with corners held down and carries a super imposed load of 3 kN/m²(inclusive of floor finishes). Use M20 mix and Fe 415 grade steel. Sketch the details of reinforcement. 14M

(OR)

8. Design a dog-legged stairs for an office building in a room measuring 2.8 m x 5.8 m clear. Vertical distance between floors is 3.6 m. Width of flight is to be 1.25 m. Allow live load of 3kN/m². Use M 20 concrete and Fe 415 steel. Assume the stairs are supported on 230 mm walls at the end of the outer edges of landing slab. 14M

UNIT-V

9. (a) Discuss various assumptions used in the limit state method of design of compression members. 4M

- (b) Design a short R.C.C column to carry an axial load of 1600kN. It is 4 meters long, effectively held in position and restrained against rotation at both ends. Use M 20 concrete and Fe 415 steel. Sketch the details of reinforcement. 10M

(OR)

10. A rectangular simply supported beam with an effective span 4.5 m is 300 mm x 500mm in cross section. It is reinforced with 4 bars of 20 mm diameter. M20 concrete and Fe415 steel are used. The effective cover is 40 mm, taking superimposed live load as 25 kN/m and dead load as 15 kN/m, Calculate the short term deflection of the beam, according to I.S. 456 code specifications. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Structural Analysis - I (CE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT - I

1. A fixed beam of 8m span carries a UDL of 40 kN/m over 4m length starting from left end and a concentrated load of 80 kN at a distance of 6m from the left end. Find 14M
 i) Moment at the supports
 ii) Deflection at the centre of the beam.
 Take $EI = 15000 \text{ kNm}^2$.

(OR)

2. Analyse the beam shown in **fig.1** . Draw SFD and BMD. EI is constant 14M

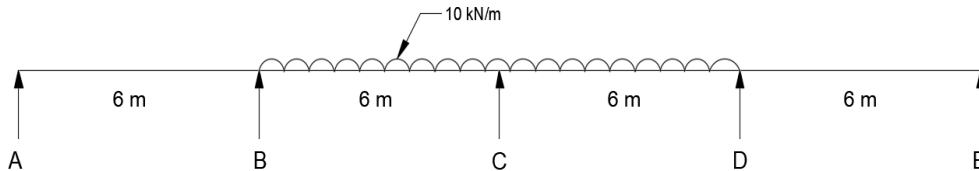


Fig.1

UNIT – II

3. A continuous beam ABCD 12m long is fixed at A and D and is loaded as shown in **fig.2** below. 14M
 Analyse the beam completely if the following moments takes place simultaneously. The end A yields, turning through $1/250$ radians in a clockwise direction. End B sinks 30mm in downward direction. End C sinks 20mm in downward direction. The beam has constant $I = 38.20 \times 10^5 \text{ mm}^4$, $E = 2 \times 10^5 \text{ N/mm}^2$.

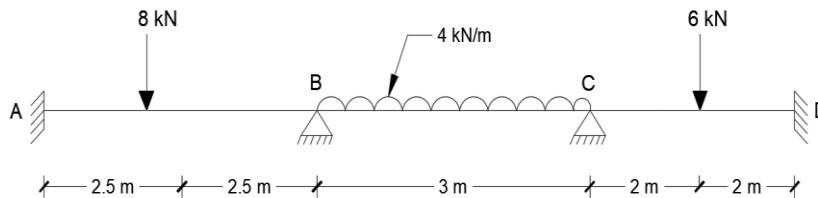


Fig.2

(OR)

4. Analyse the frame as shown in **fig.3** by slope deflection method. Draw SFD and BMD. 14M

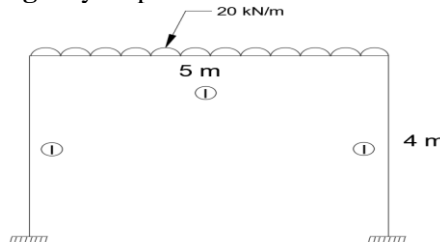


Fig.3

UNIT – III

5. Analyze the beam shown in **fig.4** by MDM. Draw SFD and BMD. 14M

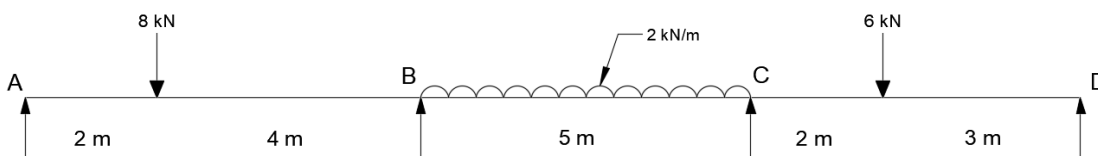


Fig.4

(OR)

6. Analyse the frame shown in **fig.5** by MDM. Draw SFD. 14M

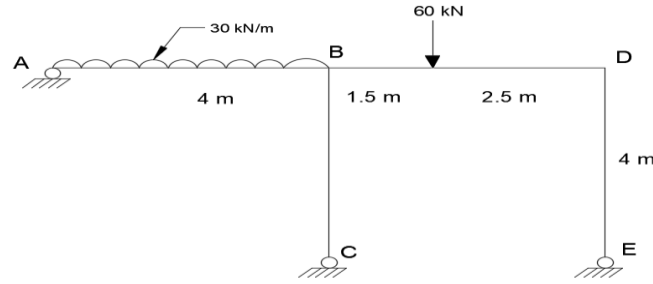


Fig.5

UNIT – IV

7. Analyse the frame shown in **fig.6** by kani's method. 14M

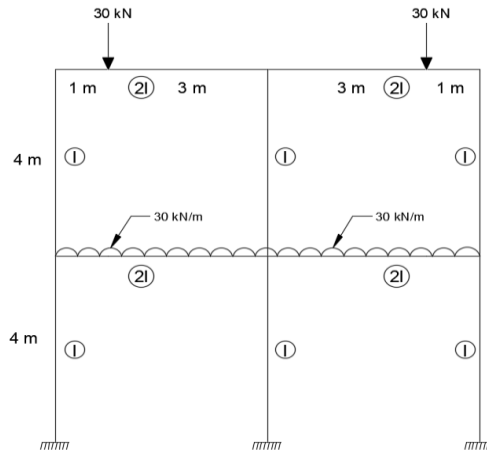


Fig.6

(OR)

8. Analyse the continuous beam as shown in **fig.7** by kani's method. Draw SFD. 14M

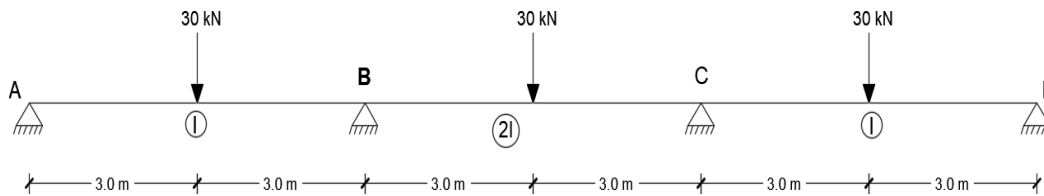


Fig.7

UNIT-V

9. A steel truss of span 15m is loaded as shown in **fig.8**. The cross-section of each member is such that it is subjected to a stress of 100 N/mm^2 . Find the vertical deflection of the joint C. Take $E = 200 \text{ kN/mm}^2$. 14M

