SET - 2

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
SUB: Remote Sensing and 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) Illustrate the physics of remote sensing in detail.   7M
    (b) Differentiate active and passive remote sensing systems.   7M
    (OR)
2. (a) Outline spectral reflectance signature of electromagnetic spectrum.   7M
    (b) How EMR does interact with water vapors?   7M

UNIT – II

3. (a) Explain various types of satellites and orbits   7M
    (b) Outline various characteristics of sensors in detail   7M
    (OR)
4. (a) Explain briefly about the sensors used in the land sat and IRS series?   7M
    (b) How the sensors are classified based on their functions?   7M

UNIT – III

5. (a) List the steps involved in image processing techniques.   7M
    (b) What is resolution and explain spatial and gray level resolutions?   7M
    (OR)
6. Discuss about visual image interpretation techniques in detail.   14M

UNIT – IV

7. (a) What is projection and list various types of projections?   7M
    (b) Explain computational analysis method in detail.   7M
    (OR)
8. What is data base management systems? Explain various features and applications of   14M
    DBMS.

UNIT-V

9. Explain the applications of remote sensing in environmental sciences   14M
    (OR)
10. Explain how drought assessment and management can be done using remote sensing   14M
    techniques.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) What are the objectives of highway Planning? Explain.   7M
    (b) Explain briefly about the third 20 year road development plan   7M

(OR)

2. (a) What are the significant recommendations of Jayakar committee? Mention how these recommendations helped in road development in India.   7M
    (b) Briefly explain about the efforts made in India for a planned development of highways since Independence.   7M

UNIT – II

3. (a) What factors influence the design of vertical curves? Explain.   7M
    (b) Define Super elevation. Derive an expression for computing the rate of super elevation for a road section on a horizontal curve analyzing the various forces acting on the vehicle moving on the curve.   7M

(OR)

4. (a) Define Overtaking Sight Distance. Explaining the process of overtaking on a two lane two way road and derive an expression for computing OSD .   7M
    (b) What factors influence SSD and how they influence ?   7M

UNIT – III

5. (a) What are the objectives of Traffic Volume studies? What are the methods of presentation of Volume Data ?   7M
    (b) Explain various types of road markings.   7M

(OR)

6. Write short notes on the following: (a) Prohibitory signs. (b) Cautionary signs. (c) Informative signs. (d) Parking related signs.   14M

UNIT – IV

7. What are the advantages and limitations of unchannelized and channelized intersections ?   14M

(OR)

8. (a) What are the various types of Grade Separated interchanges possible? Show their layouts and indicate traffic movements on them .   7M
    (b) What should be the criteria for selecting width of weaving section in rotary design as per IRC?   7M

UNIT-V

9. (a) What are the different types of stresses expected in rigid pavements and how they have to be taken care of in design? Discuss .   7M
    (b) What is the function of sub grade in a pavement structure &What is modulus of sub grade reaction ?   7M

(OR)

10. (a) Briefly discuss about the method of construction of gravel roads   7M
    (b) Write short notes about interface treatment, penetration macadam, sheet asphalt and gravel roads   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) What is 'irrigation'? What is the necessity of irrigation? Explain.   7M
   (b) Explain the terms 'duty' and 'delta'. Derive a relationship between the two.   7M

(OR)

2. (a) A field channel has culturable commanded area of 2000 hectares. The intensity of   7M
       irrigation for gram is 30% and for wheat is 50%. Gram has a kor period of 18 days
       and kor depth of 12 cm, while wheat has a kor period of 15 days and a kor depth of
       15cm. Calculate the discharge of the field channel.
   (b) What is 'crop rotation'? What is the necessity for rotation? What are its advantages?   7M

UNIT – II

3. (a) How are canals classified based on the canal alignment? Explain.   7M
   (b) Compare Kennedy's and Lacey's silt theories.   7M

(OR)

4. (a) Using Lacey's theory, design an irrigation channel for the following data: 7M
       Discharge Q =50 m^3/s
       Silt factor f =1.00
       Side slopes =1/2 : 1
   (b) What is canal lining? What are its advantages?   7M

UNIT – III

5. (a) Explain the various component parts of a diversion headwork, with a neat sketch.   7M
   (b) Discuss in brief various causes of failure of weirs and their remedies.   7M

(OR)

6. (a) Explain the Bligh's creep theory for the design of impervious floor.   7M
   (b) Explain the various corrections to be applied in the Khosla's method of independent   7M
       variables.

UNIT – IV

7. (a) Classify various types of dams (i) accoring to use and (ii) according to hydraulic   7M
       design.
   (b) Discuss the physical factors that govern the selection of type of dam.   7M

(OR)

8. (a) Explain the various zones of storage in a reservoir, with a neat sketch.   7M
   (b) Discuss various methods of reservoir sediment control.   7M

UNIT-V

9. (a) List the various forces acting on a gravity dam. Explain any four forces in detail.   7M
   (b) What do you understand by the elementary profile of a gravity dam? Derive   7M
       expressions for determining base width of such a dam based on (i) stress criterion and
       (ii) sliding criterion.

(OR)

10. (a) Explain the various types of earth dams with sketches.   7M
    (b) Explain the various hydraulic and seepage failures of earth dams.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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. What are the different methods of design of reinforced concrete structures, explain the merits and demerits of each method.   14M

(OR)

2. (a) Draw the stress verses strain diagrams of concrete and steel, explain the salient features of them.   7M

   (b) What are the different types of limit states that are considered in the design of reinforced concrete structures.   7M

UNIT – II

3. (a) Differentiate between balanced , under reinforced and over reinforced concrete structures.   7M

   (b) A rectangular reinforced concrete beam section is of 230mm wide and 500mm overall depth. It is reinforced with 4 number of 25mm diameter bars in compression at an effective cover of 50mm. Determine the area of tension reinforcement needed to make the beam section fully effective and what would be the moment of resistance, use M20 and Fe 415 grade materials.   7M

(OR)

4. (a) State the advantages of T – beams over rectangular beams in case of reinforced concrete structures.   7M

   (b) Calculate the ultimate moment of resistance of a T-beam with an effective width of flange as 1500mm and depth of flange as 100mm. The overall depth of the beam is 600mm and width of web is 300mm. Area of tension steel is 2455 mm^2 with an effective cover of 40mm, the materials used are M20 grade concrete and Fe 415 grade steel.   7M

UNIT – III

5. (a) What are the reasons for providing minimum shear reinforcement in reinforced concrete beams.   7M

   (b) What are the different types of shear reinforcement that will be provided in case of reinforced concrete beams, show them with sketches.   7M

(OR)

6. What are the I.S – 456 code recommendations for the design of a reinforced concrete section subjected to torsion.   14M

UNIT – IV

7. A room has a clear dimension of 7m x 3m with 350mm thick brick wall. The live load on the slab is 2 kN/m^2 and has a floor finish of 1 kN/m^2.Use M20 grade concrete and Fe 415 grade steel for the design of the slab and sketch the details of the reinforcement.   14M

(OR)

8. Design a dog legged stair for a building with vertical distance between the floors as 3.30m. The staircase room has a clear dimension of 3m x4.5m. The live load on the stair may be taken as 3kN/m^2 and the floor finish as 1kN/m^2. Use M20 grade concrete and Fe415 grade steel for the design.   14M

UNIT-V

9. Design a circular column to carry an axial service load of 1500kN. Use M20 grade concrete and Fe415 grade steel for the design.   14M

(OR)

10. What are the factors that affect the short term and long term deflections of reinforced   14M

concrete structural members.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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. (a) What is artificial intelligence? What is an AI technique? 　　4M
   (b) Explain the three most important AI techniques. 　　10M

(OR)

2. (a) Discuss symbolic reasoning system. 　　7M
   (b) Discuss functioning of an expert system 　　7M

UNIT – II

3. Explain in detail the architecture of McCulloch-Pitt's neuron model and also realize the 2 input AND & OR gate? 　　14M

(OR)

