K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 2021
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) Define remote sensing? What are the essential components of a remote sensing system? 7M

   (b) What is EMR? What do you understand by electro magnetic spectrum? 7M

(OR)

2. How electromagnetic radiation does interact with soil particles and water? 14M

UNIT – II

3. Explain the satellite and Sensor characteristics of IRS IC & ID 14M

(OR)

4. Discus about various types of resolutions that is required in satellites. Explain spatial and temporal resolutions of satellites in detail. 14M

UNIT – III

5. (a) Outline image enhancement that is required to process the image 7M

   (b) Discus about spatial filtering with the help of a neat sketch. 7M

(OR)

6. (a) Explain the elements of visual interpretation techniques. 7M

   (b) Illustrate the edge enhancement technique in detail. 7M

UNIT – IV

7. (a) Explain the components of GIS. 7M

   (b) What is G.I.S? Explain various principles of G.IS 7M

(OR)

8. (a) Compare vector and raster data structures? 7M

   (b) Differentiate GIS from an information system and CAD software? 7M

UNIT-V

9. (a) List out various applications of remote sensing 7M

   (b) Discuss how remote sensing can be used in surveying 7M

(OR)

10. Explain how remote sensing is use full in development of agriculture. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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. What are the time salient features of Bombay Road Development Plan? In what aspects it differs from Nagpur Road Development Plan?   14M

(OR)

2. (a) Explain briefly about the third 20 year road development plan.   7M
   (b) What are the uses of map study in engineering surveys for highway location?   7M

UNIT – II

3. (a) State the factors on which the Overtaking Sight Distance depends. Explain Briefly   7M
   (b) vertical summit curve is formed at the intersection of two gradients, (+) 3.0 and (–) 3.5 percent. Design the length of summit curve to provide a stopping sight distance for a speed of 65 kmph. Assume suitable data.   7M

(OR)

4. (a) Enumerate the various design factors controlling the vertical alignment of highways.   7M
   (b) Derive an expression for extra widening on highway curves   7M

UNIT – III

5. (a) What are the various objectives of traffic volume studies   7M
   (b) Explain the various measures that may be taken to prevent accidents   7M

(OR)

6. (a) Explain spot speed, running speed, space mean speed, time mean speed and average speed. How are spot speed studies carried out?   7M
   (b) Draw a neat sketch of full clover leaf and show the movement of traffic.   7M

UNIT – IV

7. (a) With neat sketches, explain the Different types of traffic Islands and conflicts at Intersections..   7M
   (b) What are the IRC recommendations for radius at entry, exit and central island?   7M

(OR)

8. (a) What are the requirements of at grade intersection?   7M
   (b) Present the design procedure of isolated traffic signal.   7M

UNIT-V

9. (a) Explain the design procedure of tie bars in a CC pavement.   7M
   (b) A CC pavement has a thickness of 18 cm and has two lanes of 7.2 m width with a longitudinal joint at the centre. Design the dimensions and spacing of the tie bars using the following data: Allowable working stress in tension = 1400 kg/cm 2 Unit weight of concrete = 2400 kg/ m 3 Coefficient of friction = 1.5 Allowable bond stress in deformed bars in concrete = 24.6 kg/cm 2   7M

(OR)

10. (a) List the specifications, materials and construction steps for laying Bituminous concrete.   7M
   (b) Explain briefly the importance and requirements of Highway Drainage.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Explain the necessity and importance of irrigation.   7M
    (b) What are 'duty' and 'delta'? Explain the factors affecting duty.   7M

(OR)

2. (a) A water course has a 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) Describe with the help of a diagram various forms of soil moisture.   7M

UNIT – II

3. (a) What is 'balancing depth' of a canal? Derive an expression for the same.   7M
    (b) Explain the procedure of designing a channel using Kennedy's theory.   7M

(OR)

4. (a) Using Lacey's theory, design an irrigation channel for the following data: 7M
Discharge Q $=30$ m^3/s
Silt factor f $=1.00$
Side slopes $=1/2 : 1$
    (b) What is canal lining? What are the requirements of a good lining material?   7M

UNIT – III

5. (a) What are the various components of a diversion headwork? What are their functions?   7M
    (b) Describe various types of weirs. Distinguish between a weir and a barrage.   7M

(OR)

6. (a) Explain the design of impervious floor using the Bligh's creep theory.   7M
    (b) Explain the Khosla's method of independent variables.   7M

UNIT – IV

7. (a) Discuss in brief, the merits and demerits of various types of dams.   7M
    (b) What are the factors on which selection of site for a dam depends?   7M

(OR)

8. (a) Explain various types of reservoirs. What do you understand by multipurpose reservoir?   7M
    (b) Explain the method of calculating reservoir capacity for a specified yield, from the mass inflow curve.   7M

UNIT-V

9. (a) Discuss in brief various modes of failure of a gravity dam.   7M
    (b) Distinguish between a low gravity dam and a high gravity dam. Derive the expression used for such a distinction.   7M

(OR)

10. (a) What are the criteria for safe design of earth dam?   7M
    (b) Explain the various measures for control of seepage through earth dams.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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. Explain in detail about the stress block parameters of a rectangular reinforced concrete section in the limit state method of design of structures.   **14M**

(OR)

2. (a) What is meant by characteristic strength and characteristic loads in limit state method of design of reinforced concrete structures.   **7M**

(b) Explain the significance of partial safety factors that are used in the limit state method of design of reinforced concrete structures.   **7M**

UNIT – II

3. (a) What are the assumptions made in the design of limit state of collapse of reinforced concrete structures in flexure.   **7M**

(b) Find the moment of resistance of a singly reinforced concrete beam of 230mm width and 400 mm effective depth, reinforced with 4 bars of 16 mm diameter with steel of grade Fe415 and concrete is of grade M20.   **7M**

(OR)

4. (a) Under which circumstances a doubly reinforced beam is preferred in case of reinforced concrete structures.   **7M**

(b) A T- beam of overall depth 450mm and 300mm web width has an effective flange width of 1000mm with a depth of 120mm. It is reinforced with 6 bars of 20mm diameter bars on tension side with a cover of 40mm. If M20 and Fe415 grade materials are used, calculate the moment of resistance of the beam.   **7M**

UNIT – III

5. (a) What are the factors that influence the shear resistance of a reinforced concrete structural member.   **7M**

(b) A simply supported rectangular beam of size 230mm wide and 500mm effective depth carries a uniformly distributed load of 60kN/m including its self weight over an effective span of 6m. Design the shear reinforcement in the form of vertical stirrups. Assume that the beam carries 0.75% tension reinforcement throughout the length. Concrete is of grade M20 and steel is of grade Fe415. Take the width of supports as 400mm.   **7M**

(OR)

6. Find the reinforcement required for a rectangular beam section of size 300 x 500 mm with a factored bending moment of 60 kN-m, factored torsional moment of 40 kN-m and with factored shear force of 70 kN. Use M20 grade concrete and Fe415 grade steel.   **14M**