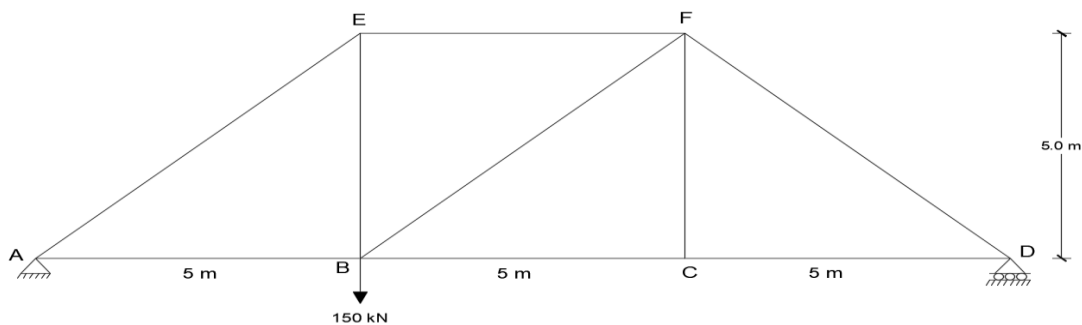


Fig.8

(OR)

10. A simply supported beam of span l carries a concentrated load P at a distance of ' a ' and ' b ' from two ends. Find the strain energy stored in the beam and deflection under the load by Castigliano's theorem. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Managerial Economics and Financial Analysis (CE, ME & ECE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. Define Managerial Economics? What type of issues comes under the purview of Managerial Economics? 14M

(OR)

2. Explain the various factors that influence the demand for an android mobile. 14M

UNIT – II

3. What do you understand by production function? How does a producer achieve least cost combination of factors? 14M

(OR)

4. State the assumptions in Break-Even-Analysis. Explain how Break-Even-Analysis is used by the managers in their day-to-day operations. 14M

UNIT – III

5. Monopoly is disappearing from the market. Do you agree with this statement? Do you advocate for the monopoly to continue in the market situations? 14M

(OR)

6. Why pricing is significant in the context of business? Explain 14M

UNIT – IV

7. Discuss the factors that help in choosing a suitable form of business organization. 14M

(OR)

8. A company is considering an investment proposal which will cost Rs. 5000 with a life of 5 years. The estimated Cash Flows After Tax (CFATs) from the proposal are given below. Determine IRR. 14M

YEAR	1	2	3	4	5
CFATs	1000	1045	1180	1225	1675

UNIT-V

9. Distinguish the differences between a Journal and a Ledger. 14M

(OR)

10. The Balance sheet of Water coopers Ltd., as at 31st March 2019 is as follows 14M

Liabilities	Rs	Assets	Rs
Equity Capital	14,00,000	Goodwill	12,00,000
Debentures	2,50,000	Fixed Assets	4,00,000
Outstanding Expenses	1,50,000	Stock	2,00,000
Sundry Creditors	8,00,000	Debtors	2,00,000
Reserves and Surplus	2,00,000	Cash	2,00,000
Bank OD	2,00,000	Marketable securities	8,00,000
	30,00,000		30,00,000

Net sales Rs 5,00,000; Cost of goods sold Rs. 2,00,000. Opening balances of stock, debtors and creditors are Rs1,00,000, Rs,60,000 and Rs.4,00,000 respectively. Analyse the Solvency and Turnover position of the company.

Q.P. Code: 355212

SET - 2

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Soft Computing Techniques (EEE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.
All questions carry Equal Marks.

UNIT – I

1. Discuss about various approaches of artificial intelligence. 14M

(OR)

2. Discuss in detail about expert system characteristics, capabilities and components. 14M

UNIT – II

3. (a) Write about various historical developments of ANNs. 7M

(b) Explain in detail about various desirable characteristics of ANN. 7M

(OR)

4. (a) Explain briefly about delta learning rule used in ANNs. Why it is called error correction rule. 7M

(b) Write in detail about ADALINE and MADALINE networks. 7M

UNIT – III

5. Discuss any one application of Neural Networks for Control systems in detail. 14M

(OR)

6. (a) Define pattern recognition. Explain its importance in modern world. 7M

(b) Write about ANN application in Pattern Recognition 7M

UNIT – IV

7. (a) Define Classical sets and Fuzzy sets. 4M

(b) What are the different operations on fuzzy sets and explain them with examples 10M

(OR)

8. (a) Define Fuzzification and Defuzzification. 4M

(b) Explain about different Defuzzification methods used in Fuzzy Logic. 10M

UNIT-V

9. Explain the role of fuzzy logic in Switched Reluctance Motor control. 14M

(OR)

10. Design and explain fuzzy logic control system for a typical DC motor speed control. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Power System Operation and Control (EEE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Define the terms
(i) penalty factor (ii) incremental fuel cost and (iii) production costs. 6M
- (b) The fuel cost in Rs/h for a three thermal plants are given by,
 $F_1 = 350 + 7.2P_{G1} + 0.004P_{G1}^2$, $F_2 = 500 + 7.3P_{G2} + 0.0025P_{G2}^2$, $F_3 = 600 + 6.74P_{G3} + 0.003P_{G3}^2$ 8M
 P_{G1} , P_{G2} , P_{G3} are in MW. Find the optimal schedule and compare the cost of this to the case when the generators share the load equally, if i) $P_D=450$ MW ii) $P_D=800$ MW.

(OR)

2. (a) Derive the transmission loss formula for a system consisting of n-generating plants supplying several loads inter connected through a transmission networks. State any assumptions that are made. 14M

UNIT – II

3. (a) Discuss in brief about priority list method to find the solution to unit commitment problem. 8M
- (b) What is meant by unit commitment problem? Explain the need for unit commitment problem in power system operation. 6M

(OR)

4. (a) With the help of flow chart, explain the solution of unit commitment problem using dynamic programming. 14M

UNIT – III

5. (a) Discuss the advantages of operation of power plants with hydro thermal coordination. 5M
- (b) In a two plant operation system, the hydro plant is operate for 8 hrs. during each day and the steam plant is operate all over the day. The characteristics of the steam and hydro plants are $C_s = 20+30P_s+0.04P_s^2$ Rs/h and $W_H = 7.5P_H+0.0012P_H^2$ m³/sec 9M
When both the plants are running, power flow from steam plant to load is 190 MW and the total quantity of water is used for hydro plant operation during 8 hrs is 220×10^6 m³. Determine generation of hydro plant and cost of water used. Neglect transmission losses.

(OR)

6. (a) Explain in brief about short-term hydrothermal scheduling problem and derive co-ordinate equations. 14M

UNIT – IV

7. (a) Explain why it is necessary to maintain the frequency of the system constant. 8M
- (b) Discuss in brief about dynamic response of single area control system. 6M

(OR)

8. (a) Show that steady state frequency deviation in a single area LFC is reduced to zero if the PI controller is reduced. 14M

UNIT-V

9. (a) Discuss in brief about proportional plus integral control of two area system and its block diagram representation. 14M

(OR)

10. (a) Distinguish between load frequency control and economic dispatch control. 8M
- (b) Discuss in brief about uncontrolled case of two area system in load frequency control. 6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Power Systems-III (EEE)

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

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Draw the flow chart for gauss-siedel method considering without PV Buses. 7M
(b) In a 2-Bus power system with Bus-1 as slack bus, $V_1 = 1.0 \angle 0^\circ$ p.u., $P_2 = 1$ and $Q_2 = 0.5$ p.u. with $Z_{12} = 0.012 + j0.16$ p.u. Using GS-method, Determine V_2 after one iteration. 7M

(OR)

2. (a) Derive load flow equations for GS-method. 7M
(b) A 3-Bus power system with generation at Bus-1(slack bus), $V_1 = 1.05 \angle 0^\circ$, $Y_{12} = 10 - j20$, $Y_{13} = 10 - j30$ p.u., $Y_{23} = 16 - j32$ p.u., $Y_{22} = Y_{12} + Y_{23}$, $Y_{33} = Y_{13} + Y_{23}$ with $P_2 = -1.566$ p.u., $Q_2 = -1.162$ p.u., $P_3 = -1.4$ p.u. and $Q_3 = -0.5$ p.u. Using GS-method, determine the voltages at load buses 2 and 3 after one iterations. 7M

UNIT – II

3. (a) Compare the NR & FDL method. 7M
(b) Write the algorithm for NR method considering without PV Buses. 7M

(OR)