4. What is Back propagation? Derive its weight updation algorithm with a schematic two layer feedfarward neural network. 　　14M

UNIT – III

5. (a) List various applications of ANN in Electrical Power Systems. 　　4M
   (b) Explain about ANN approach to Load Forecasting problem. 　　10M

(OR)

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

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 membership function. What are the various types membership functions used in Fuzzy Logic? 　　5M
   (b) Let us define three fuzzy sets: $\tilde{A}=\{(x_1, 0.3)(x_2, 0.5)(x_3, 0.2)\}$, $B=\{(x_1, 0.4)(x_2, 0.6)(x_3, 1)\}$,$C=\{(x_1, 0.2)(x_2, 0.8)(x_3, 0.3)\}$. Verify the following Properties of fuzzy sets. (i) $AU(BUC) = (AUB)\ U\ C$ 　　9M
   (ii) $A\ U\ (B \cap C) = (AUB) \cap (AUC)$
   (iii) $(AUB)^c = (A^c \cap B^c)$

UNIT-V

9. Explain elaborately about fuzzy logic application in speed control of Induction Motor. 　　14M

(OR)

10. What is Automatic Voltage Regulator? Explain the fuzzy logic implementation in Automatic voltage regulator? 　　14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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 continuous beam ABC is built-in at A and C and is carried over simple roller **14M** support at B. Span AB = 8.5 m and span BC = 7.5 m. It carries a uniformly distributed load of 17 kN/m over the span AB and a point load of 26 kN is acting in the span BC, 3.5 m from the middle support B. The middle support B sinks by 8 mm with respect to supports A and C. Find the moments and reactions at all the supports and draw the bending moment and shear force diagrams using Clapeyron's theorem of three moments. Assume $E = 2.1 \times 10^5$ M Pa and $I = 2.3 \times 10^{-3}$ m^4

(OR)

2. A beam AB of uniform section and 9 m span is built at the ends. A udl of 30 kN/m **14M** runs over left half of the span and there is an additional two-point load (acting equidistant from support) of 20 kN at right quarter. Determine the fixed end moments at the ends and the reaction. Draw BMD & SFD.
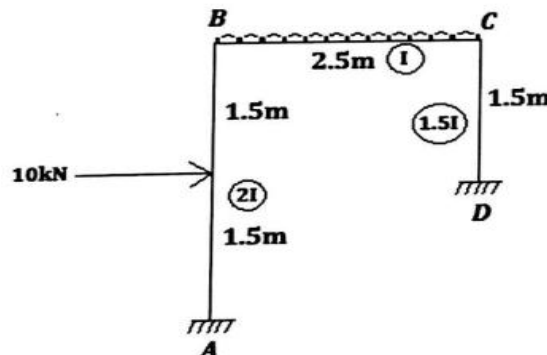
UNIT – II

3. Analyse the given frame by slope deflection method. Draw SFD, BMD and EC. **14M** Take E = 210 GPa and I = 0.1 Gmm⁴.
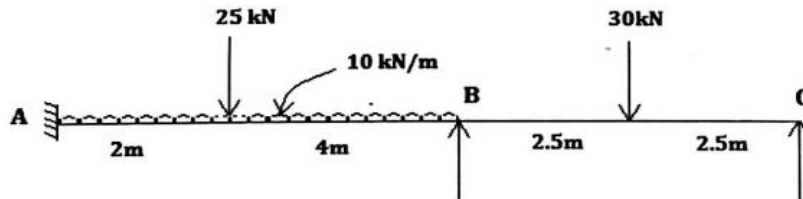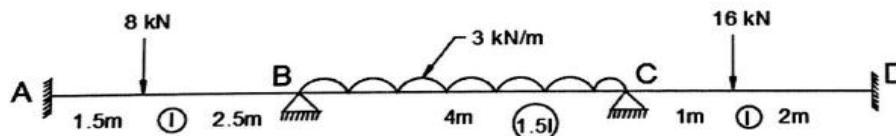

(OR)

4. Analyse the given frame by Slope deflection method. Draw SFD, BMD and EC. **14M**
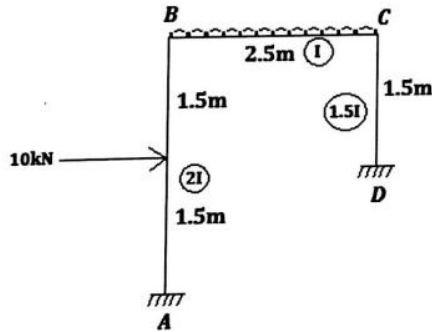

UNIT – III

5. Analyse the beam shown in fig by moment distribution method. Draw SFD and **14M** BMD.

(OR)

6.   Analyse the given frame by Slope deflection method. Draw SFD, BMD and EC.   **14M**

UNIT – IV

7.   Analyse the beam shown in fig by Kani's method. Draw SFD and BMD.   **14M**

(OR)
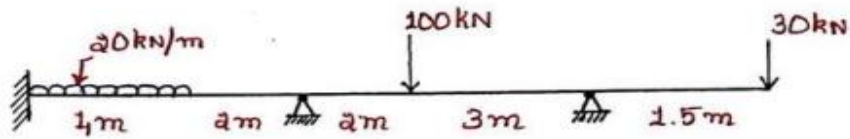
8.   Anayse the portal frame shown in fig by Kani's method. Draw SFD and BMD.   **14M**
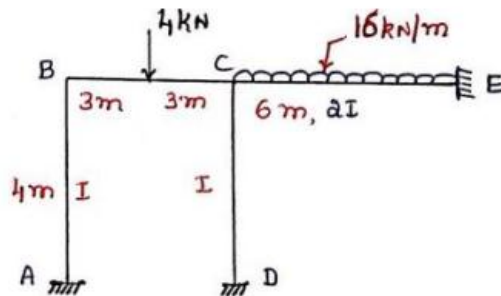
UNIT-V

9.   Determine the horizontal deflection of joint B as shown in fig below. Take **14M** $E=200$ kN/mm^2. Take A $=$ 600 mm^2 for all the members. Using Castigliano's theorem.
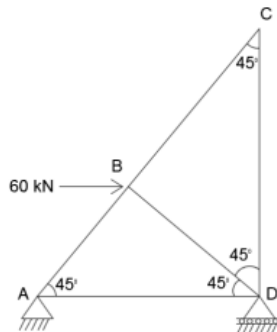
(OR)

10. (a) State Castigiliano's theorem. Derive an expression for strain energy due to bending.   **7M**
      (b) Derive an expression for strain energy due to axial load.   **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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.	In Managerial Economics part of Micro & Macro Economics explains with its features and scope.	14M

(OR)

2.	Explain the types of Elasticity of Demand along with the significance.	14M

UNIT – II

3.	Write indetail about the production function with one variable input factor	14M

(OR)

4.	(a)	Define cost and write any four cost concepts	7M
	(b)	Explain cost output determination in the short run.	7M

UNIT – III

5.	How can you determine the price- output in the perfect market condition	14M

(OR)

6.	Discuss any five pricing methods based on cost and competition.	14M

UNIT – IV

7.	Distnguish sole trader form organization to partnership form	14M

(OR)

8.	Calculate 1) Payback 2) ARR 3) NPV @ 10% for the two projects which require Rs.2,00,000/- investment.	14M

Year	1	2	3	4	5
Project 1	50000	60000	70000	80000	100000
Project 2	100000	80000	70000	60000	50000

UNIT-V

9.	Journalise the following transactions and prepare necessary ledger accounts in the books of Arya .	14M

2014 January

(i) Arya commenced business with Rs.40000/-

(ii) Deposited into bank Rs.30000/-

(iii)Bought goods worth Rs.48000/- from Kamal

(iv)Sold goods worth Rs.60000/-

(v) Paid Rent Rs.4000/-,

(vi)Sold goods worth Rs,50000/- to Suresh

(vii) Suresh pays Rs.48600/- in full settlement of account

(viii) Paid Rs.40000/- to Kamal on account

(ix)Paid to Advertising Rs.3000/-

(OR)