UNIT – IV

7. Design a slab over a room of internal dimensions 4m x 5m and supported on 350mm thick brick wall. All the edges are simply supported with corners of the slab are held down. Take live load as 2kN/m^2, floor finish as 1kN/m^2. Use M20 and Fe415 grade materials for the design of the slab. Sketch the details of reinforcement.   **14M**

(OR)

8. The stairs of an office building has located in a room measuring 3.5m x 5.5m. The vertical distance between the floors is 3.6m. Design doglegged stairs using M20 and Fe415 grade materials. The live load on stairs is 4kN/m^2.   **14M**

UNIT-V

9. Design a short axially loaded square column 500mm x500mm for a service load of 500kN. Use M20 and Fe415 grade materials.   **14M**

(OR)

10. A 450mm x 230mm rectangular column is reinforced with 8 number of 20mm steel bars. The effective length of the column is 3m. The lateral ties are of 8mm diameter have been provided   **14M**

as transverse reinforcement at 150mm centre to centre. Find the ultimate load carrying capacity of the column. Use M20 and Fe415 grade materials.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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 beam AB of uniform section and 6 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 concentrated load of 40 kN at right quarter. Determine the fixed end moments at the ends and the reaction. Draw BMD & SFD.

(OR)

2. A continuous beam ABC is built-in at A and C and is carried over simple support at **14M** B. Span AB = 6 m and span BC = 4 m. It carries a clockwise couple of 30 kNm in the mid span AB, and a point load of 10 kN is acting in the span BC, 2 m from the middle support B.
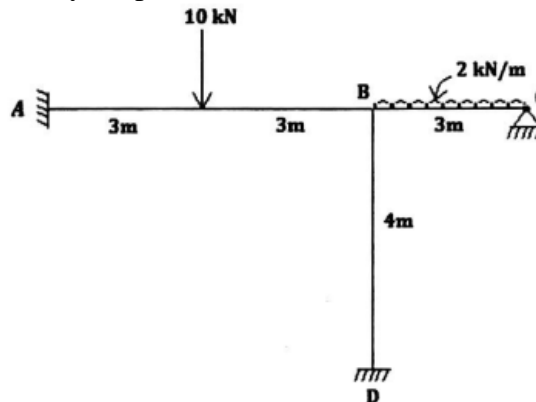
UNIT – II

3. Analyse the given frame by slope deflection method. Draw SFD, BMD and EC. **14M** Given that, the support 'B' sinks by 5mm. Take E = 210 GPa and I = $0.1 Gmm^4$.
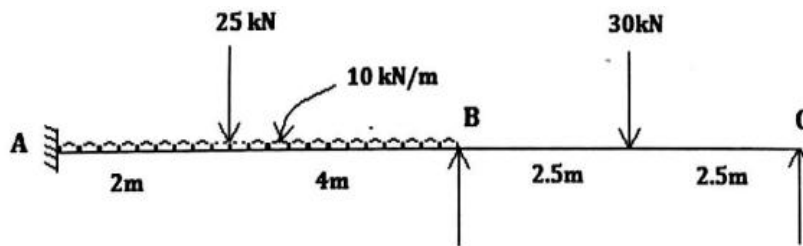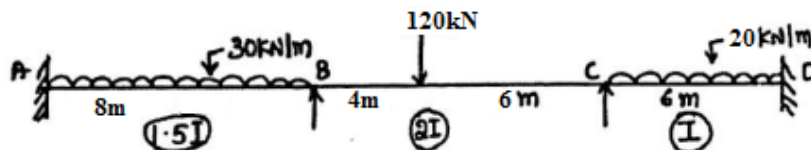

(OR)

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 portal frame shown in fig by moment distribution method. Draw **14M**

SFD and BMD.
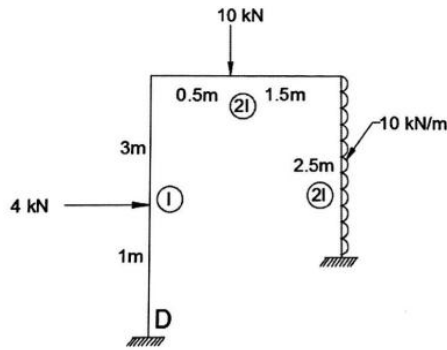
UNIT – IV

7. Analyse the continuous beam shown in fig by Kani;s method. Take EI = 2×10^4 kNm². **14M**
Draw SFD and BMD.
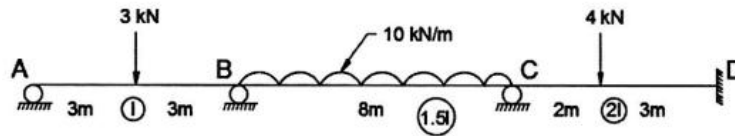
(OR)

8. Analyse the frame by Kani's method. Draw SFD and BMD. **14M**

UNIT-V

9. Determine deflection under point load. Take E = 200 kN/mm², I = 1 x 10^7 mm⁴. **14M**

(OR)

10. Determine vertical component of deflection at point C for the frame by SEM. **14M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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

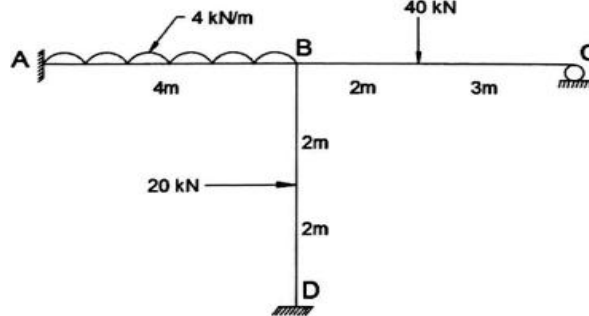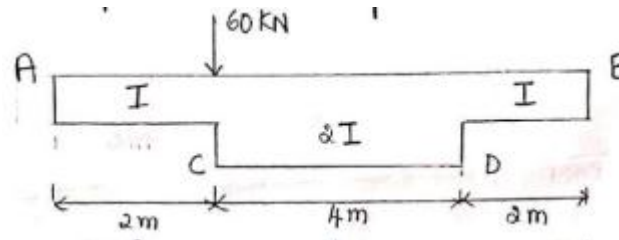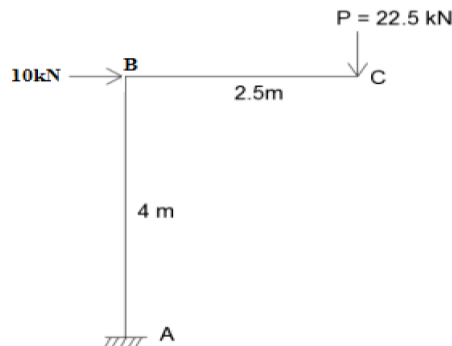1. Define Managerial Economics and write about the scope and nature of Managerial Economics   14M