4. (a) Derive the jacobian matrix for NR method and Fast decoupled method. 14M

UNIT – III

5. Find the steady state power limit of a system consisting of a generator equivalent reactance 0.50 pu connected to an infinite bus through a series reactance of 1.0 pu. The terminal voltage of the generator is held at 1.20 pu and the voltage of the infinite bus is 1.0 pu. 14M

(OR)

6. (a) A synchronous generator with a synchronous reactance of 1.3 p.u. is connected to a infinite bus whose voltage is 1.0 p.u. through an equivalent reactance of 0.2 p.u. for maximum output of 1.2 p.u. Calculate the alternator e.m.f. 4M
(b) Derive the power angle equation of a power system. Also explain in detail, the power angle curve. 10M

UNIT – IV

7. Explain in detail, the equal area criterion for transient stability analysis of a system. 14M

(OR)

8. (a) Explain in detail, the various methods of improving transient stability in a power system. 7M
(b) A synchronous generator, capable of developing 500MW power per phase, operates at a power angle of 8° . By how much can the input shaft power be increased suddenly without loss of stability? Assume that P_{max} will remain constant. 7M

UNIT-V

9. Derive reflection and refraction currents & voltages on open, short circuit and the line terminated with surge impedance. 14M

(OR)

10. (a) Derive the reflection and refraction coefficients for T-junction. 7M
A surge of 15 kV magnitude travels along a cable towards its junction with an overhead line. The inductance and capacitance of the cable and overhead line are respectively 0.3 mH, 0.4 μ F and 1.5 mH, 0.012 μ F per km. Find the voltage rise at the junction due to the surge. 7M
(b)

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Power Semiconductor Drives (EEE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT – I**

1. (a) What is an electric drive? Explain in detail its essential parts with a neat block diagram. 7M
(b) Classify various load torques? 7M

(OR)

2. (a) Derive the expression for moment of inertia for an electrical drive. 7M
(b) State the merits and demerits of an electrical drives. 7M

UNIT – II

3. (a) Write short notes on: (i) Regenerative braking (ii) Dynamic braking (iii) Plugging 7M
(b) Explain how separately excited d.c. motor is controlled by single phase half-controlled rectifier by assuming continuous conduction mode. Also derive the expression for torque. 7M

(OR)

4. (a) Explain how separately excited d.c. motor is controlled by three phase fully-controlled rectifier by assuming continuous conduction mode. Also derive the expression for torque. 10M
(b) Explain the significance of rectification and inversion mode of 3 phase fully controlled rectifier 4M

UNIT – III

5. (a) State the major features of rotor resistance control of wound rotor induction motor 6M
(b) Explain the operation of static Kramers drive 8M

(OR)

6. Explain the operation of static Scherbius drive in detail 14M

UNIT – IV

7. (a) Derive the torque expression for Synchronous motor. 7M
(b) Explain the open loop operation of VSI fed Synchronous motor drive. 7M

(OR)

8. (a) Explain self-control of Synchronous motor by line commutated inverter? 7M
(b) Explain the Brushless d.c motor drive and enumerate its applications? 7M

UNIT-V

9. (a) What are the methods to involve the improvement of power factor in electrical drives? 7M
(b) Explain the different types of losses in electrical drive system in detail 7M

(OR)

10. (a) Discuss the energy efficient operation of adjustable speed drives 7M
(b) Describe briefly the methods to reduce the energy losses of during starting and braking. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Microprocessors & Microcontrollers (EEE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Explain the various addressing modes of 8086 with an example. 7M
(b) Draw and explain the memory read timing diagrams for maximum mode configuration of 8086. 7M

(OR)

2. Explain in detail about the Instruction Set in 8086 Microprocessor. 14M

UNIT – II

3. (a) Explain the given assembler directives **DD**, **ENDS** and **EVEN** with an examples. 6M
(b) Write an ALP in 8086 to search the largest number in the given array. 8M

(OR)

4. (a) Write an ALP in 8086 to sort numbers in ascending order in an array of n numbers, where size “n” is stored at memory address 500 and the numbers are stored from memory address 501. 7M
(b) Write an ALP in 8086 to sort numbers in descending order in an array of n numbers, where size “n” is stored at memory address 500 and the numbers are stored from memory address 501. 7M

UNIT – III

5. (a) Distinguish between synchronous and asynchronous communication. 6M
(b) Draw the block diagram of 8253 and explain the functions of each block. 8M

(OR)

6. (a) Explain 8251 with a neat block diagram. 7M
(b) Discuss the architecture of 8259 with diagram. 7M

UNIT – IV

7. Explain in detail about how an ADC is interfaced with 8086. 14M

(OR)

8. Explain in detail about how a stepper motor is interfaced with 8086. 14M

UNIT-V

9. Explain in detail about Interrupt structure of 8051. 14M

(OR)

10. (a) Write a program to add the values of locations 50H and 51H and store the result in locations in 52h and 53H using 8051 Microcontroller. 7M
(b) Write a program to find the cube of an 8 bit number program using 8051 Microcontroller. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Linear and Digital Integrated Circuit Analysis (EEE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT – I**

1. (a) Sketch the circuit diagram of instrumentation amplifier and derive the expression for gain. 8M
(b) Design a differentiator to differentiate an input signal varies in frequency ranging 10Hz to 1KHz. If a sine wave of 1V peak at 1KHz is applied to this differentiator, Draw the output waveform. 6M

(OR)

2. (a) Draw the frequency response of dominant pole and pole zero compensation techniques. 8M
(b) Derive the output expression for Non inverting amplifier. 6M

UNIT – II

3. (a) Draw the circuit of a mono-stable multi vibrator using 555 IC and explain its operation. 10M
(b) Design a mono-stable multi vibrator for pulse width of 10ms by IC 555 timer. 4M

(OR)

4. (a) Explain the operation of a Schmitt trigger circuit. 7M
(b) Draw the internal block diagram of 555 timer IC and explain the importance of every component/block of it. 7M

UNIT – III

5. (a) Explain the concept and implementation of ECL logic family. 8M
(b) What are the advantages and disadvantages of ECL? 6M

(OR)

6. (a) Explain in detail about: (i) Open collector TTL (ii) Tri-state logic in TTL 8M
(b) Discuss about CMOS dynamic electrical behavior with characteristics. 6M

UNIT – IV

7. (a) Explain about functions and procedures with examples. 7M
(b) Explain data flow design elements used in VHDL. 7M

(OR)

8. (a) Explain various data types and subtypes used in VHDL. 7M
(b) Explain in detail about the Libraries and packages in VHDL. 7M

UNIT-V

9. (a) Describe the working of 4 to 1 multiplexer and write the VHDL code for it. 7M
(b) Write a VHDL code to simulate a full adder circuit. 7M

(OR)

10. (a) Write VHDL code for 4 bit up-down counter with synchronous reset and clear inputs. 7M
(b) Explain the operation of a 4 bit shift register and write VHDL code. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Computer Networks (ECE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. Explain in detail about TCP/IP model with the help of a neat diagram and list the protocols used in the each layer. 14 M

(OR)

2. (a) Explain in detail about metropolitan and wide area networks 7 M
(b) Explain briefly about wireless LAN 7 M

UNIT – II

3. (a) Explain in detail about twisted pair and co-axial cable. 7 M
(b) Explain in detail about unguided transmission 7 M

(OR)

4. (a) Consider GB-4 protocol, if 10 packets are being transmitted, assuming every 6th packet is lost. Find in how many transmissions all the packets are being transmitted 7 M
(b) Discuss in detail about Stop and Wait protocol. 7 M

UNIT – III

5. (a) Discuss in detail about slotted ALOHA 7 M
(b) Explain in detail about IPv6. 7 M

(OR)

6. (a) Discuss about switched Ethernet 7 M
(b) A pure ALOHA network transmits 200 bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces (a) 1000 frames / second (b) 500 frames / second (c) 250 frames / second 7 M