10.	How will you do the financial analysis through liquidity, profitability and solvency ratios.	14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Explain how the incremental production cost of a thermal power station can be determined. **7M**

(b) Derive expressions for economic distribution of load between generating units considering the effect of transmission losses **7M**

(OR)

2. A power system with two generating stations supplied a total load of 300MW. Neglecting transmission losses, the economic schedule for the plant generation is 175MW and 125MW. Find the saving in the production cost in Rs./hr. due to this economic schedule as compared to equal distribution of the same load between the two units. **14M**

The incremental cost characteristics are:

$\frac{dC_1(P_1)}{dP_1} = 30 + 0.3P_1$ and $\frac{dC_2(P_2)}{dP_2} = 32.5 + 0.4P_2$

UNIT – II

3. (a) Discuss the dynamic programming method to solve unit commitment problem in a power system. **7M**

(b) Explain the Priority-list method to solve unit commitment problem in a power system. **7M**

(OR)

4. (a) Explain the various constraints in unit commitment problem. **7M**

(b) Explain the cost function in unit commitment problem. **7M**

UNIT – III

5. (a) Explain the problem of scheduling hydrothermal power plants. **7M**

(b) Derive the coordination equation for the optimal scheduling of hydrothermal power plants. **7M**

(OR)

6. (a) Derive the model of a speed governing system and represent it by a block diagram. **7M**

(b) Explain the steam turbines and Approximate linear models using block diagram representation. **7M**

UNIT – IV

7. (a) Draw and explain the block diagram representation of an isolated power system **7M**

(b) A 100 MVA synchronous generator operates on full load at a frequency of 50 Hz. The load is suddenly reduced to 50 MW. Due to time lag in governor system, the steam valve begins to close after 0.4 s. Determine the change in frequency that occurs in this time. **7M**

(OR)

8. (a) Explain the necessity of maintaining a constant frequency in power system operation. **7M**

(b) Two generators rated 200 MW and 400 MW are operating in parallel. The droop characteristics of their governors are 4% and 5%, respectively from no load to full load. Assuming that the generators are operating at 50 Hz at no load, how would a load of 600 MW be shared between them? What will be the system frequency at this load? Assume free governor operation. Repeat the problem if both governors have a droop of 4%. **7M**

UNIT-V

9. (a) Draw and explain the block diagram of two area interconnected system. 7M

(b) For a two identical area system the following data is given. Determine the frequency of oscillations when a step load disturbance occurs. 7M

Speed regulation coefficient == R == 4 Hz/*p.u.* MW

Damping coefficient D == 0.03 pu MW/*Hz*

System frequency = 50Hz

The tie - line has a capacity of 0.1 p.u.

The power angle is 30° just before the occurrence of the load disturbance.

(OR)

10. (a) Explain how the tie-line power deviation can be incorporated in two-area system block diagram? 7M

(b) Two interconnected areas A and B have capacities 2000 MW and 750 MW respectively. The speed regulation coefficients are 0.1 p.u. for both the areas on their own area ratings. The damping torque coefficients are 1.0 p.u. also on their own base. Find the steady state change in system frequency when a load increment of 50 MW occurs in area A. Find also the tie line power deviation. System frequency is 50 Hz. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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.   Explain in detail with a flow chart the computational procedure for load flow solution   14M
        using Gauss-Seidel method when the system contains all types of buses.

(OR)

2. (a) Write short notes on data for power flow studies.   6M
    (b) Explain computation of losses and injected power (real and reactive power) in a load   8M
         flow study and derive its equations.

UNIT – II

3. (a) With neat flow chart, explain the computational procedure for load flow solution   8M
         using fast decoupled method when the system contains all types of buses.
    (b) What is Jacobian matrix? How the elements of Jacobian matrix are computed?   6M

(OR)

4.   Explain the detailed procedure for a Newton – Raphson method-based solution of a   14M
        power system network when PV buses are present with a flow chart. Also, give the
        necessary formulae

UNIT – III

5. (a) Explain Methods of Improvement of Steady State Stability   7M
    (b) Derive Power flow equations of a two machine system with and without losses   7M

(OR)

6. (a) Define the following terms : (i) Steady state stability limits   6M
         (ii) Dynamic state stability limit (iii) Transient state stability limit.
    (b) Derive an expression for steady state stability limit using ABCD parameters   8M

UNIT – IV

7. (a) Distinguish between steady state, transient and dynamic stability   7M
    (b) What are the factors that affect transient stability?   7M

(OR)

8. (a) Derive the power angle equation of a single machine connected to infinite bus.   7M
    (b) Derive an expression for steady state stability limit if the resistance and shunt   7M
         capacitance of the transmission line are considered

UNIT-V

9. (a) When the transmission line is terminated by the capacitive load, how do you find out   6M
         the expressions of reflected voltage and current wave?
    (b) Discuss the behavior of a travelling wave when it reaches: 8M
         (i) Short circuited.
         (ii) Open circuited transmission lines.

(OR)

10. (a) Derive reflection and refraction coefficient of transmission line when terminated   7M
         through a resistance.
    (b) An inductance of 800μH connects two sections of a transmission line each having a   7M
         surge impedance of 350 ohms. A 500 kV 2μs rectangular surge travels along the line
         towards the inductance. Determine the maximum value of the transmitted wave.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Explain about nature and classification of different load torques.   7M
   (b) Explain the different components of basic electrical drive system   7M

(OR)

2. (a) Explain about fundamental torque equation   7M
   (b) Discuss the different modes of operation of electric drive with suitable examples   7M

UNIT – II

3. (a) Obtain the speed-torque characteristics of separately excited DC motor operated with   7M
       3-phase full converter and describe the effect of firing angle?
   (b) Obtain the speed-torque characteristics of separately excited DC motor operated with   7M
       1-phase semi converter and describe the effect of firing angle?

(OR)

4. (a) Explain the operation of two-quadrant, type-D chopper drive with necessary   7M
       equivalent circuits and waveforms?
   (b) Explain the control strategies of dc chopper   7M

UNIT – III

5. (a) Show that variable frequency control of induction motor is more efficient than stator   7M
       voltage control.
   (b) Explain why stator voltage control is suitable for speed control of Induction motors in   7M
       fan and pump drives. Draw and explain speed control of 3 phase Induction motor
       using AC Voltage Controller.

(OR)

6. (a) Draw the circuit diagram and explain the working of a slip power recovery system   7M
       using static Scherbius system for a three phase induction motor
   (b) Explain Static Kramer drive for a three phase induction motor   7M

UNIT – IV

7. (a) In variable frequency control of a synchronous motor why (V/f) ratio is maintained   7M
       constant up to base speed and V constant above the base speed. Explain briefly with
       necessary waveform
   (b) Draw the block diagram of a closed loop synchronous motor drive fed from VSI.   7M

(OR)

8. (a) Write short notes on BLDC motor operation and control   7M
   (b) Describe self-controlled synchronous motor drives in detail.   7M

UNIT-V

9. (a) What are various methods used for improvement of quality of supply?   7M
   (b) Write short notes on Energy Efficient operation of drives   7M

(OR)

10. (a) Explain the power factor improvement methods   7M
    (b) Explain the losses in the electrical drive system   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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.	Draw the Pin diagram of 8086 Microprocessor and explain each pin in detail.	14M

(OR)

2.	Draw and explain in detail the Architecture of 8086 Microprocessor.	14M

UNIT – II

3.	(a)	Write an ALP in 8086 to sort the given set of 16-bit data.	7M
	(b)	Write an ALP to find the sum of the given array of a data?	7M

(OR)

4.	(a)	Write an ALP to find out the given data is a palindrome or not?	7M
	(b)	Explain the various stage of Software development.	7M

UNIT – III

5.	(a)	With a neat diagram explain the operation of Programmable DMA Controller.	7M
	(b)	Explain in detail about USART.	7M