(OR)

2. Explain different Demand Forecasting Techniques along with the importance.   14M

UNIT – II

3. (a) Write the COBB – DOUGLAS production function in detail.   7M
   (b) What is Law of Variable Proportion in the production?   7M

(OR)

4. How can you determine Break Even Point through graphical presentation?   14M

UNIT – III

5. (a) Write the features of Perfect Market.   7M
   (b) Define Price and write any five methods of pricing with examples.   7M

(OR)

6. Explain process of determination of pricing under Monopoly Market.   14M

UNIT – IV

7. What are the various long term sources of finance required by the business organization?   14M

(OR)

8. Mohan & Co had two projects before it that costs Rs.5,00,000/- each. Rank the projects through NPV and PI @10% discount rate. (Net Present value and Profitability Index).   14M

Year	1	2	3	4	5
Project 1	200000	250000	300000	250000	200000
Project 2	100000	50000	200000	100000	150000

UNIT-V

9. Journalise the following the transactions in the books of Ram and prepare necessary ledger accounts.   14M
   2014 January
   (i) Ram commenced with Rs.15000/-
   (ii) Paid into bank Rs.10000/-
   (iii)Purchased goods from 'Balu' for Rs.2000/-
   (iv)Returned goods to 'Balu for Rs.200/-
   (v) Paid to 'Balu' in full settlement of A/c RS.1700/-
   (vi)Received interest from the bank Rs.750/-
   (vii) Sold goods for the bank Rs.7000/-
   (viii) Sold goods of Dinesh for Rs.4000/-
   (ix)Received goods worth Rs.100/- from Dinesh with a complaint about damage
   (x) Paid salaries Rs.400/-
   (xi) Entertainment Rs.50/-
   (xii) Received a cheque form Dinesh Rs.500/-
   (xiii) Issued a cheque for Rs.100/- towards rent to landlord

(OR)

10. Support your argument that the financial ratios will indicate the health of business.   14M

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   14M
   the 2 input AND & OR gate?

(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   5M
     used in Fuzzy Logic?
     (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,   9M
     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
     (ii) A U (B∩C) = (AUB) ∩ (AUC)
     (iii) $(AUB)^c = (A^c \cap B^c)$

UNIT-V

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

(OR)

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

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Explain the following terms with reference to thermal plants.   6M
         (i) Heat rate curve   (ii) Input-Output characteristics
    (b) Derive the transmission loss formula for a system consisting of n-generating plants   8M
         supplying several loads inter-connected through a transmission network.

(OR)

2. (a) What are the assumptions made in deriving transmission loss coefficients? Enumerate   6M
         them.
    (b) Two units each of 200 MW in thermal power plants are operating all the time   8M
         throughout the year. The maximum and minimum load on each unit is 200 and 50
         MW, respectively. The incremental fuel characteristics for the two units are given as

         $$\frac{dC_1}{dP_{G1}} = 15 + 0.08P_{G1} Rs./MWh$$

         $$\frac{dC_2}{dP_{G2}} = 13 + 0.1P_{G2} Rs./MWh$$

         Find the incremental fuel cost, if the total load varies between 100 and 400 MW.

UNIT – II

3. (a) Explain the Priority list method for unit commitment.   7M
    (b) Derive an expression for cost function including running, startup and shunt down   7M
         costs.

(OR)

4. (a) Explain the unit commitment problem.   7M
    (b) Explain the Backward and Forward dynamic programming approach to solve unit   7M
         commitment problem in a power system.

UNIT – III

5. (a) Write short notes on hydroelectric power plant models.   7M
    (b) Explain the short term Hydrothermal scheduling problem.   7M

(OR)

6. (a) Derive the model of a speed governing system and represent it by a block diagram.   7M
    (b) Draw and explain turbine transfer function model.   7M

UNIT – IV

7. (a) Draw and explain First order approximate block diagram of load frequency control of   7M
         an isolated area.
    (b) Determine Kps and Tps and B, the primary automatic load frequency control   7M
         parameters for a control area having the following Data.
         Total rated area capacity = 1000 MW
         Inertia constant H = 5 KWs/KVA
         Regulation R = 2 Hz/pu MW (all generators) and
         Normal operating load = 500 MW at 50 Hz.
         Assume the change in load 1% for 1% change in frequency.

(OR)

8. (a) Define control area.   4M

(b) Two generators of the ratings 40 MW and 400 MW respectively are supplying power to a system. The frequency is 50 Hz and each generator is half loaded. The system load increases by 110 MW and as a result the frequency drops to 49.5 Hz. What must be the individual regulations if the two generators should increase their turbine powers in proportion to their ratings?   10M

UNIT-V

9. (a) Explain load frequency control and economic dispatch control.   7M
    (b) Draw and explain the block diagram of two area interconnected system using PI controller.   7M

(OR)

10. (a) What are the advantages of inter connected operation of power systems? Explain.   7M
    (b) A 1000 MW control area (1) is interconnected with a 5000 MW control area (2). The 1000 MW area has the system parameters given below   7M
    $R = 2$ Hz/pu MW
    $B = 0.01$ pu MW/Hz and
    increase in load, $\Delta PD1 = 0.01$ pu MW.
    Area 2 has the same parameters R and B but in terms of the 5000 MW base. Find the static frequency drop?

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Explain the use of acceleration factors in G-S method.   7M
    (b) Derive the static load flow equations in a power system   7M

(OR)

2. Describe the Gauss-Seidel method for the solution of power flow equations in power systems   14M
    deriving necessary equations.

UNIT – II

3. (a) Distinguish between Newton-Raphson and Gauss-Seidel methods of load flow analysis   8M
    (b) What is Jacobian matrix? How the elements of Jacobian matrix are computed?   6M

(OR)

4. (a) Explain the load flow solution using N-R method with the help of a flow chart   7M
    (b) Writ the advantages and disadvantages of N-R method over Gauss Seidel method   7M

UNIT – III

5. (a) A salient pole synchronous generator is connected to an infinite bus. Derive an   8M
         expression for the electrical output power of the generator and draw P -δ curve.
    (b) Explain Methods of Improvement of Steady State Stability   6M

(OR)

6. (a) Determine the Steady state stability limit of a system consisting of a generator   8M
         equivalent reactance of 0.5 pu connected to an infinite bus through a series reactance
         of 1.0 pu. The terminal voltage of the generator is held constant at 1.2pu and the
         voltage of infinite bus is 1.0pu
    (b) Explain Steady State Stability and Limits   6M

UNIT – IV

7. (a) Explain equal area criterion with respect to stability with neat sketch   7M
    (b) Explain critical clearing time and critical clearing angle by deriving its expressions 7M

(OR)

8. (a) Explain the classical methods for improving power system stability.   7M
    (b) A 20 MVA, 50 Hz generator delivers 20 MW over a double circuit line to an infinite bus. The 7M
         generator has kinetic energy of 2.52 MJ/MVA at rated speed. The generator transient
         reactance is Xd = 0.30 pu. Each transmission circuit has R = 0 and a reactance of 0.2 pu on a
         20 MVA base. E' = 1.1 pu and infinite bus voltage V = 1 pu. A three phase short circuit
         occurs at the midpoint of one of the transmission lines. plot swing curves with fault cleared by
         simultaneous opening of breakers at both ends of the line at 2.5 cycles.