UNIT – IV

7. (a) Explain UDP header 7 M
(b) Explain in detail about TCP 7 M

(OR)

8. (a) Discuss about transport service primitives 7 M
(b) Explain three way handshake works in TCP 7 M

UNIT-V

9. (a) Write short notes on SMTP 7 M
(b) Write short notes on cryptography. 7 M

(OR)

10. Discuss in detail about WWW with examples and architectures 14 M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Microcontrollers and Applications (ECE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Draw and explain the block diagram of 8051 Microcontroller 10M
(b) Define the term addressing mode? and List out different addressing modes available in 8051 microcontroller 4M

(OR)

2. (a) Explain the functions of SCON and SBUF registers of 8051 7M
(b) Explain the memory organization in 8051 Microcontroller 7M

UNIT – II

3. (a) Assume crystal frequency=12MHz implement the time delay loop for the generation of 50 ms using the instruction set of 8051 7M
(b) Write an Assembly language program for 8051 to copy a block of data 10 bytes long from Ram locations starting at 35H to RAM locations starting at 60H 7M

(OR)

4. (a) Mention the four modes of timer operation and explain 7M
(b) Briefly discuss about the SCON and TCON registers in 8051 7M

UNIT – III

5. (a) Explain addressing modes of Arm 7. 7M
(b) Explain the register organization of ARM7

(OR)

6. (a) Explain the interrupts and vector table in ARM7 7M
(b) Which are the basic features adopted from RISC architecture to enhance the performance of ARM architecture? Explain in short two of them. 7M

UNIT – IV

7. (a) Explain the function of the barrel shifter in the ARM7 core. 7M
(b) Explain the basic registers in exists in ARM processors 7M

(OR)

8. (a) Explain the following ARM instructions 10M
i) $CMP\ r_0, r_1$ ii) $ADD\ r_2, r_1, r_0$
iii) $LDR\ r_{10}, [r_1]$ iv) $AND\ r_1, r_1, \#3$ v) $OR\ r_2, r_2, \#3$
(b) What is mean by thumb mode operation in ARM7 4M

UNIT-V

9. (a) Mention the important characteristics of IoT and applications. 7M
(b) Outline Physical design of IoT with proper explanation of all the blocks 7M

(OR)

10. (a) Summarize IoT enabling Technologies clearly 7M
(b) Give short notes on Zigbee smart and UWB(IEEE 802.15.4). 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Control Systems (ECE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Obtain the transfer function of armature voltage controlled DC Servo motor. 6M
 (b) Obtain mathematical model of the Fig. 1 shown 8M

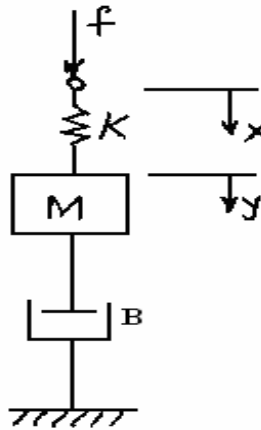


Fig.(1)

(OR)

2. (a) Explain various types of control systems with suitable examples. 6M
 (b) Using block diagram reduction technique, obtain closed loop transfer function of the Fig. 2 shown. 8M

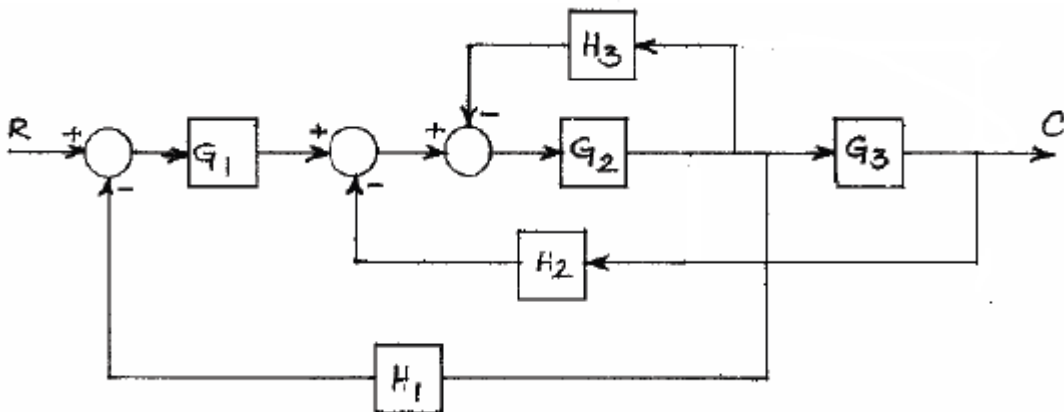


Fig.(2)

UNIT - II

3. (a) Derive the expressions for peak time and settling time of standard 2nd order system when subjected to a unit step input. 7M
 (b) The open loop transfer function of a unity feedback system is $G(s) = \frac{10}{s^2(s+1)}$. If the input is $r(t) = t^2 + 4t + 3$, find the steady – state error 7M

(OR)

4. (a) Determine the position, velocity and acceleration error constants for a unity feedback control system whose open loop transfer function is given by $G(s) = \frac{k}{S(S+4)(S+10)}$. 7M
 For $k = 200$, determine the steady state error for a unit ramp input.
- (b) Show that a derivative feedback has the effect of increasing the damping ratio without affecting the undamped natural frequency of oscillations. 7M

UNIT – III

5. (a) A unity feedback control system is characterized by the open loop transfer function $G(s) = \frac{K(S+10)}{S(S+7)(S+3)}$. (i) Using the Routh's criterion determine the range of values of K for the system to be stable. (ii) Check if for $K=1$, all roots of the characteristic equation of the above system have damping factor greater than 0.5. 8M
- (b) Define the terms: (i) Absolute stability (ii) Marginal stability (iii) Conditional stability 6M
- (OR)
6. (a) Sketch the root locus of the control system whose forward path transfer function is $G(s) = \frac{K}{S(S^2+6S+25)}$. 8M
- (b) The characteristic equation of a servo system is given by $a_0 s^4 + a_1 s^3 + a_2 s^2 + a_3 s + a_4 = 0$. Determine the conditions which must be satisfied by the coefficients of the characteristic equation for the system to be stable. 6M

UNIT – IV

7. (a) List out and derive frequency domain specifications. 7M
- (b) Plot Nyquist plot and test for stability of the system whose $G(s) = \frac{10}{S(0.5S+1)(0.1S+1)}$ 7M
- (OR)
8. (a) Explain polar plot to determine phase margin and gain margin. 7M
- (b) Show that in bode magnitude plot the slope corresponding to a quadratic factor is - 40dB/sec. 7M

UNIT-V

9. Explain the design considerations of lead and lead-lag compensation based on frequency-response approach. 14M
- (OR)
10. The open loop transfer function of unity feedback system is $G(s) = \frac{K}{S(S+1)}$. It is desired to have velocity error constant $K_v = 10 \text{ Sec}^{-1}$ and phase margin as 45° . Design the lead compensator to meet the specifications. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Microwave Engineering (ECE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Explain how velocity modulation is converted into current modulation with Applegate diagram and also derive the equation for output power efficiency. 7M
(b) How to change the frequency of oscillations in reflex klystron? 7M

(OR)

2. (a) Explain in brief about the limitations of conventional vacuum tubes 7M
(b) With necessary equations, explain the velocity modulation process in two cavity klystron amplifier. 7M

UNIT – II

3. (a) What are the different propagation constants TWT? How to calculate them? 7M
(b) Define M-type tubes? List out the techniques for Pi-mode separation? 7M

(OR)

4. (a) Draw the structure of TWT and explain its amplification process. 7M
(b) What is Hartree condition in Magnetron? Derive the equation for Hartree voltage of it. 7M

UNIT – III

5. (a) Discuss about construction and operation of PIN diode. 7M
(b) .Discuss RWH theory. 7M

(OR)

6. (a) Draw and explain in detail about IMPATT diode. 7M
(b) Explain classifications and applications of Tunnel diode. 7M

UNIT – IV

7. (a) With relevant equations, explain the properties of S-matrix with corresponding proof. 7M
(b) Discuss the structure and principle of operation of Isolator.