(OR)

6.	(a)	Discuss the architecture of 8259 with diagram.	7M
	(b)	Compare synchronous and asynchronous communication.	7M

UNIT – IV

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

(OR)

8.	Explain in detail about Temperature Measurement and Control.	14M

UNIT-V

9.	(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 square of an 8-bit number program using 8051 Microcontroller.	7M

(OR)

10.	Explain in detail about the Architecture of 8051.	14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Draw the circuit diagram of a basic differential amplifier and explain its transfer   7M
        characteristics.
    (b) Discuss about block diagram of IC741?   7M

(OR)

2. (a) Draw the block diagram of log Amplifiers and explain its operation in detail.   7M
    (b) Discuss bout the Precision Rectifier   7M

UNIT – II

3. (a) Explain the operation of Astable multivibrator using 555 timer and also derive the   7M
        expression for frequency of oscillation.
    (b) Draw the block diagram of 565 PLL and explain its principle of operation   7M

(OR)

4. (a) Draw and explain the monostable operation of 555 timer.   7M
    (b) Discuss about the applications of IC 565.   7M

UNIT – III

5. (a) List different types of CMOS logic families and compare with different parameters.   7M
    (b) Explain about CMOS dynamic electrical behavior   7M

(OR)

6. (a) Explain the transistor switching operation of 2 input LS-TTL NAND with neat circuit   7M
        diagram and truth tables.
    (b) Distinguish between CMOS logic and TTL logic circuits   7M

UNIT – IV

7. Explain the behavioral and data flow style description type of HDL programming,   14M
    with examples and keywords used

(OR)

8. (a) With an example, mention the structural design elements of VHDL   7M
    (b) Discuss any Three sequential statements with relevant examples   7M

UNIT-V

9. (a) Design 4 to 16 decoder using standard ICs.   7M
    (b) Write a VHDL program for 4-bit Comparator.   7M

(OR)

10. Draw the logic diagram of a Master slave JK flop using gates. Write its function table   14M
     and derive the characteristic equation. What is the type of triggering used in master
     slave flip flops?

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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. (a) Draw and Explain ISO-OSI reference model.   7M
    (b) Explain LAN, MAN, WAN   7M

(OR)

2. (a) Explain the TCP/IP Reference Model with neat diagram.   7M
    (b) What are the different types of transmission media used for data communication?   7M

UNIT – II

3. (a) Distinguish between guided and unguided transmission media.   7M
    (b) Explain the different elementary data link protocols.   7M

(OR)

4. (a) Explain three transmission media of physical layer.   7M
    (b) Explain the operation of selective repeat protocol.   7M

UNIT – III

5. (a) Describe the features of ALOHA protocol, Explain its merits.   7M
    (b) Explain shortest path routing with an example.   7M

(OR)

6. (a) Write a short notes on wireless LANs   7M
    (b) Explain the design issues of network layer   7M

UNIT – IV

7. (a) Briefly discuss about quality service parameters of transport layer.   7M
    (b) What is TCP service model? Explain in details usage of TCP segment header in providing these services.   7M

(OR)

8. (a) Enumerate the primitives of the transport service. How are they used in transport layer?   7M
    (b) Draw the header part of UDP protocol. Explain the components.   7M

UNIT-V

9. (a) Describe the salient features of multimedia. Also explain the applications of multimedia   7M
    (b) What is meant by encryption? Describe the public key encryption.   7M

(OR)

10. (a) What is WWW? Give its architecture, Discuss requirements of server side and client side.   7M
    (b) What is cryptography? Explain about firewalls.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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. Draw the pin diagram of 8051 microcontroller and describe the functionality of each pin?   14M

(OR)

2. (a) List the features of 8051 micro controller.   6M
   (b) Explain about external memory interfacing of 8051 microcontroller?   8M

UNIT – II

3. (a) Write a program to generate a delay of 1 hour. Assume that the oscillator frequency is 12 MHZ   7M
   (b) Write an Assembly Language Program for descending order?   7M

(OR)

4. (a) List the SFRs of Timer/Counter. Explain   7M
   (b) . Discuss about timer modules of 8051?   7M

UNIT – III

5. (a) What are the various registers in ARM? Explain.   6M
   (b) Explain interrupt and interrupt vector table   8M

(OR)

6. (a) List the features of ARM 32-bit microcontroller.   6M
   (b) Write short notes on ARM design philosophy   8M

UNIT – IV

7. Explain about ARM programming model with neat sketches.   14M

(OR)

8. (a) What ae the types of instructions available in ARM controller? Briefly explain the instruction set with atleast one example?   14M
   (b)

UNIT-V

9. (a) Define IOT. Explain the characteristics of IOT?   6M
   (b) Explain how IOT is used in energy systems.   8M

(OR)

10. Briefly explain the physical design and logical design of IOT?   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
SUB: Control Systems (ECE)

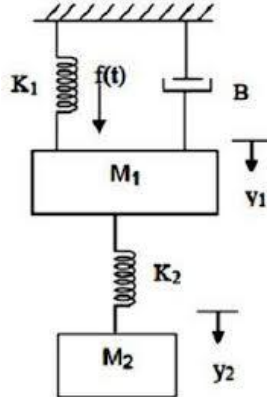Time: 3 Hours   Max. Marks: 70

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

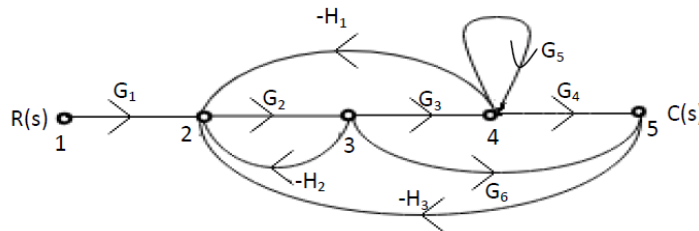### UNIT - I

1. (a) Write the block diagram reduction techniques in the analysis of control systems   7M
    (b) Determine the transfer function Y2(s)/F(s) of the system shown in the figure below   7M

(OR)

2. (a) With the help of Mason's gain formula find the overall transfer function of the   8M
         following signal flow graph.

    (b) Write the analogy between mechanical systems and electrical systems   6M

UNIT – II

3.   Derive the response of un-damped second order system for unit step input and sketch   14M
         the response?

(OR)

4. (a) Determine position error constant Kp, velocity error constant Kv, acceleration error   7M
         constant Ka for type 2 system.
    (b) The unity feedback system is characterized by an open loop transfer function   7M
         $G(s)=K/S(S+10)$. Determine the gain K, so that the system will have a damping ratio
         of 0.5 for this value of K. Determine settling time and peak time for a unit step input.

UNIT – III

5. (a) Sketch the root locus for the open loop transfer function of unity feedback control   10M
         system given by $G(S) H(S)=K/S(S+1)(S+2)$. Also find K of breakaway point
    (b) What is centroid and how it is calculated?   4M

(OR)

6. (a) Construct Routh criterion, determine the stability of the system represented by the   8M
         characteristic equation, $S^5+S^4+2S^3+2S^2+3S+5=0$. Comment on the location of the
         roots of characteristics equation.
    (b) Explain the stability of a system based on location of poles in S-plane?   6M

UNIT – IV

7. Sketch the bode plot for the transfer function $(S)=K\ S^2/(1+0.2S)(1+0.2S)$. Determine the system gain 'K' for the gain cross-over frequency to be 5 rad/sec.   14M

(OR)

8. (a) Define the following terms: (i) Phase margin. (ii) Phase cross over frequency   6M

    (b) Sketch the polar plot for the transfer function $G(s) =1/s(s+1)(s+3)$ 8M

UNIT-V

9. A unity feedback system has an open loop transfer function G(s) = K/s(1 + 2s). Design a suitable lag compensator so that phase margin is 400 and the steady state error for ramp input is less than or equal to 0.2.   14M

(OR)

10. Explain in detail about lag-lead compensator technique   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Draw the Applegate diagram with gap voltage for a reflex klystron. **7M**

(b) A two cavity klystron amplifier has the following parameters V_0=1000 R_0=100 KΩ I_0=30mA f=5GHz. Gap spacing in either cavity d=1mm, spacing between the two cavities L=5cm shunt impedance Rsh=50KΩ **7M**
i) Find the input gap voltage to give maximum voltage V2
ii) Voltage gain , neglecting the beam loading in the output cavity.
iii) Find the efficiency of the amplifier, neglecting beam loading.