UNIT-V

9. (a) Discuss briefly about the attenuation of travelling waves   7M
    (b) An overhead transmission line with surge impedance 400 Ω is 300 km long. One end of this 7M
         line is short circuited and at the other end a source of 11 kV is suddenly switched in.
         Calculate the current at source end after 0.005 sec from voltage is applied

(OR)

10. (a) Obtain the expressions of reflection and transmission coefficients at the receiving end of line 7M
         characteristics impedance for the case where line is terminated by short circuit.
    (b) A step wave of 200 kV travels on a line having surge impedance of 500 ohms and reaches the 7M
         end of the line where the line is terminated by an inductance of 2500µH. Find the voltage
         across the inductance

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Explain briefly, what are the factors involved in the selection of drives?   7M
    (b) Explain the four quadrant operation of a motor drive in general   7M

(OR)

2. (a) What are advantages of electrical drive?   7M
    (b) Write the torque equation of the motor-load system? What is meant by acceleration   7M
        mode of the electric drive

UNIT – II

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

(OR)

4. (a) Draw a neat sketch of a four-quadrant DC-DC converter for a variable speed   7M
        reversible drive of DC series motor and discuss its operation?
    (b) Explain the control strategies of dc chopper   7M

UNIT – III

5. (a) Discuss speed control of induction motor from stator side with speed-torque curves   7M
    (b) Show that variable frequency control of induction motor is more efficient than stator   7M
        voltage control.

(OR)

6. (a) Draw the circuit diagram and explain the operation of rotor- resistance control of   7M
        Induction motor. Mention the advantages and disadvantages of the above method of
        control.
    (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) Describe self-controlled and separate controlled mode of operation of a synchronous   7M
        motor drive in detail and compare them.

(OR)

8. (a) Show that the torque of synchronous motor is independent of speed when it operates   7M
        in current control mode?
    (b) Explain the synchronous motor drive self-control operation with power factor   7M
        improvement

UNIT-V

9. (a) Explain the power factor improvement methods   7M
    (b) What are various methods used for maintenance of motors   7M

(OR)

10. (a) Explain the energy conservation in electrical drives   7M
    (b) Explain the losses in electrical drive system   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Write short notes on Interrupt system.   6M

   (b) Explain the various addressing modes of 8086 with an example.   8M

(OR)

2. Explain in detail about maximum mode and minimum mode configurations of 8086.   14M

UNIT – II

3. Elucidate (i) Assembler Directives (ii) Look up tables (iii) Delay subroutines   14M

(OR)

4. (a) Write an ALP in 8086 to multiply the given two 16-bit data.   7M

   (b) Write an ALP in 8086 to find the smallest number in a given block of data.   7M

UNIT – III

5. (a) With a neat diagram explain the operation of Programmable interrupt controller   7M

   (b) Explain in detail about Programmable Interval Timer.   7M

(OR)

6. (a) Explain the roll of DMA controller to transfer a data from I/O devices to memory or   7M
       vice versa?

   (b) Explain in detail about USART.   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 (i) Register set (ii) Instruction set of 8051 Microcontroller   14M

(OR)

10. Elucidate: 14M

    (i) Interrupt structure

    (ii) Memory and I/O Interfacing

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Explain about operational amplifier with the help of a diagram indicating the various building blocks. **7M**

(b) List the important characteristics of the comparator and explain some applications of it. **7M**

(OR)

2. (a) Explain about I to V and V to I converters **7M**

(b) What is an instrumentation amplifier? Explain the working of three op-amp instrumentation amplifier. **7M**

UNIT – II

3. (a) Design a Monostable multi-vibrator using 555 timer . **7M**

(b) Explain about Schmitt Trigger using IC 555 with neat sketch? **7M**

(OR)

4. (a) With suitable diagram explain the Astable operation of IC 555 timer. **7M**

(b) With block diagram discuss the principle of operation of IC 565 PLL. **7M**

UNIT – III

5. Write short notes on **14M**
   i. TTL logic
   ii. Bipolar logic
   iii. ECL

(OR)

6. (a) Design a CMOS 4-input AND -OR-INVERT gate. Draw the logic diagram and function table **7M**

(b) Write short notes on comparison of different logic families **7M**

UNIT – IV

7. (a) Describe the design flow of HDL with an example. **7M**

(b) With an example discuss in detail about functions and libraries in VHDL **7M**

(OR)

8. (a) Write a VHDL program on 3 to 8 Decoder using Behavioral design? **7M**

(b) Difference between dataflow design and structural design with example **7M**

UNIT-V

9. (a) Difference between decoder and encoder **7M**

(b) Explain multiplexer and de multiplexer code converters **7M**

(OR)

10. (a) Explain the operation of a simple SR Flip Flop using NAND gates **7M**

(b) Explain about shift registers **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Semester (R15) Supplementary Examinations of August – 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. (a) What are the principles of OSI reference model? Give importance of every layer of it.   7M

     (b) How the LAN, MAN and WAN are distinguished with respect to size, transmission technology, speed of transmission and area of coverage.   7M

(OR)

2. (a) Explain TCP/IP reference model.   7M

     (b) What are the various types of network topology? What are the implication of having different topology.   7M

UNIT – II

3. (a) Explain three transmission media of physical layer.   7M

     (b) What are the different framing techniques used in DLL. Explain with an example.   7M

(OR)

4. (a) Write a short notes on communication Satellites   7M

     (b) Explain different error detecting schemes with an example.   7M

UNIT – III

5. (a) What is pure ALOHA and slotted ALOHA? Mention the advantages of slotted ALOHA.   7M

     (b) With an example, Explain hierarchical routing algorithm.   7M

(OR)

6. (a) Explain CSMA/CD protocol.   7M

     (b) Explain link state routing algorithm with an example.   7M

UNIT – IV

7. (a) Write about TCP protocol.   7M

     (b) Illustrate different protocol scenarios for establishing a connection using three-way handshake.   7M

(OR)

8. (a) Explain the UDP protocol   7M

     (b) Explain in detail four protocol scenarios for releasing a connection.   7M

UNIT-V

9. (a) What is domain? Explain the internet domain space in the context of DNS.   7M

     (b) With the help of diagram explain the encryption model.   7M

(OR)

10. (a) What is SNMP? Briefly discuss its message types.   7M

     (b) With the help of suitable example, Explain transposition cipher and substitutional cipher   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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.	Explain the internal architecture of 8051 micro controller with neat diagram?	14M