(OR)

8. (a) Derive scattering matrix of E – plane tee using S – parameter theory 7M
(b) What are ferrites devices? Explain in detail the different ferrite devices 7M

UNIT-V

9. (a) Write a brief note on insertion loss and attenuation measurements 7M
(b) List out advantages of MICs. 7M

(OR)

10. (a) Discuss in detail the impedance measurement using microwave devices 7M
(b) Discuss materials and fabrication. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Digital Signal Processing (ECE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Using properties of Z-transform, find the Z-transform of the following signals: 8M
- $x(n) = u(-n)$
 - $x(n) = u(-n - 2)$
 - $x(n) = u(-n + 1)$
 - $x(n) = 2^n u(n - 2)$
- (b) Determine the Inverse z-transform of 6M
- $$X(z) = \frac{1}{1 - 1.5z^{-1} + 0.5z^{-2}}$$
- when
- ROC: $|z| > 1$
 - ROC: $|z| < 0.5$

(OR)

2. (a) List and explain the properties of ROC w.r.t Z-transform. 9M
- (b) Determine the step response of an LTI system whose impulse response $h(n)$ is given by $h(n) = a^{-n}u(-n)$; $0 < a < 1$. 5M

UNIT – II

3. (a) List and explain the properties of DFS. 5M
- (b) Find the linear convolution of the following sequences using DFT: 9M
- $x(n) = \{1, -1, 1, -1\}$, $h(n) = \{1, 2, 3, 4\}$
 - $x(n) = \{1, 2, 0, 1\}$, $h(n) = \{2, 2, 1, 1\}$
 - $x(n) = \{1, 2, 1, 2\}$, $h(n) = \{4, 3, 2, 1\}$

(OR)

4. (a) Develop DIT FFT algorithms for decomposing the DFT for $N = 12$ and draw the flow diagrams for: 7M
- $N = 3 \times 4$ and
 - $N = 4 \times 3$.
- (b) Explain the radix-2 DIF FFT algorithm and draw the butterfly diagram for 8-point DIF FFT. 7M

UNIT – III

5. Obtain the direct form I, direct form II, cascade, and parallel structures for the following systems: 14M

i. $y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n) + \frac{1}{3}x(n-1)$

ii. $H(z) = \frac{2(1-z^{-1})(1+\sqrt{2}z^{-1}+z^{-2})}{(1+0.5z^{-1})(1-0.9z^{-1}+0.81z^{-2})}$

(OR)

6. (a) Discuss the different methods of realization of IIR systems and explain how conversion can be made from direct form-I structure to direct form-II structure. 7M

- (b) Construct the block diagram and signal flow graph of a discrete-time system whose input-output relations are described by the difference equation: 7M
- i. $y(n) = 0.5x(n) + 0.5x(n-1)$
 - ii. $y(n) = 0.25y(n-1) + 0.5x(n) + 0.75x(n-1)$

UNIT – IV

7. (a) For the given specifications, design an analog Butterworthy filter: 10M
- $$0.9 \leq |H(j\Omega)| \leq 1 \text{ for } 0 \leq \Omega \leq 0.2\pi$$
- $$|H(j\Omega)| \leq 0.2 \text{ for } 0.4\pi \leq \Omega \leq \pi$$
- (b) Discuss the concept of frequency transformation in analog domain. 4M

(OR)

8. (a) Design a digital low pass Butterworth filter using Bilinear transformation, if pass band and stop band cut off frequencies are 800 rad/sec & 1800 rad/sec respectively. The pass band attenuation is -3dB and stop band attenuation is -10dB. 10M
- (b) Compare impulse invariant and bilinear transformation methods. 4M

UNIT-V

9. (a) Design an FIR Digital Low-Pass Filter using Rectangular window whose cut-off frequency is 2 rad/s and length of window N=9. 10M
- (b) Compare the Hamming and Kaiser windows. 4M

(OR)

10. (a) List and explain some important characteristics of an FIR digital filter. 8M
- (b) What is an FIR filter? Compare an FIR filter with an IIR filter. 6M

Q.P. Code: 555212

SET - 2

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Power Plant Engineering (ME)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT – I

1. Explain the need for condensers in a steam power plant and explain the operation of a High level barometric condenser 14M

(OR)

2. Draw a layout of ash handling and dust collection system and Explain 14M

UNIT – II

3. What different methods are used to improve the thermal efficiency of a open cycle gas turbine power plant 14M

(OR)

4. What are the methods used for cooling of an IC Engine? Describe the working of a thermostatically controlled cooling system 14M

UNIT – III

5. (a) Explain a high head Tidal power plant giving its layout clearly 7M
(b) What are the various factors to be consider in selecting site for a hydroelectric power plant 7M

(OR)

6. Explain the working principle of sodium graphite reactor with a help of neat diagram and also write the advantages and disadvantages of the sodium graphite reactor 14M

UNIT – IV

7. (a) What are the different types of solar energy collectors 7M
(b) Draw a neat diagram of Horizontal axis wind turbine and explain its main components 7M

(OR)

8. Demonstrate the working of open cycle MHD system with a neat sketch and also write the advantages and disadvantages of MHD system? 14M

UNIT-V

9. Explain Different methods of Pollution control? 14M

(OR)

10. A power plant has the following annual factors load factor 70%,capacity factor 50%,used factor 60% and maximum demand 20MW.Estimate
i) Annual energy production 14M
ii) Reserve capacity over and above the peak load
iii) Hours in a year during the which the plant was not in operation

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Refrigeration and Air Conditioning (ME)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Define COP and differentiate Heat Engine, Heat Pump and Refrigerator. **7M**
 (b) An air refrigerator working on Bell-Coleman cycle takes air into the compressor at 1 bar and -5°C . It is compressed to 5 bar and cooled to 25°C at the same pressure. It is further expanded in the expander to 1 bar and discharged to take the cooling load. The isentropic efficiencies of the compressor and expander are 85% and 90% respectively. Find:
 (i) Refrigeration capacity of the system if the air circulation is 40 kg/min
 (ii) KW capacity of the motor required to run the compressor. (iii) COP of the system.

(OR)

2. (a) Derive an expression for COP of a Bell-Coleman air refrigeration cycle. **7M**
 (b) Explain the working principle of a simple evaporative air craft refrigeration system. **7M**

UNIT – II

3. (a) A vapour compression refrigeration plant works between pressure limits of 5.3 bar and 2.1 bar. The vapour is super-heated at the end of compression, its temperature being 37°C . The vapour is super-heated by 5°C before entering the compressor. If the specific heat of super-heated vapour is 0.63 kJ/Kg-K, find the COP of the plant. Use the data given below. **8M**

Pressure Bar	Saturation Temp $^{\circ}\text{C}$	Liquid heat, kJ/Kg	Latent Heat, kJ/Kg
5.3	15.5	56.15	144.9
2.1	-14.0	25.12	158.7

- (b) Explain the differences between expander and throttling device. **6M**

(OR)

4. (a) Explain the working principle of four shell Li-Br- water vapour absorption refrigeration system. **8M**
 (b) Derive an expression for calculation of maximum COP for ideal vapour absorption refrigeration system. **6M**

UNIT – III

5. (a) What are the desirable properties of refrigerants and how do you select? **8M**
 (b) How do you classify refrigerants? **6M**

(OR)

6. (a) Explain the nomenclature of refrigerants with suitable examples. **7M**
 (b) Discuss the effect of refrigeration and air conditioning on global warming. **7M**