(OR)

2. (a) With the help of Applegate diagram describe the bunching process in a two cavity klystron amplifier and derive the bunching parameter. **7M**

(b) A reflex klystron operates under the following conditions: **7M**
Vo=500V, Rsh =10KΩ, fr= 8 GHz, L =1 mm, e/m = l.759 x 1011   (MKS system) The tube is oscillating at fr at the peak of the n = 2 or $1\frac{3}{4}$ mode . Assume that the transit time through the gap and beam loading to be neglected. Determine:-
i). The value of the repeller voltage Vr.
ii). The direct current necessary to give a microwave gap voltage of 200 V.
iii). The electronic efficiency under this condition.

UNIT – II

3. (a) Draw a labeled schematic diagram of Helix TWT & show that output power gain of TWT is G = -9.54 + 47.3 NC db **7M**

(b) The linear magnetron has the following parameters: Vo =32KV, Io = 60A, f=10GHz, Bo= 0.01Wb/m2, d=6cm. Find: i. Electron velocity at the hub space. **7M**
ii. Phase velocity for synchronization.   iii. Hartree anode voltage.

(OR)

4. (a) Derive the Hartree anode Voltage equation for linear magnetron. **7M**

(b) A TWT has the following parameters Vo=3KV , Io = 4mA, f = 10 GHz, Zo = 30 & N=50. Calculate: i.Gain parameter   ii. Power gain in db. **7M**

UNIT – III

5. (a) Derive the equation for power output & efficiency of IMPATT diode. **7M**

(b) Explain the principle of π mode oscillations in cylindrical magnetron. **7M**

(OR)

6. (a) Describe a non-degenerate negative resistance parametric amplifier. **7M**

(b) Am IMPATT diode has drift length of 2 μm. Determine **7M**
i). Drift time of the carriers   ii). Operating frequency of IMPATT diode.

UNIT – IV

7. (a) Why are S - parameters used at microwave frequencies explain? Give the properties of S - parameters. **7M**

(b) Explain the principle of operation of an isolator. What is the significance of using isolator in microwave circuits? **7M**

(OR)

8. (a) What is Faraday rotation? Explain how a three port circulator operates. **7M**

(b) Derive S - matrix for series Tee using the properties of S parameters. **7M**

UNIT-V

9. (a) Explain how you measure VSWR of given load for all kinds of loads possible. **7M**

(b) Give the measurement procedure of Q factor of a resonant cavity. **7M**

10. (a) What is the average power of a periodic wave if the peak power is 1300 W and the pulse width is 0.56 and periodic frequency of the wave is 1500 Hz.   7M

(b) Describe various techniques of measuring unknown frequency of a microwave generator.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Given the sequences,   7M
$$x_1(n) = 3\,\delta(n) + 2\,\delta(n-1)$$
$$x_2(n) = 2\,\delta(n) - \delta(n-1)$$
Find the z-transform of their convolution.

   (b) Determine the inverse Z-Transform of the function: 7M
$$F(z) = \frac{10z(z+5)}{(z-1)(z-2)(z+3)}$$

(OR)

2. (a) List out the properties of Z-transform.   7M

   (b) A DSP system is described by the following differential equation with zero initial   7M
   condition: $y(n) + 0.1y(n-1) - 0.2y(n-2) = x(n) + x(n-1)$

   Determine the impulse response $y(n)$ due to the impulse sequence: $x(n) = \delta(n)$.

UNIT – II

3. (a) Compute the DFT of the following sequences: 9M
   i. $x = [1,1,1,1,1,1,1,1]$
   ii. $x[n] = \cos(0.25\pi n), \quad n = 0, \ldots\ldots, 7$
   iii. $x[n] = 0.9^n, \quad n = 0, \ldots\ldots, 7$

   (b) Develop a butterfly diagram for DIF FFT algorithm for N = 8.   5M

(OR)

4. (a) How do you calculate linear convolution using DFT? Explain with one example.   7M

   (b) List and explain the properties of Discrete Fourier Series.   7M

UNIT – III

5. (a) What are the basic structures for FIR and IIR systems realization? Explain them   7M
   briefly.

   (b) Given a three stage lattice filter with coefficients K1 = 0.25, K2 = 0.5 and K3 = 1/3,   7M
   determine the FIR filter coefficients for the direct-form structure.

(OR)

6. (a) Determine the Direct Form II (Canonic) structure of the IIR Filter described by the   7M
   following difference equation:
   $$y(n) = 0.5y(n-1) - 0.76y(n-2) + 0.63y(n-3) + x(n) + 0.875x(n-1)$$

   (b) Determine the Parallel Form structure of the IIR Filter described by the following   7M
   difference equation:
   $$y(n) = -\frac{1}{4}y(n-1) + \frac{3}{8}y(n-2) + x(n) + 2x(n-1) + x(n-2)$$

UNIT – IV

7. (a) Design a digital Butterworth filter satisfying the constraints   10M
   $$0.8 \leq |H(\omega)| \leq 1.0 \; ; 0 \leq \omega \leq \pi/4$$
   $$|H(\omega)| \leq 0.2 \; ; \pi/2 \leq \omega \leq \pi.$$
   Apply Bilinear transformation method.

   (b) Discuss the general considerations of IIR Digital Filters.   4M

(OR)

8. (a) Write the design procedure for Chebeshev filter. 6M

(b) Determine the system function of the IIR digital filter for the analog transfer function 8M

$$H(s) = \frac{10}{s^2 + 7s + 10}$$

with T=0.2 sec using impulse invariant method.

UNIT-V

9. (a) Design a Band Pass Filter to pass frequencies in the range 1 to 2 radians/sec using 10M
Hanning window, with N=5.

(b) Compare and contrast Hanning window and Hamming window. 4M

(OR)

10. (a) Write the design procedures of FIR filter using frequency sampling method. 7M

(b) Design an ideal Band Reject Filter using hamming window for the given frequency 7M
response. Assume N=11.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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. Draw a general layout of a thermal power plant and explain the different circuits?   14M

(OR)

2. (a) Explain about energy usage scenario in India?   7M
    (b) Explain different properties of coal?   7M

UNIT – II

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

(OR)

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

UNIT – III

5. Explain any five different types of spill ways?   14M

(OR)

6. Explain the working of sodium graphite reactor with a neat sketch. Write the   14M
    advantages and disadvantages of it?

UNIT – IV

7. Demonstrate the working of open cycle MHD system with a neat sketch. Write the   14M
    advantages and disadvantages of it?

(OR)

8. (a) What are the different types of solar energy collectors?   7M
    (b) Briefly explain the working principle of fuel cell with a neat sketch?   7M

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%,   14M
    used factor 60% and maximum demand 20MW.
    Estimate:
    (i) Annual energy production
    (ii) Reserve capacity over and above the peak load
    (iii) Hours in a year during which the plant was not in operation

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Compare heat engine, refrigerator and heat pump and find their COP'S.   8M
    (b) Discuss the working principle of bootstrap air cooling system.   6M

(OR)

2. (a) Explain the simple air cooling system with a schematic diagram & show the cycle on T-S   7M
    diagram.
    (b) A simple air cooling system is used for an aero plane having a load of 10 tonnes. The   7M
    atmospheric Pressure & temperature are 0.9 bar & 10^0C respectively. The pressure
    increases to 1.013 bar due to ramming. The temperature of the air is reduced by 50^0C in
    heat exchanger. The pressure in the cabin is 1.01 bars & temperature of the air leaving the
    cabin is 25^0C. Determine
    (i) power required to take the load of cooling cabin   (ii) COP.