(OR)

2.	(a)	List the differences between microcontrollers and microprocessors?	4M
	(b)	Draw and explain the internal memory architecture of 8051 microcontroller	8M

UNIT – II

3.	(a)	Explain each bit in SCON and SMOD registers in 8051 microcontroller?	6M
	(b)	Explain 8051 interrupt structure?	8M

(OR)

4.	(a)	What is an assembly directive? Explain 8051 Assembly directives?	7M
	(b)	Write an ALP to find the maximum and minimum numbers in a given set of numbers.	7M

UNIT – III

5.	(a)	Explain the major design rules for implementing RISC and ARM philosophy	8M
	(b)	Write a short note on ARM9 FAMILY.	6M

(OR)

6.	With a neat diagram, explain about ARM controller architecture?	14M

UNIT – IV

7.	(a)	Discuss about 32/16-bit arm instruction set.	7M
	(b)	What is addressing mode? What are the various addressing modes of ARM controller?	7M

(OR)

8.	Explain about THUMB instruction set in ARM MCU?	14M

UNIT-V

9.	(a)	Explain how IOT is used in home automation.	6M
	(b)	Explain IOT enabling technologies.	8M

(OR)

10.	(a)	What is IOT and what are the different IOT levels and design templates?	8M
	(b)	Write short notes on domain specific IOT?	6M

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

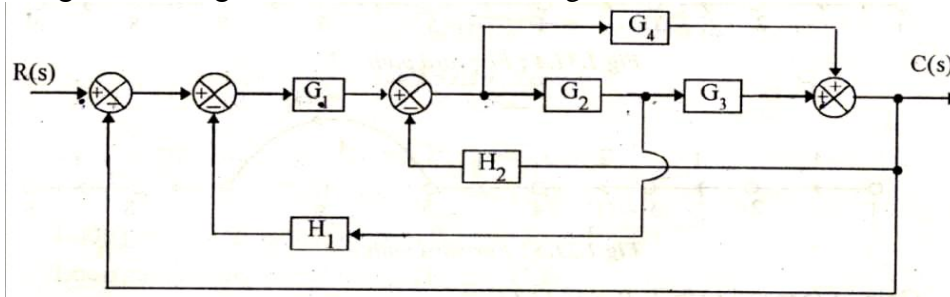Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Distinguish between open loop and closed loop control systems with neat sketch?   6M
    (b) Convert the block diagram to signal flow graph and determine the transfer function   8 M
        using Masaon's gain formula as shown in figure below.?

(OR)

2. (a) Write the force balance and torque balance equations for basic elements in mechanical   6M
        systems
    (b) Obtain the transfer function for the signal flow graph using mason's gain formula?   8M
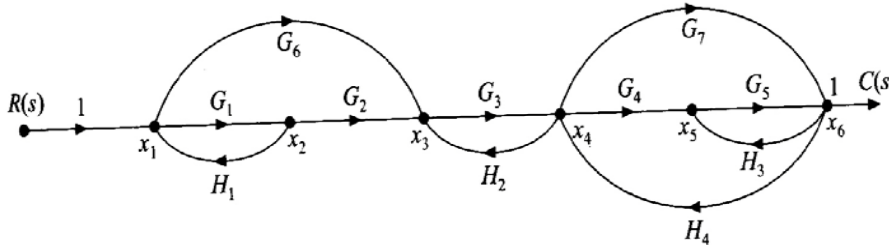
UNIT – II

3. (a) The unity feedback system is characterized by an open loop transfer function   7M
        $(s)=K/S(S+10)$. 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.
    (b) What is steady state error and explain its importance?   7M

(OR)

4. (a) Derive the Time response of first order system with step input   7M
    (b) For a unity feedback control system the open loop transfer function   7M
        $G(s) = 10(s+2)/s^2(s+1)$. Find position, velocity and acceleration error constants

UNIT – III

5. (a) The open loop transfer function of a unity feedback control system is given by   10M
        $G(s) = (s+9)/s(s^2+4s+11)$ Sketch the root locus of the system.
    (b) Write any two difficulties in R-H Criterion and explain how they can be removed?   4M

(OR)

6. (a) By means of RH criterion determine the stability of the system represented by the   7M
        characteristic equation: $S^4 + 2S^3 + 8S^2 + 4S + 3 = 0$. State the advantages of RH
        Stability criterion
    (b) Write the effects of adding poles and zeros to the G(s)H(s) on the root loci   7M

UNIT – IV

7. Sketch the bode plot for the following transfer function and determine phase margin and gain margin. $G(s)=75(1+0.2S)/S(S^2+16S+100)$ — 14M

(OR)

8. For a feedback control system given below, find gain margin and stability from Nyquist plot. $G(s)H(s)=40(S+4)/(S^2+2S+2)$ — 14M

UNIT-V

9. What is compensation? What are the different types of compensators? What is a lag compensator, obtain the transfer function of lag compensator and draw pole-zero plot? — 14M

(OR)

10. A unit feedback system has an open loop transfer function $G(s) = K / S (S+1) (0.2S+1)$. Design a phase lag compensator to meet the following specifications. — 14M
Velocity error constant = 8
Phase margin $\geq 40^0$

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) What are the limitations of conventional tubes at microwave frequencies. Describe the construction & working of two cavity klystron amplifier. — 7M

   (b) A reflex klystron having an accelerated field of 300V oscillates at a frequency of 10GHZ with a retarding field of 500V. If its cavity is retured to 9GHZ. What must be the new value of retarding field fro oscillations in the same mode to take place? — 7M

(OR)

2. (a) Name different methods of generating microwave power. Describe the necessary theory & Working of reflex klystron. — 7M

   (b) A reflex klystron has following parameters: $V_0 = 800v$, L = 1.5mm, $R_{sh} = 15k - 2$, f = 9GHZ. — 7M

   Calculate: i) The repeller voltage from which the tube can oscillate in $1\frac{3}{4}$ mode.

   ii) The direct current necessary to give a microwave gap voltage of 200V.
   iii) Electron efficiency.