UNIT – IV

7. (a) In a laboratory test a psychrometer recorded 36°C DBT and 30°C WBT calculate the following terms. **8M**
 i) Vapour pressure, ii) Relative humidity, iii) Specific humidity, vi) Degree of saturation, v) Dew point temperature, vi) Enthalpy of the mixture.
 (b) The temperature and relative humidity of air at a place are 33°C and 68% respectively. Find i) dew point temperature ii) humidity ratio iii) specific volume of the moist air. Assume the pressure as 1.013 bar and the universal gas constant as 8.3143 kJ/kgmole.k **6M**

(OR)

8. (a) Elaborate the term 'RSHF' and what loads are considered in fixing 'RSHF'? **6M**

- (b) The amount of air supplied to an air conditioned hall is $300 \text{ m}^3/\text{min}$. The atmospheric conditions are 35°C DBT and 55% RH. The required conditions are 20°C DBT and 60% RH. Find the Sensible Heat and Latent Heat removed from air per minute **8M**

UNIT-V

9. (a) Explain the winter air-conditioning system with the help of a neat sketch. **7M**
(b) Define the “human comfort” and Briefly explain the requirements of human comfort air conditioning. **7M**

(OR)

10. (a) Define the term “effective temperature” and explain its importance in air conditioning system. Describe the factors which affect effective temperature. **7M**
(b) Explain the working of window air-conditioner with a neat sketch. **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Dynamics of Machinery - II (ME)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Discuss the effect of gyroscopic couple on a naval ship during steering. 6M
(b) Explain the effect of gyroscopic couple and centrifugal couple on the four wheel drive moving on a curved path. 8M

(OR)

2. (a) Explain the application of gyroscopic principles to aircrafts. 7M
(b) The mass of the turbine rotor of a ship is 20 tons and has a radius of gyration of 0.60 m. Its speed is 2000 r.p.m. The ship pitches 6° above and 6° below the horizontal position. A complete oscillation takes 30 seconds and the motion is simple harmonic. Determine the following: 7M
a) Maximum gyroscopic couple,
b) Maximum angular acceleration of the ship during pitching, and
c) The direction in which the bow will tend to turn when rising, if the rotation of the rotor is clockwise when looking from the left.

UNIT – II

3. (a) Discuss how a single rotating mass by a single mass rotating in the same plane. 4M
(b) Four masses m_1 , m_2 , m_3 and m_4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45° , 75° and 135° . Find the position and magnitude of the balance mass required, if its radius of rotation is 0.2 m. 10M

(OR)

4. The crank and connecting rod of a petrol engine, running at 1800 r.p.m. are 50 mm and 200 mm respectively. The diameter of the piston is 80 mm and the mass of the reciprocating parts is 1 kg. At a point during the power stroke, the pressure on the piston is 0.7 N/mm^2 , when it has moved 10 mm from the inner dead centre. Determine 14M
a) Net load on the gudgeon pin,
b) Thrust in the connecting rod,
c) Reaction between the piston and cylinder, and
d) The engine speed at which the above values become zero.

UNIT – III

5. The three cylinders of an air compressor have their axes 120° to one another and their connecting rods are coupled to a single crank. The stroke is 100 mm and the length of each connecting rod is 150 mm. The mass of the reciprocating parts per cylinder is 1.5kg. Find the maximum primary and secondary forces acting on the frame of the compressor when running at 3000 r.p.m. Describe clearly a method by which such forces may be balanced. 14M

(OR)

6. Discuss the balancing of V-engines. 14M

UNIT – IV

7. (a) A cantilever shaft 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free end. The Young's modulus for the shaft material is 200 GN/m². Determine the frequency of longitudinal and transverse vibrations of the shaft. 7M
- (b) Explain the term Whirling speed of a shaft. Prove that the whirling speed for a rotating shaft is the same as the frequency of natural transverse vibration. 7M

(OR)

8. (a) Establish an expression for the natural frequency of free transverse vibrations for a simply supported beam carrying a number of point loads, by Dunkerley's method 7M
- (b) Calculate the whirling speed of a shaft 20 mm diameter and 0.6 m long carrying a mass of 1 kg at its mid-point. The density of the shaft material is 40 Mg/m³, and Young's modulus is 200 GN/m². Assume the shaft to be freely supported. 7M

UNIT-V

9. Establish an expression for frequency of under damped forced vibrations using differential equation method. 14M

(OR)

10. A single-cylinder engine of total mass 200 kg is to be mounted on an elastic support which permits vibratory movement in vertical direction only. The mass of the piston is 3.5 kg and has a vertical reciprocating motion which may be assumed simple harmonic with a stroke of 150 mm. It is desired that the maximum vibratory force transmitted through the elastic support to the foundation shall be 600 N when the engine speed is 800 r.p.m. and less than this at all higher speeds. 14M
- a) Find the necessary stiffness of the elastic support, and the amplitude of vibration at 800 r.p.m., and
- b) If the engine speed is reduced below 800 r.p.m. at what speed will the transmitted force again becomes 600 N?

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Operations Research (ME)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. An electronic company manufactures two television models each on a separate production line. The daily capacity of I line is 60 and that of II line is 75 Televisions. Each unit of the model I uses 10 pieces of a certain electronic Component, where as each unit of model II requires 8 pieces of the same component. The maximum daily availability of the special component is 800 pieces. The profit per unit for models I and II are Rs.30 and Rs.20 respectively. Formulate this problem as linear programming model. Using graphical method determine the optimum daily production of the two models. 14M

(OR)

2. Solve the following LPP using Big-M method. 14M
 Maximize $z = 15x_1 + 25x_2$
 Subject to : $7x_1 + 6x_2 \geq 20$
 $8x_1 + 5x_2 \leq 30$
 $3x_1 - 2x_2 = 18$
 $x_1, x_2 \geq 0$

UNIT - II

3. A company has four factories manufacturing the same commodity, which are required to be transported to meet the demand in four warehouses. The supplies and demands as also the cost per transportation from factory to warehouse in rupees per unit of product are given in following table. Find the optimum transportation plan. 14M

Plant	Ware houses				Supply (Units)
	X	Y	Z	W	
A	25	55	40	60	60
B	35	30	50	40	140
C	36	45	26	66	150
D	35	30	41	50	50
Demand	90	100	120	140	

Derive an optimal strategy of transportation of goods from factories to Warehouses and assess the optimal cost.

(OR)

4. A dispatcher of the police department has received four requests for police assistance. Currently, six patrol-cars are available for assignment and the estimated response time (in minutes) are shown in table that follows. 14M

Incident	Patrol Unit					
	1	2	3	4	5	6
I	6	5	3	4	5	6
II	8	6	2	3	7	6
III	4	4	7	6	5	5
IV	3	7	9	8	4	7

- (a) Which patrol unit should respond?
 (b) What will be average response time?

UNIT – III

5. A computer contains 10,000 resistors. When any resistor fails, it is replaced. The cost of replacing a resistor individually is Rs.1 only .If all the resistors are replaced at the same time , the cost per resistor would be reduced to 35 paise. The percent surviving at the end of month ‘t’ is given below: 14M

Month	:	1	2	3	4	5	6
% surviving at the end of the month(S_t)	:	97	90	70	30	15	0

What is the optimum replacement plan?

(OR)

6. Determine the optimal sequences of jobs that minimizes the total elapsed time based on the following information, processing time on machines is given in hours and passing is not allowed 14M

Job	A	B	C	D	E	F	G
M_1	3	8	7	4	9	8	7
M_2	4	3	2	5	1	4	3
M_3	6	7	5	11	5	6	12

UNIT – IV

7. In a railway yard goods train arrive at a rate of 30 trains per day. Assuming that the inter-arrival time follows an exponential distribution and the service time distribution is also exponential with an average of 36 minutes. Calculate the following. 14M
- (a) The average number of trains in the queue
 (b) The average number of trains in the system.
 (c) The probability that the number trains exceeds 10.

(OR)

8. A super market has two sales girls at the sales counters. If the service time for each customer is exponential with a mean of 4 minutes, and if the people arrive in a Poisson fashion at the rate of 10 an hour, calculate 14M
- (i) Probability that there is no customer in the system.
 (ii) Average number of customers in the queue
 (iii) Average number of customers in the system.
 (iv) Average waiting time in the queue
 (v) Utilization factor.