UNIT – II

3. (a) Describe the working principle of vapour compression refrigeration system with neat   8M
    sketch.
    (b) Draw the vapour compression refrigeration cycle on T-s diagram when the refrigerant is   6M
    dry and saturated at the end of compression and find an expression for the C.O.P in terms
    of (i) Temperature and entropies; (ii)Enthalpy

(OR)

4. (a) Draw a neat sketch of a practical vapour absorption refrigeration cycle. Indicate there on   8M
    the phases of various fields and the name of the equipment. Also indicate the direction of
    the external energy flow to or from the equipment.
    (b) Describe the working of lithium bromide water absorption refrigeration system.   6M

UNIT – III

5. (a) Discuss the working principle of thermo electric refrigeration system with the help of   6M
    diagram.
    (b) Explain the working principle of Steam Jet Refrigeration system with neat sketch.   8M

(OR)

6. (a) Demonstrate the working of vortex tube with neat sketch.   7M
    (b) Discuss the desirable properties of refrigerants used in refrigeration process.   7M

UNIT – IV

7. (a) The following data apply to an air conditioning system: 8M
    Room sensible heat =41868 kJ/hr room latent heat=41868 kJ/hr; inside design condition=
    25^0C, 50% RH, outside design condition=35^0C,DBT, 27.8 WBT. Return air from the
    room is mixed with the outside air before entering the cooling coil in the ratio of 4:1.
    Return air from the room is mixed with the cooling air, i.e. after the cooling coil in the
    ratio of 1:4. Cooling coil by pass factor is 0.1. The air may be reheated if necessary before
    supplying to the conditioned space. Assume ADP as 10^0C and determine,
    i) Supply air conditions into the room   (ii) Refrigeration load due to the reheat
    iii) Total refrigeration capacity   (iv) The quantity of fresh air supplied.
    (b) Discuss various Psychrometric processes and mention in psychrometric chart.   6M

(OR)

8.   In a laboratory test a psychometer recorded 36^oC DBT and 30^oC WBT calculate the   14M

following terms.
(i) vapour pressure,
(ii) relative humidity,
(iii) specific humidity,
(iv) degree of saturation,
(v) dew point temperature,
(vi) enthalpy of the mixture.

UNIT-V

9. (a) Explain the working of window air-conditioning system with neat sketch.   8M
   (b) Discuss the factors will affect the effective temperature of a body when interacts with surroundings.   6M

(OR)

10. (a) Describe the working of split air-conditioning system with neat sketch.   8M
    (b) Discuss requirements of human comfort.   6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Explain about the effect of precession motion on the stability of moving vehicles such as motor car?   8M

    (b) Derive the expression for Gyroscopic Couple.   6M

(OR)

2. A rear engine automobile is travelling along a track of 100m mean radius. Each of the four road wheels has a moment of inertia of 2.5 kg-m^2 and an effective diameter of 0.6m. The rotating parts of the engine have a moment of inertia of 1.2 kg-m^2. The engine axis is parallel to the rear axle and the crankshaft rotates in the same sense as the road wheels. The ratio of engine speed to back axle speed is 3:1. The automobile has a mass of 1600 kg and has its centre of gravity 0.5 m above road level. The width of the track of the vehicle is 1.5 m. Determine the limiting speed of the vehicle around the curve for all four wheels to maintain contact with the road surface. Assume that the road surface is not cambered and centre of gravity of the automobile lies centrally with respect to the four wheels.   14M

UNIT – II

3. Four masses m_1, m_2, m_3 and m_4 having 100, 175, 200 and 25Kg are fixed to cranks of 20cm, 30cm, 15cm, and 50cm radius and revolve in planes 1,2,3 and 4 respectively. The angular position of the cranks in planes 2, 3 and 4 with respect to the crank in plane 1 are 75^0, 135^0 and 200^0 taken in the same sense. The distance of planes 2, 3 and 4 from plane 1 are 60cm, 186cm and 240 cm respectively. Determine the position and magnitude of the balance mass at radius of 60cm in plane L and M located at middle of the plane 1 and 2 and the middle of the planes 3 and 4 respectively.   14M

(OR)

4. Derive an expression for the inertia force due to reciprocating mass in reciprocating engine, neglecting weight of the connecting rod.   14M

UNIT – III

5. The firing order in a 6 cylinder vertical four stroke in-line engine is 1-4-2-6-3-5. The piston stroke is 100 mm and the length of each connecting rod is 200 mm. The pitch distances between the cylinder centre lines are 100 mm, 100 mm, 150 mm, 100 mm, and 100 mm respectively. The reciprocating mass per cylinder is 1 kg and the engine runs at 3000 r.p.m. Examine the engine for the balance of primary and secondary forces and couples. Determine the out-of-balance primary and secondary forces and couples on this engine, taking a plane midway between the cylinder 3 and 4 as the reference plane.   14M

(OR)

6. The following particulars relate to a two-cylinder locomotive with two coupled wheels on each side :

    Stroke = 650 mm,   Mass of reciprocating parts per cylinder = 240 kg

    Mass of revolving parts per cylinder = 200 kg,   Mass of each coupling rod = 250 kg

    Radius of centre of coupling rod pin = 250 mm,   Distances between cylinders = 0.6 m

    Distance between wheels = 1.5 m,   Distance between coupling rods = 1.8 m

    The main cranks are at right angles and the coupling rod pins are at 180° to their respective main cranks. The balance masses are to be placed in the wheels at a mean radius of 675 mm in order to balance whole of the revolving and 3/4th of the reciprocating masses. The balance mass for the reciprocating masses is to be divided equally between the driving wheels and the coupled wheels. Find: i). The magnitudes and angular positions of the masses required for the driving and trailing wheels, and ii). The hammer blow at 120 km/h, if the wheels are 1.8m diameter.   14M

UNIT – IV

7. (a) Discuss briefly with neat sketches the longitudinal, and transverse free vibrations. 6M

(b) A cantilever shaft 50 mm diameter and 300 mm long has a disc of mass 100 kg at its free end. 8M
The Young's modulus for the shaft material is 200 GN/m². Determine the frequency of
longitudinal and transverse vibrations of the shaft.

(OR)

8. A flywheel is mounted on a vertical shaft as shown in Fig. The both ends of the shaft are 14M
fixed and its diameter is 50 mm. The flywheel has a mass of 500 kg. Find the natural
frequencies of longitudinal and transverse vibrations. Take E = 200 GN/m².
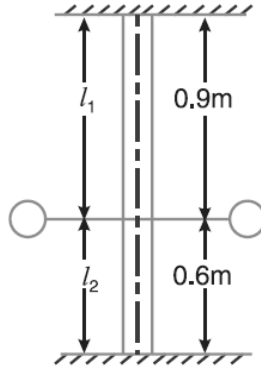
UNIT-V

9. A steel shaft 1.5m long is 95mm in diameter for the first 0.6m of its length, 60mm in diameter 14M
for the next 0.5m of the length and 50mm in diameter for the remaining length. The shaft
carries two flywheels at two ends, the first having a mass 900kg and 0.85m radius of gyration
located at the 95mm diameter end second having a mass of 700kg and 0.55m radius of
gyration located at the other end. Determine the location of the node and the natural
frequency of system. The modulus of rigidity of shaft material may be taken as 80GN/m².