UNIT – II

3. (a) Explain the various types of slow wave structures. — 7M

   (b) A helix travelling wave tube operates at 4 GHz, under a beam voltage of 10 KV and beams current of 500mA. If the helix is 25Ω and interaction length is 20cm, find the gain parameter. — 7M

(OR)

4. (a) Derive the expression of axial electric field of Helix TWT. — 7M

   (b) A helix travelling wave tube is operated with a Beam current of 300mA, beam Voltage of 5KV, characteristic Impedance of 20Ω.. What length of helix will be Selected to give an output power gain of 500db at 10GHz. — 7M

UNIT – III

5. (a) Derive the criterion for classifying the modes of operation for Gunn effect diodes. — 7M

   (b) An n-type GaAs Gunn diode has following parameters
   Electron drift velocity $V_d = 2.5 \times 105$m/s, Negative Electron mobility $|\mu_n| = 0.015$ m^2/ v s
   Relative dielectric constant $\varepsilon_r = 13.1$. Determine the criterion for classifying the modes of operation. — 7M

(OR)

6. (a) Describe the principle of operation of IMPATT diode. — 7M

   (b) A Ku-band IMPATT diode has a pulse operating voltage of 100V and a pulse operating current of 0.9 A. The efficiency is about 10%. Calculate
   i) The output power (ii). The duty cycle if the pulse width is 0.01ns and frequency is 16 GHz. — 7M

UNIT – IV

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

   (b) A Three port circulator has an insertion loss of 1dB, isolation 30 dB and VSWR = 1.5. Find the S - matrix. — 7M

(OR)

8. What is a Gyrator? Describe how isolators can be realized by using Gyrators and Hybrids. Give the S matrix for an ideal Gyrators. — 14M

UNIT-V

9. (a) The calibrated power from a generator as read at the power meter is 25mw.When a 3dB attenuator with a VSWR of 1.3/1 is inserted between the generator and detector what value should the power meter read. — 7M

   (b) How are microwave measurements different from low frequency measurements? — 7M

(OR)

10. (a) The signal power at the input of a device is 10 mw. The signal power at the output of same device is 0.2mw. Calculate the insertion loss in db of this component. — 7M

(b)   Draw a neat sketch of a microwave test bench for making impedance measurements, naming   7M
        the various components connected.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Find inverse z-transform of $X(z) = \frac{1}{(1-z^{-1})(1-0.5z^{-1})}$.   6M

   (b) List and explain the ROC properties w.r.t Z-transforms.   8M

(OR)

2. (a) For the following function $F(z)$, find an inverse Z Transform using long division method.   7M

   $$F(z) = \frac{z}{z - 0.5}$$

   (b) Solve the following difference equation when the initial condition is $y(-1) = 1$.   7M

   $$y(n) - 0.5\, y(n-1) = 5(0.2)^n\, u(n)$$

UNIT – II

3. (a) List and explain the properties of DFT.   7M

   (b) Compute the 8-point DFT of the sequence $x(n) = \{1,1,1,1,1,1,1,1\}$ by using DIF-FFT algorithm.   7M

(OR)

4. (a) Find the linear convolution of the following sequences using DFT: 8M
   (i) $x(n) = \{1, 2, 3\}, h(n) = \{4, 7, 0, 5\}$
   (ii) $x(n) = \{2, -3, 1, -4, 3, -2, 4, -1\}, h(n) = \{2, -1\}$

   (b) Develop a butterfly diagram for Decimation – In – Time FFT algorithm for N = 8.   6M

UNIT – III

5. (a) Determine the Parallel Form structure of the IIR Filter described by the following difference equation;   7M

   $$y(n) = -\frac{1}{2}y(n-1) + \frac{5}{11}y(n-2) + x(n) + 3x(n-1) + 4x(n-2)$$

   (b) Describe the procedure to realize the lattice structure of FIR system.   7M

(OR)

6. (a) Realize the FIR system with difference equation   7M

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

   in direct form II.

   (b) Determine the Direct Form I structure of the IIR Filter described by the following difference equation;   7M

   $$y(n) = 0.4\, y(n-1) - 0.56\, y(n-2) + 0.53\, y(n-3) + x(n) + 0.75\, x(n-1).$$

UNIT – IV

7. (a) Write the design procedure for Butterworth filter.   5M

   (b) The specifications of desired low pass filter is   9M
   $0.79 \le |H(\omega)| \le 1.0$; $0 \le \omega \le 0.2\pi$
   $|H(\omega)| \le 0.2$; $0.6\pi \le \omega \le \pi$.
   Design a Chebyshev digital filter using Bilinear transformation.

(OR)

8. (a) Convert the analog filter with transfer function $H(s) = \frac{2}{(s+1)(s+2)}$ into digital filter using   9M
   Impulse Invarient method.

   (b) List and explain the characteristics of practical frequency-selective filters.   5M

UNIT-V

9. (a) Design a High pass filter Hamming window by taking 9 samples of $w(n)$ and with a cutoff   10M

frequency of 1.2 radians/sec.

(b) List the characteristics of FIR filters designed using window functions. 4M

(OR)

10. (a) Explain the procedure of designing FIR filters by window. 8M

(b) Compare and contrast FIR and IIR filters. 6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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. Draw a neat line diagram of inplant coal handling and indicate the names of equipments used at different stages?   14M

(OR)

2. Explain the need for condensers in a steam power plant and explain the operation of a shell and tube condenser with neat sketch?   14M

UNIT – II

3. (a) Explain closed cycle gas turbine plant with a neat sketch?   7M
   (b) Distinguish the advantages of closed cycle gas turbine over open cycle gas turbine plant?   7M

(OR)

4. Explain a neat diagram of a diesel power plant showing all systems and explain it?   14M

UNIT – III

5. Describe with a neat sketch of the construction and working of a pressurized water reactor?   14M

(OR)

6. (a) What are the factors to be considered in selecting the site for the hydal plant?   7M
   (b) Explain the pumped storage plant with a neat sketch?   7M

UNIT – IV

7. (a) Explain working of a flat plate collector?   7M
   (b) Draw a neat diagram of Horizontal axis wind turbine and explain its main components?   7M

(OR)

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

UNIT-V

9. (a) A 60 MW power station has an annual peek load of 50MW. The power station Supplies loads having maximum demands of 20MW, 17MW, 10MW and 9 MW. The annual load factor is 0.45. Find   7M
       (i) Average load   (ii) Energy supplied per year
       (iii) Diversity factor   (iv) Demand factor
   (b) Explain the various costs which constitute the total cost of power generation?   7M

(OR)

10. (a) Define the following terms.   7M
        i. Load factor.   ii. Demand factor   iii. Diversity factor
        iv. Plant capacity factor v. Plant use factor   vi. Connected load
    (b) Explain the various cost which constitute the total cost of power generation?   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Demonstrate the working principle of air-refrigerator working on a Bell-Coleman cycle and derive an expression for the same   .   8M

(b) Enumerate the necessity and applications of refrigeration.   6M

(OR)

2. (a) Explain the working principle of boot strap air refrigeration system.   8M

(b) Discuss about the Unit of refrigeration and COP.   7M

UNIT – II

3. (a) Describe the working principle of vapour compression refrigeration system with neat sketch.   8M

(b) Draw the T-S and P-h diagrams of the vapour compression refrigeration system and derive the expression for COP.   6M

(OR)

4. (a) Explain the working principle of vapour absorption refrigeration system with neat sketch.   8M

(b) Compare vapour compression and vapour absorption refrigeration systems.   6M

UNIT – III

5. (a) Classify refrigerants.   6M

(b) Explain the working principle ofSteam Jet Refrigeration system with neat sketch.   8M

(OR)

6. (a) Demonstrate the working ofThermo-electric refrigerator with neat sketch

(b) Enumerate the desirable properties of refrigerants.