UNIT-V

9. (a) Discuss the assumptions underlying basic EOQ formula and derive EOQ formula. 6M
 (b) An automobile industry requires 3600 special bushes per year. Ordering cost is expected to be Rs.225 per order and carrying cost is estimated at Rs.2 per bush per year. Purchase cost of the bush is Rs. 30 /unit. The vendor of this bush offers a discount scheme as follows. Suggest a better scheme. 8M
- (i) 10% discount per bush is offered if the annual demand is placed in one order
 (ii) 5% discount is offered if every year two orders are placed

(OR)

10. (a) List the applications of simulation? 4M
 The probability distribution for arrival and service is to follow the following pattern.

Arrival time(min)	3	4	5	6	7	8
Probability	0.02	0.2	0.4	0.3	0.1	0.08
Service time(min)	3	4	5	6	7	
Probability	0.1	0.2	0.4	0.28	0.02	

- (b) 10M

Simulate queuing system and Find average waiting time of customer and server.

Random numbers for Inter arrival time: 09, 41,74, 00,72, 67, 55, 71, 35, 41.

Random numbers for Inter service time: 72, 34, 54, 30, 22, 48, 74, 76, 02, 07.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Design of Machine Elements - II (ME)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Explain the following terms of the spring : (i) Free length; (ii) Solid height; (iii) Spring rate; (iv) Active and inactive coils; (v) Spring index; and (vi) Stress factor. 6M
(b) Design a helical compression spring for a maximum load of 1000 N for a deflection of 25 mm using the value of spring index as 5. The maximum permissible shear stress for spring wire is 420 MPa and modulus of rigidity is 84 kN/mm². 8M

(OR)

2. (a) Explain the utility of the centre bolt, U-clamp, rebound clip and camber in a leaf spring. 6M
(b) Design a leaf spring for the following specifications: Total load = 140 kN; Number of springs supporting the load = 4; Maximum number of leaves = 10; Span of the spring = 1000 mm; Permissible deflection = 80 mm. Take Young's modulus, $E = 200 \text{ kN/mm}^2$ and allowable stress in spring material as 600 MPa. 8M

UNIT – II

3. (a) Explain the following terms as applied to journal bearings: (a) Bearing characteristic number; and (b) Bearing modulus. 4M
(b) A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm². The speed of the journal is 900 r.p.m. and the ratio of journal diameter to the diametral clearance is 1000. The bearing is lubricated with oil whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s. The room temperature is 35°C. Find : 1. The amount of artificial cooling required, and 2. The mass of the lubricating oil required, if the difference between the outlet and inlet temperature of the oil is 10°C. Take specific heat of the oil as 1850 J / kg / °C. 10M

(OR)

4. (a) Provide the commonly used materials for sliding contact bearings? 4M
(b) Design a journal bearing for a centrifugal pump running at 1440 r.p.m. The diameter of the journal is 100 mm and load on each bearing is 20 kN. The factor ZN/p may be taken as 28 for centrifugal pump bearings. The bearing is running at 75°C temperature and the atmospheric temperature is 30°C. The energy dissipation coefficient is 875 W/m²/°C. Take diametral clearance as 0.1 mm. 10M

UNIT – III

5. (a) Explain how the following factors influence the life of a bearing: 6M
(a) Load (b) Speed (c) Temperature (d) Reliability
(b) A ball bearing subjected to a radial load of 5 kN is expected to have a life of 8000 hours at 1450 r.p.m. with a reliability of 99%. Calculate the dynamic load capacity of the bearing so that it can be selected from the manufacturer's catalogue based on a reliability of 90%. 8M

(OR)

6. (a) Select appropriate type of rolling contact bearing under the following condition of loading giving reasons for your choice. 6M
1. Light radial load with high rotational speed.
2. Heavy axial and radial load with shock.
3. Light load where radial space is very limited.
4. Axial thrust only with medium speed.

- (b) Design a bearing of shaft rotating at constant speed is subjected to variable load. The bearings supporting the shaft are subjected to stationary equalent radial load of 3KN for 10% of time, 2KN for 20% of time, 1KN for 30% of time and no load for remaining time of cycle. If the total expected for the bearing is 20 million revolutions at 95% reliability, calculate dynamic load rating of the roller bearing? 8M

UNIT – IV

7. Discuss the design procedure of spur gears. 14M

(OR)

8. A pair of helical gears are to transmit 15 kW. The teeth are 20° stub in diametral plane and have a helix angle of 45°. The pinion runs at 10 000 r.p.m. and has 80 mm pitch diameter. The gear has 320 mm pitch diameter. If the gears are made of cast steel having allowable static strength of 100 MPa; determine a suitable module and face width from static strength considerations and check the gears for wear, given $\sigma_{es} = 618$ MPa. 14M

UNIT-V

9. Design a connecting rod for an I.C. engine running at 1800 r.p.m. and developing a maximum pressure of 3.15 N/mm². The diameter of the piston is 100 mm ; mass of the reciprocating parts per cylinder 2.25 kg; length of connecting rod 380 mm; stroke of piston 190 mm and compression ratio 6 : 1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressures as 10 N/mm² and 15 N/mm². The density of material of the rod may be taken as 8000 kg/m³ and the allowable stress in the bolts as 60 N/mm² and in cap as 80 N/mm². The rod is to be of I-section for which you can choose your own proportions. Draw a neat dimensioned sketch showing provision for lubrication. Use Rankine formula for which the numerator constant may be taken as 320 N/mm² and the denominator constant 1 / 7500. 14M

(OR)

10. Discuss the design procedure of piston for an internal combustion engine. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Unix and Shell Programming (CSE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Explain the salient features of Unix system. 7M
(b) Explain buffer cache and write its advantages. 7M

(OR)

2. (a) Explain inodes and its assignment to a new file. 7M
(b) Explain the accessing and releasing blocks of inodes. 7M

UNIT – II

3. (a) Explain file system types. 7M
(b) Explain mounting and un mounting the file systems. 7M

(OR)

4. (a) Explain where to use links. 7M
(b) Explain symbolic links and give example. 7M

UNIT – III

5. (a) Explain the concept of Job control and its related commands with examples. 6M
(b) Explain various process states with neat diagram. 8M

(OR)

6. (a) Explain the following commands: cron, nice, nohup and kill with examples. 8M
(b) Explain the advantages of running jobs in background and give example. 6M

UNIT – IV

7. (a) Explain different types of shells. 8M
(b) Explain disk related commands in Bourne shell. 6M

(OR)

8. (a) Explain any two loop control structures of Korn shell with examples. 8M
(b) Write a shell script to print all prime numbers from 1 to 100. 6M

UNIT-V

9. (a) Explain the functions of socket programming for Inter Process Communication. 7M
(b) Explain the Network Communication techniques. 7M

(OR)

10. (a) Explain the Inter Process Communication mechanism using Message Queues. 7M
(b) Explain the solution with Semaphores. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Mobile Application Development (CSE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) What is Text View control? Explain with example? 7M
(b) How to launch Android Application (Project) on a Handset? 7M

(OR)

2. (a) Explain the procedure of Installing Android SDK? 7M
(b) What is ADB? Why it is required? 7M

UNIT – II

3. (a) Explain about Radio Button concept with example? 7M
(b) Explain about Edit Text control with example? 7M

(OR)

4. (a) Explain Button control with example? 7M
(b) Explain Check Box control with example?