(OR)

10. (a) What do you mean by transmissibility? 4M

(b) An instrument vibrates with a frequency of 1 Hz when there is no damping. When the 10M
damping is provided, the frequency of damped vibrations was observed to be 0.9 Hz.
Find the damping factor.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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. (a) Explain general methods for solving operation research models and write an applications of operation research.   **10 M**

   (b) What are the essential characteristics of operation research?   **4 M**

(OR)

2. (a) Solve the following linear programming problem graphically: **10 M**
   Minimise Z = 200 x + 500 y;
   subject to the constraints: x + 2y ≥ 10;   3x + 4y ≤ 24;   x ≥ 0, y ≥ 0

   (b) List the advantages of linear programming problem?   **4 M**

UNIT – II

3. (a) Determine the basic feasible solution to the following transportation problem by using Low-cost method: **10 M**

Sources	D1	D2	D3	D4	Supply
S1	2	3	11	7	6
S2	1	0	6	1	1
S3	5	8	15	9	10
Requirements	7	5	3	2	

   (b) What are the main characteristics of transportation problem?   **4 M**

(OR)

4. (a) Write the difference between assignment and Transportation models.   **4 M**

   (b) The assignment cost of assigning any one operator to any one machine is given in the following table: **10 M**

Operators

		I	II	III	IV
Machined	A	10	5	13	15
	B	3	9	18	3
	C	10	7	3	2
	D	5	11	9	7

Find the optima assessment.

UNIT – III

5. (a) What are the failure mechanisms in replacement models?   **4 M**

   (b) The cost of a machine is Rs. 6100 and its scarp value is only Rs. 100. The maintenance costs are found from experience to be: **10 M**

Year	1	2	3	4	5	6	7	8
Maintenance cost in Rs.	100	250	400	600	900	1250	1600	2000

When should machine be replaced?

6. (a) List out the principal assumptions in sequencing problem. **4 M**

(b) There are five jobs, each of which is to be processed through two machines M1, M2 **10 M**
in the order M1, M2, processing hours as follows;

Job	1	2	3	4	5
Machine A	3	8	5	7	4
Machine B	4	10	6	5	8

Determine the optimum sequence for the five jobs and minimum elapsed time.
Also, find the idle time of machines A and B.

UNIT – IV

7. The mean rate of arrival of planes at an airport during the peak period 20 hour, but **14 M**
the actual number of arrivals in nay hour follows a Poisson distribution with
respective averages. When there is congestion, the [lanes are forced to fly over the
field in the stack awaiting the lading of other planes that arrived earlier.

   i. How many planes would be flying over the field in the stack on an average in
     good weather and in bad weather?

  ii. How long a plan would be in the stack and in the process of landing in food and
     in bad weather?

  iii. How much stake and landing time to allow so that priority to land out of order
     would have to be requested only one time in twenty?

(OR)

8. The rate of arrival of customers at a public telephone follows Poisson distribution, **14 M**
With an average time of ten minutes between one customer and the next. The
duration of a phone call is assumed to follow exponential distribution with a mean
time of three minutes.

   i. What is the probability that a person arriving at the booth will have to wait?

  ii. What is the average length of the queue?

     The Mahanagar Telephone Nigam Ltd. Will install another booth when it is
     convinced that the customers would have to wait for at least three minutes for
     their turn to make a call. How much should be the flow of customers in order to
     justify a second booth?

UNIT-V

9. (a) Define Inventory. What are the disadvantages of having inventories? **4 M**

(b) You have to supply your customer 100 units of certain product every Monday (and **10 M**
only then). you obtain the product from a local supplier at Rs 60 per unit. The costs
of ordering and transportation from the supplier are Rs.150per order. The cost of
carrying inventory is estimated at 15 %per year of the cost of the product carried.

   i. Describe graphically the inventory system.

  ii. Find the lot size which will minimize the cost of the system.

  iii. Determine the optimal cost.

(OR)

10. (a) Write the advantages and limitations of simulation techniques? **7 M**

(b) Distinguish between mathematical models and simulation models. **7 M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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. Design a close coiled helical compression spring for a service load ranging from 2250 N to 2750 N. The axial deflection of the spring for the load range is 6 mm. Assume a spring index of 5. The permissible shear stress intensity is 420 MPa and modulus of rigidity, $G = 84$ kN/mm^2.   **14M**

(OR)

2. Design a leaf spring for the following specifications :   **14M**
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, $E = 200$ kN/mm^2 and allowable stress in spring material as 600 MPa.

UNIT – II

3. (a) Enumerate the differences between hydrostatic & Hydrodynamic journal bearings.   **7M**

(b) Discuss the procedure followed in designing of a journal bearing?   **7M**

(OR)

4. A full journal bearing of 50 mm diameter and 100 mm long has a bearing pressure of 1.4 N/mm^2. The speed of the journal is 900 rpm 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: (i) The amount of artificial cooling required.
(ii) 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.   **14M**

UNIT – III

5. Design a journal bearing for a centrifugal pump from the following data :   **14M**
Load on the journal = 20 000 N; Speed of the journal = 900 rpm; Type of oil is SAE 10, for which the absolute viscosity at 55°C = 0.017 kg / m-s; Ambient temperature of oil = 15.5°C; Maximum bearing pressure for the pump = 1.5 N / mm^2.

(OR)

6. (a) Explain the properties required by bearing materials.   **7M**

(b) What are rolling contact bearings? Discuss their advantages over sliding contact bearings.   **7M**

UNIT – IV

7. 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 rpm. 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 σ_{es} = 618 MPa.   **14M**

(OR)

8. A reciprocating compressor is to be connected to an electric motor with the help of spur gears. The distance between the shafts is to be 500 mm. The speed of the electric motor is 900 rpm and the speed of the compressor shaft is desired to be 200 rpm. The torque to be transmitted is 5000 N-m. Taking starting torque as 25% more than the normal torque, determine: i) Module and face width of the gears using 20^0 stub teeth and ii) Number of teeth and pitch circle diameter of each gear. Assume suitable value of velocity factor and Lewis factor. 14M

UNIT-V

9. Design a cast iron piston for a single acting four stroke engine for the following data: Cylinder bore = 100 mm; Stroke = 125 mm; Maximum gas pressure = 5 N/mm^2; Indicated mean effective pressure = 0.75 N/mm^2; Mechanical efficiency = 80%; Fuel consumption = 0.15 kg per brake power per hour; Higher calorific value of fuel = 42 × 10^3 kJ/kg; Speed = 2000 rpm. Any other data required for the design may be assumed. 14M

(OR)

10. A connecting rod for a high speed IC engine uses following data: 14M
Cylinder bore = 125 m. Length of CR = 300 mm. Maximum gas pressure = 3.5 MPa Length of stroke = 125 mm. Mass of the reciprocating parts = 1.6 kg Engine speed = 2200 rpm. Calculate: (i) Size of the cross section of the connection rod.
(ii) Sizes of the big and small end bearings.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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 buffer cache.   7M
   (b) Explain the concept of conversion of a path name to an inode.   7M

(OR)

2. (a) Explain file system in UNIX.   7M
   (b) Explain the reasons and advantages for the conversion of a path name to an inode.   7M

UNIT – II

3. (a) Explain the following system calls with examples: i) read ii) write   7M
   (b) Write a C program to demonstrate pipe function.   7M

(OR)

4. (a) Explain symbolic link and hard link in the Unix system with examples.   7M
   (b) Explain the pipe system call with syntax and also demonstrate any two operations on   7M
       pipe with syntax and example.

UNIT – III

5. (a) Explain various states of a process and also explain how a process moves from   7M
       foreground to background with example.
   (b) Write a C program to demonstrate any three signals with syntax.   7M

(OR)

6. (a) Explain the layout of system memory with neat diagram.   7M
   (b) Write the differences between scheduling processes using 'batch' command and using   7M
       'at' command.

UNIT – IV

7. (a) Differentiate the exporting variables in Korn shell and C shell.   8M
   (b) Write a shell script that deletes all lines containing a specified word in one or more   6M
       files supplied as arguments to it.