UNIT – IV

7. (a) In a cooling application, moist air enters a refrigeration coil at the rate of 100 kg per min at 35^0C and 50 % RH. The apparatus dew point of coil is 5^0C and bypass factor 0.15. Determine   10M
   (i) Outlet state of moist air
   (ii) Cooling capacity of coil in tones of refrigeration

(b) Discuss various Psychrometric properties.   4M

(OR)

8. (a) The pressure and temperature of mixture of dry air and water vapour are 736 mm of Hg and 21^0C DBT. The dew point temperature of the mixture is 15^0C. Determine the following   14M
   (i)   Partial pressure of water vapour in the mixture.
   (ii) Relative humidity
   (iii) Specific humidity
   (iv) Enthalpy of mixture per kg of dry air
   (v)   Specific volume per kg of dry air.

UNIT-V

9. (a) Explain the working of summer air-conditioning system with neat sketch.   8M

(b) Mention the requirements of human comfort.   6M

(OR)

10. (a) Describe the working of winter air-conditioning system with neat sketch.   8M

(b) Discuss briefly about the comfort chart with neat sketch.   6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) An aeroplane makes a complete half circle radius towards left when flying at 210km/h. The rotary engine and the plane is of 50 kg mass having a radius of gyration of 300 mm. The engine rotates at 2400 rpm clockwise as seen from the rear. Find the gyroscopic couple on the aircraft and its effect on the plane.   **7M**

(b) Explain the working of a Gyroscope along with an example of its use.   **7M**

(OR)

2. Find the angle of inclination with respect to the vertical of a two wheeler negotiating a turn. Given: combined mass of the vehicle with its rider is 250 kg; moment of inertia of the engine flywheel 0.3 kg-m^2; moment of inertia of each road wheel 1 kg-m^2; speed of engine flywheel 5 times that of road wheels and in the same direction; height of centre of gravity of rider with vehicle 0.6 m; two wheeler speed 90 km/h; wheel radius 300 mm; radius of turn 50 m.   **14M**

UNIT – II

3. A shaft carries four masses A, B, C and D of magnitude 200 kg, 300 kg, 400 kg and 200 kg respectively and revolving at radii 80 mm, 70 mm, 60 mm and 80 mm in planes measured from A at 300 mm, 400 mm and 700 mm respectively. The angles between the cranks measured anticlockwise are A to B 45°, B to C 70° and C to D 120°. The balancing masses are to be placed in planes X and Y. The distance between the planes A and X is 100 mm, between X and Y is 400mm and between Y and D is 200 mm. If the balancing masses revolve at a radius of 100 mm, find their magnitudes and angular positions.   **14M**

(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 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: i). Net load on the gudgeon pin, ii). Thrust in the connecting rod, and iii). The engine speed at which the above values become zero.   **14M**

UNIT – III

5. (a) Differentiate Static Balancing from Dynamic Balancing.   **4M**

(b) The following data refer to two cylinder locomotive with cranks at 90°:   **10M**
Reciprocating mass per cylinder = 300 kg; Crank radius = 0.3 m; Driving wheel diameter = 1.8 m; Distance between cylinder centre lines = 0.65 m; Distance between the driving wheel central planes = 1.55 m.
Determine: i). the fraction of the reciprocating masses to be balanced, if the hammer blow is not to exceed 46 kN at 96.5 kmph; ii). the variation in tractive effort; and iii). the maximum swaying couple.

(OR)

6. (a) Explain the terms: variation of tractive force, swaying couple, and hammer blow.   **6M**

(b) A single cylinder reciprocating engine has speed 240 r.p.m., stroke 300mm, mass of   **8M**

reciprocating parts 50 kg, mass of revolving parts at 150 mm radius 37 kg. If 2/3rd of the reciprocating parts and all the revolving parts are to be balanced, find: i). The balance mass required at a radius of 400 mm, and ii). The residual unbalanced force when the crank has rotated 60° from top dead centre.

UNIT – IV

7. (a) Derive an expression for the natural frequency of free transverse vibration of simply supported beam carrying several point loads by energy method.   7M

(b) A Shaft 40 mm diameter and 2.5m long has a mass of 15kg per meter length. It is simply supported at the ends and carries three masses 90 kg, 140 kg and 60kg at 0.8m, 1.5m and 2m respectively from the left support. Taking E = 200Gpa, find the frequency of the transverse vibration.   7M

(OR)

8. A shaft 1.5 m long, supported in flexible bearings at the ends carries two wheels each of 50 kg mass. One wheel is situated at the centre of the shaft and the other at a distance of 375 mm from the centre towards left. The shaft is hollow of external diameter 75 mm and internal diameter 40 mm. The density of the shaft material is 7700 kg/m^3 and its modulus of elasticity is 200 GN/m^2. Find the lowest whirling speed of the shaft, taking into account the mass of the shaft.   14M

UNIT-V

9. A machine of mass 75 kg is mounted on springs and is fitted with a dashpot to damp out vibrations. There are three springs each of stiffness 10 N/mm and it is found that the amplitude of vibration diminishes from 38.4 mm to 6.4 mm in two complete oscillations. Assuming that the damping force varies as the velocity, determine: i). the resistance of the dashpot at unit velocity; ii). the ratio of the frequency of the damped vibration to the frequency of the undamped vibration; and iii). the periodic time of the damped vibration.   14M

(OR)

10. A single cylinder oil engine drives directly a centrifugal pump. The rotating mass of the engine, flywheel and pump with the shaft is equivalent to a three rotor system as shown in figure. The mass moment of inertia of three rotors A, B, and C are 0.15, 0.3, and 0.09kg-m^2. Find the natural frequency of the torsional vibration. The modulus of rigidity of the shaft material is 84kN/mm^2.   14M
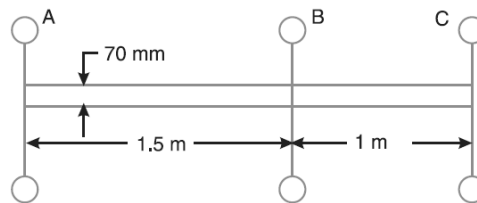
K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 2021
SUB: Operations Research (ME)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1. Write the broad classification of operation research models and give an example for each. Explain general methods for solving operation research models. **14 M**

(OR)

2. (a) Solve the following linear programming problem graphically: **10 M**
Maximise $Z = 4x + y$;
subject to the constraints: $x + y \le 50$; $3x + y \le 90$; $x \ge 0, y \ge 0$

(b) What are the Limitations of linear programming problem? **4 M**

UNIT – II

3. (a) Determine the basic feasible solution to the following transportation problem by using North-West corner rule: **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) Write the applications of transportation problem. **4 M**

(OR)

4. (a) Differentiate Assignment and Transportation models. **4 M**

(b) Solve the minimal assignment problem whose cost matrix is given below: **10 M**

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

UNIT – III

5. (a) The Initial Cost of an item is Rs 15,000 and maintenance or running costs in Rs/-. For different years are given below. **10 M**

Year	1	2	3	4	5	6	7
Running Cost	2,500	3,000	4,000	5,000	6,500	8,000	10,000

What is the replacement policy to be adopted if the capital is worth 10 percent and there is no salvage value?