UNIT – III

5. (a) How to create an Image Switcher Application? 7M
(b) Explain about Linear Layout with Example? 7M

(OR)

6. (a) How to create value Resources? 7M
(b) Write usage of Draw able Resources? 7M

UNIT – IV

7. (a) Explain in detail about Time Picker Dialog? 7M
(b) Explain in detail about Fragments? 7M

(OR)

8. (a) Explain in detail about List View? 7M
(b) List out and explain different types of Dialogs? 7M

UNIT-V

9. (a) How to create Menus through XML? 7M
(b) How to Replace menu with the Action Bar? 7M

(OR)

10. (a) How to create an application which shows Context menu with List View Example? 7M
(b) Write an Application for Login page which contains username, password, submit and reset Button? 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Data Mining (CSE)

Time : 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) Discuss about the specific challenges that motivates the development of Data mining. 7M
 (b) Explain about different attribute types. 7M

(OR)

2. (a) What are the different OLAP operations? Explain. 8M
 (b) Explain about Simple matching coefficient and Jaccard coefficient. 6M

UNIT – II

3. (a) Explain about model over fitting due to presence of noise. 7M
 (b) Discuss the Hunt's algorithm with an example. 7M

(OR)

4. (a) Explain the methods for expressing attribute test conditions for different types of attributes in decision tree induction 6M
 (b) Discuss the methods used to evaluate the performance of a Classifier. 8M

UNIT – III

5. (a) State Bayes theorem. Explain how Bayes theorem is used for classification. 7M
 (b) Explain different methods for constructing an Ensemble classifier. 7M

(OR)

6. (a) Discuss the characteristics of Nearest neighbor classifier. 7M
 (b) What are the characteristics of SVM? Explain. 7M

UNIT – IV

7. Generate frequent itemsets for the following Transaction data set using Apriori algorithm. 14M
 Consider min_Support =2.

TID	Items
1	{a,b}
2	{b,c,d}
3	{a,c,d,e}
4	{a,d,e}
5	{a,b,c}
6	{a,b,c,d}
7	{a}
8	{a,b,c}
9	{a,b,d}
10	{b,c,e}

(OR)

8. (a) What is meant by Maximal frequent itemsets and closed frequent itemsets. Give an example. 6M
 (b) Explain Support and Confidence of an association rule with an example. 8M

UNIT-V

9. (a) Compare DBSCAN and K-Means algorithms 7M
 (b) Write basic Agglomerative Hierarchical clustering algorithm. 7M

(OR)

10. (a) Explain about classification of points according to Centre-based density. 6M
 (b) Explain about different cluster characteristics. 8M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Cryptography and Network Security (CSE)

Time: 3 Hours**Max. Marks: 70****Answer any FIVE Questions choosing one question from each unit.****All questions carry Equal Marks.****UNIT - I**

1. (a) What is meant by transposition technique? Discuss Rail fence technique with an example 7M
(b) Explain Hill Cipher encryption technique with an example. 7M

(OR)

2. (a) What is meant by computer security? Explain different types of security attacks with appropriate diagrams. 9M
(b) Write about modern stream ciphers. 5M

UNIT – II

3. (a) Describe about RC4 algorithm. 5M
(b) What is the difference between Block cipher and stream cipher? Explain DES with appropriate diagrams. 9M

(OR)

4. (a) Discuss modular arithmetic and explain $GF(2^n)$ fields with addition and multiplication 7M
(b) Explain linear congruence and quadratic congruence with examples 7M

UNIT – III

5. (a) Identify the possible threats for RSA algorithm and list their counter measures. 7M
(b) Perform decryption and encryption using RSA algorithm with $p=3$, $q=11$, $e=7$ and $n=5$. 7M

(OR)

6. (a) What are the requirements for cryptographic hash function? 5M
(b) List out the applications of cryptographic Hash – functions. Discuss briefly on Hash functions based on Cipher Block Chaining technique. 9M

UNIT – IV

7. (a) What is a message authentication code? Explain the requirements for MACs. 5M
(b) Write about HMAC algorithm and its security? 9M

(OR)

8. (a) What are the two different approaches to digital signature? Explain. 8M
(b) Explain digital signature standard briefly? 6M

UNIT-V

9. (a) What is meant by user authentication? Explain the principles of Remote user authentication. 7M
(b) What is the motivation for Kerberos? Discuss Kerberos version 4. 7M

(OR)

10. (a) Explain the functionality of S/MIME? 8M
(b) Explain briefly about different nature of viruses? 6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Design & Analysis of Algorithms (CSE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Explain bubble sort algorithm and simulate it for the following data 5,1,4,2,8 7M
 (b) Write a short notes on asymptotic notations. 7M

(OR)

2. (a) Differentiate between priori analysis and posteriori analysis. 7M
 (b) Discuss sequential search algorithm and analyze its time complexity 7M

UNIT – II

3. (a) Explain quicksort algorithm and show the tracing steps for following data sequence: 7M
 54,26,93,17,77,31,44,55,20
 (b) Solve the following recurrence relation $T(n) = 7T(n/2) + cn^2$ 7M

(OR)

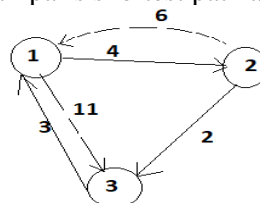
4. (a) Compute the optimal solution for job sequencing with deadlines using greedy method. $N=4$, 7M
 profits $(p_1, p_2, p_3, p_4) = (100, 10, 15, 27)$, Deadlines $(d_1, d_2, d_3, d_4) = (2, 1, 2, 1)$
 (b) Explain about Kruskal’s algorithm with an example. 7M

UNIT – III

5. (a) Solve the solution for 0/1 knapsack problem using dynamic programming $(p_1, p_2, p_3) =$ 7M
 $(1, 2, 5)$, $(w_1, w_2, w_3) = (2, 3, 4)$, $M=6$, $n=3$
 (b) Write a short notes on multistage graph. 7M

(OR)

6. (a) Explain single source shortest path problem with example using dynamic programming 7M
 (b) Calculate shortest distances using all pairs shortest path algorithm 7M



UNIT – IV

7. (a) Write and explain depth first search algorithm with example. 7M
 (b) Apply the backtracking algorithm to solve the following instance of the sum of subsets 7M
 problem $S = \{5, 10, 12, 13, 15, 18\}$ and $M=30$.

(OR)

8. (a) Discuss the concept of biconnected component with an example. 7M
 (b) Describe graph coloring problem and write an algorithm for m-coloring problem. 7M

UNIT-V

9. (a) Solve the following instance of travelling sales person problem using Branch and Bound 7M

	A	B	C	D
A	∞	4	12	7
B	5	∞	∞	18
C	11	∞	∞	6
D	10	2	3	∞

- (b) State and prove Cook’s theorem. 7M

(OR)

10. (a) Explain deterministic and non-deterministic algorithms. 7M
 (b) Draw the portion of state space tree generated by LCBB by the following knapsack problem 7M
 $n=5$, $(p_1, p_2, p_3, p_4) = (10, 10, 12, 18)$, $(w_1, w_2, w_3, w_4) = (2, 4, 6, 9)$ and $m=15$

Q.P. Code: 656212

SET - 2

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of March – 2021
SUB: Object Oriented Analysis & Design (CSE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT – I

1. (a) Draw and explain the system architecture for unified modeling language. 10M
(b) Give brief description about the principle of modeling. 4M

(OR)

2. Explain in detail about the conceptual model of a unified modeling language. 14M

UNIT – II

3. What is relationship? And explain modeling techniques for relationships? 14M

(OR)

4. What is Class diagram and write with an example? Explain about the steps involved in modeling a logical database schema with examples? 14M

UNIT – III

5. (a) Distinguish between collaboration and Sequence diagrams. 7M
(b) Explain the modeling of flow of control by time ordering. 7M

(OR)

6. Write briefly about Swimlanes , Forking and Joining in Activity diagram with an example. 14M

UNIT – IV

7. Write short notes on 14M
(i) States
(ii) Transitions
(iii) Substates

(OR)

8. Explain about State chart diagram in detail. 14M

UNIT-V

9. What is deployment diagram? Write modeling technique for client/server system. 14M

(OR)

10. Draw and explain the following diagrams for the unified library management application: 14M
(i) Sequence diagram
(ii) Use case Diagram