(OR)

8. (a) Explain Filename substitution metacharacters with examples.   7M
   (b) Explain the syntax of *for* loop and *until* loop in shell programming and give examples.   7M

UNIT-V

9. (a) Write the syntax and explain the following : i) msgrcv() ii)shmdt()   8M
   (b) Explain Semaphores and its functions.   6M

(OR)

10. (a) Explain the problem of multi-processor systems.   8M
    (b) Explain process tracing.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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)	How to understanding the Android software stack?	**7M**
	(b)	Write the steps for creating the Android First Project?	**7M**

(OR)

2.	(a)	Write the steps for creating the virtual devices	**7M**
	(b)	How to understanding the Android Software stack?	**7M**

UNIT – II

3.	(a)	Write about Activity Life Cycle in Android.	**7M**
	(b)	Write a short notes on Utility of Android API?	**7M**

(OR)

4.	(a)	Write about Android Application Components	**7M**
	(b)	Explain Radio button control with example.	**7M**

UNIT – III

5.	(a)	Write an Android application using Progress Bar.	**7M**
	(b)	How to Playing video and Displaying progress with Progress Bar.	**7M**

(OR)

6.	(a)	Write about	**7M**

(i) Table layout
(ii) Grid layout
(iii)Frame layout

	(b)	How to creating an Images switcher Application.	**7M**

UNIT – IV

7.	(a)	How to creating an image gallery using the view page control.	**7M**
	(b)	What are the debugging applications	**7M**

(OR)

8.		Create an Android application for creating image switcher application	**14M**

UNIT-V

9.	(a)	How to creating interface menus and action bars	**7M**
	(b)	What are the accessing databases with the ADB	**7M**

(OR)

10.	(a)	How to creating a data entry form.	**7M**
	(b)	How to creating a tabbed action bar and a drop-sown list action bar	**7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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 various Data preprocessing strategies.	7M
	(b)	Define mean, median, Range and variance. Give example for each.	7M

(OR)

2.	(a)	Discuss the following: i)Euclidean distance ii) City block distance iii) Minkowski distance	6M
	(b)	Explain the various OLAP operations in the Multidimensional Data model.	8M

UNIT – II

3.	(a)	Define confusion matrix. Explain the procedure to calculate the Accuracy and Error rate when a confusion matrix for a 2-class problem is given.	7M
	(b)	Discuss about Hold out method and Cross validation methods.	7M

(OR)

4.	(a)	Write Hunt's algorithm and explain with an example.	7M
	(b)	Explain about pre pruning and post pruning methods.	7M

UNIT – III

5.	(a)	Discuss about maximum marginal hyper planes.	7M
	(b)	Describe SVM in case of objects are linearly separable.	7M

(OR)

6.	(a)	Describe Rule-based classifiers.	7M
	(b)	Explain the various methods for constructing an Ensemble classifier.	7M

UNIT – IV

7.	(a)	Explain the factors that affect the computation complexity of the Apriori Algorithm?	7M
	(b)	Define Support and confidence of an association rule. How can you formulate the Association mining problem?	7M

(OR)

8.	(a)	Using Apriori algorithm, Generate the frequent itemsets for the following data. Consider minimum support = 2.	14M

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

UNIT-V

9.	(a)	Discuss about various cluster characteristics.	7M
	(b)	Briefly explain about Core points, Border points and Noise points.	7M

(OR)

10.	(a)	Write and explain CLIQUE algorithm.	7M
	(b)	Explain about Agglomerative Hierarchical clustering and Divisive Hierarchical clustering.	7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Define security Mechanism. Discuss network security model with a neat diagram. **7M**

(OR)

2. (a) Explain symmetric cipher model with neat diagram. **7M**

   (b) Elucidate security services briefly. **7M**

UNIT – II

3. (a) Compare block cipher with stream cipher and write block cipher principles. **7M**

   (b) Explain DES algorithm with neat diagram. **7M**

(OR)

4. (a) Discuss modular arithmetic and explain GF(2n) fields with addition and multiplication. **7M**

   (b) What is prime factorization? Discuss Chinese Remainder theorem with an example. **7M**

UNIT – III

5. (a) Explain Secure Hash Algorithm (SHA) briefly. **7M**

   (b) Write applications of cryptographic hash functions. **7M**

(OR)

6. (a) Explain principles of public key cryptography **7M**

   (b) Illustrate Diffie - Hellman key exchange algorithm? **7M**

UNIT – IV

7. (a) Discuss briefly on Schnorr digital signature scheme. **7M**

   (b) Explain digital signature standard briefly. **7M**

(OR)

8. (a) Discuss security of MACs and HMAC. **7M**

   (b) What are the different approaches to message authentication? **7M**

UNIT-V

9. (a) What is PGP? Explain the general format of PGP message. **7M**

   (b) What is S/MIME? Discuss variety of MIME content types. **7M**

(OR)

10. (a) What is the motivation for Kerberos? Discuss Kerberos version 4. **7M**

    (b) Explain the principles of Remote user authentication. **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Write a short note on asymptotic notations.   7M
    (b) Explain bubble sort algorithm and simulate it for the following data 5,1,4,2,8   7M

(OR)

2. (a) Differentiate between priori analysis and posteriori analysis.   7M
    (b) Discuss Linear 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. 7M
        N=4, profits (p1,p2,p3,p4) = (100,10,15,27), Deadlines (d1,d2,d3,d4) = (2,1,2,1)
    (b) Explain about Knapsack problem with an example.   7M

UNIT – III

5. (a) Solve the solution for 0/1 knapsack problem using dynamic programming (p1,p2,p3)   7M
        = (1,2,5), (w1, w2, w3) = (2, 3,4), M=6, n=3
    (b) Write a short note on multistage graph.   7M

(OR)

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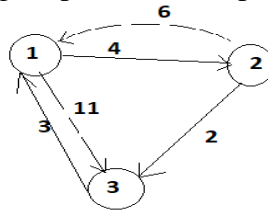
UNIT – IV

7. (a) Write and explain Breath first search algorithm with example.   7M
    (b) Apply the backtracking algorithm to solve the following instance of the sum of   7M
        subsets 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   7M
        problem.

UNIT-V

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

$$\begin{array}{c c}
 & \begin{array}{c c c c} \text{A} & \text{B} & \text{C} & \text{D} \end{array} \\
\begin{array}{c} \text{A} \\ \text{B} \\ \text{C} \\ \text{D} \end{array} &
\begin{bmatrix}
\infty & 4 & 12 & 7 \\
5 & \infty & \infty & 18 \\
11 & \infty & \infty & 6 \\
10 & 2 & 3 & \infty
\end{bmatrix}
\end{array}$$

(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 n=5 , (p1,p2,p3,p4) =(10,10,12,18), (w1,w2,w3,w4)=(2,4,6,9) and m=15   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of February – 2022
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) Explain the Common Mechanisms which is used in UML.   7M
   (b) Give short notes on Software Development Life Cycle.   7M

(OR)

2. Explain the conceptual model of the UML?   14M

UNIT – II

3. What is the role of a Class Diagram? Develop a library information system using   14M
   Class Diagram.

(OR)

4. (a) Explain the common modeling technique for modeling logical database schema.   7M
   (b) Write short notes on Object Diagrams?   7M

UNIT – III

5. (a) Define Usecase Diagram and explain its common properties?   7M
   (b) What is use of Sequence Diagram and explain the important elements of Sequence   7M
       Diagram?

(OR)

6. Define collaboration Diagram? Explain the properties of collaboration diagram and   14M
   draw the collaboration Diagram for Library management system?

UNIT – IV

7. (a) Explain the role of Process and Threads and how it is used in modeling   7M
   (b) Draw the Activity Diagram for Library Management system   7M

(OR)

8. What is State Chart Diagram? Explain the properties of state chart diagram and draw   14M
   the state chart diagram for Library System

UNIT-V

9. (a) Explain about Deployment diagram? How it is useful in modeling of an embedded   7M
       system?
   (b) Draw the Deployment Diagram for Library System?   7M

(OR)

10. (a) Explain the purpose of Component Diagram and also explain the distribution of   7M
        artifacts using Component Diagram
    (b) Draw the Component Diagram for Library System   7M