(b) What are the factors to be considered in replacement problems? **4 M**

(OR)

6. (a) Write the terminology and notations of job sequencing problems. **4 M**

(b) There are five jobs, Find the sequence that minimizes the total elapsed time required to complete the following tasks: **10 M**

Tasks	A	B	C	D	E	F	G
Time on Machine I	3	8	7	4	9	8	7
Time on Machine II	4	3	2	5	1	4	3
Time on Machine III	6	7	5	11	5	6	12

And find Idle time of Machines I, II, III?

UNIT – IV

7. The mean rate of arrival of planes at an airport during the peak period 20 hour, but the **14 M**

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. A road transport company has one reservation clerk on duty at a time. He handles information of bus schedules and makes reservations. Customers arrive at a rate of 8 per hour and the clerk can, on average service 12 customers per hour. Find   14 M

   i. Average no. of customers waiting for the service of the clerk.

   ii. Average time a customer has to wait before being served.

The management is contemplating to install a computer for handling information and reservation. This is expected to reduce service time from 5 to 3minutes. The additional cost of the system works out to Rs 50 per day. If the cost of goodwill of having to wait is 12 paise per minute spent waiting, before being served, Should the company install the computer? Assume 8hours working day.

UNIT-V

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

  (b) An aircraft company uses rivets at an approximate customer rate of 2,500 kg. per year.   10 M
Each unit costs Rs 30 per Kg. and the company personnel estimate that it costs Rs.130 to place an order, and that carrying cost of inventory is 10 % per year. How frequently should orders for rivets to be placed? Also determine the optimum size of each order.

(OR)

10. (a) Distinguish between mathematical models and simulation models.   7 M

  (b) Define simulation and discuss few applications in detail.   7 M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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 helical spring is made from a wire of 6 mm diameter and has outside diameter of 75 mm. If the permissible shear stress is 350 MPa and modulus of rigidity 84 kN/mm², find the axial load which the spring can carry and the deflection per active turn.   **14M**

(OR)

2. A closely coiled helical spring is made of 10 mm diameter steel wire, the coil consisting of 10 complete turns with a mean diameter of 120 mm. The spring carries an axial pull of 200 N. Determine the shear stress induced in the spring neglecting the effect of stress concentration. Determine also the deflection in the spring, its stiffness and strain energy stored by it if the modulus of rigidity of the material is 80 kN/mm²   **14M**

UNIT – II

3. (a) What are journal bearings? Classify the journal bearings.   **7M**

(b) What are the various terms used in journal bearings analysis and design? Explain them in brief.   **7M**

(OR)

4. An 80 mm long journal bearing supports a load of 2800 N on a 50 mm diameter shaft. The bearing has a radial clearance of 0.05 mm and the viscosity of the oil is 0.021 kg / m-s at the operating temperature. If the bearing is capable of dissipating 80 J/s, determine the maximum safe speed.   **14M**

UNIT – III

5. (a) Discuss the performance of journal bearings based on   **7M**
(i) Bearing characteristic number and   (ii) Bearing modulus

(b) List the merits & demerits of rolling contact bearings over sliding contact bearings   **7M**

(OR)

6. A 100 MW turbine, rated at speed of 1800 rpm has two 225 mm by 450 mm bearings. The pressure on these bearing is slightly below 0.7 MN/m². The temperature of the bearings is 80°C and the oil temperature is 95°C when oil similar to SAE 40 is used. The clearance is 0.002 mm per mm of journal diameter. Considering the bearing to be an average industrial bearing, Determine whether artificial cooling is used on this turbine bearing and if so, the approximate amount of heat per minute to be dissipated by the bearing cooling medium if the room temperature is 25° C.   **14M**

UNIT – IV

7. A helical cast steel gear with 30° helix angle has to transmit 35 kW at 1500 rpm. If the gear has 24 teeth, determine the necessary module, pitch diameter and face width for 20° full depth teeth. The static stress for cast steel may be taken as 56 MPa. The width of face may be taken as 3 times the normal pitch. What would be the end thrust on the gear? The tooth factor for 20° full depth involute gear may be taken as, $0.154 - \dfrac{0.912}{T_E}$. where T_E represents the equivalent number of teeth.   **14M**

(OR)

8. A motor shaft rotating at 1500 rpm has to transmit 15 kW to a low speed shaft with a speed reduction of 3:1. The teeth are $14\frac{1^o}{2}$ involute with 25 teeth on the pinion. Both   **14M**

the pinion and gear are made of steel with a maximum safe stress of 200 MPa. A safe stress of 40 MPa may be taken for the shaft on which the gear is mounted and for the key. Design a spur gear drive to suit the above conditions. Also sketch the spur gear drive. Assume starting torque to be 25% higher than the running torque.

UNIT-V

9. A four stroke diesel engine has the following specifications :   14M
Brake power = 5 kW; Speed = 1200 rpm. ;
Indicated mean effective pressure = 0.35 N / mm ^{2};   Mechanical efficiency = 80 %.
Determine:
(i) bore and length of the cylinder;
(ii) thickness of the cylinder head; and
(iii) size of studs for the cylinder head.

(OR)

10. Design a connecting rod for an I.C. engine running at 1800 rpm. and developing a   14M
maximum pressure of 3.15 N/mm^2. 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/mm^2 and 15 N/mm^2. The density of material of the rod may be taken as 8000 kg/m^3 and the allowable stress in the bolts as 60 N/mm^2 and in cap as 80 N/mm^2. The rod is to be of I-section for which you can choose your own proportions. Use Rankine formula for which the numerator constant may be taken as 320 N/mm^2 and the denominator constant 1/7500.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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 process of assigning an inode to a new file in the Unix system.   7M
   (b) Explain UNIX architecture with a neat diagram.   7M

(OR)

2. (a) Explain the structure of the regular files.   7M
   (b) Explain the internal representation of file system.   7M

UNIT – II

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

(OR)

4. (a) Explain mounting and un-mounting File system.   7M
   (b) Explain the differences between named pipe and unnamed pipe with examples.   7M

UNIT – III

5. (a) Write a C program to demonstrate fork and vfork functions   7M
   (b) Explain the following commands with syntax: i) kill ii) nice iii) nohup iv) ps   7M

(OR)

6. (a) Write and explain any four commands on processes with examples.   7M
   (b) Define a signal and explain the following signals with syntax : SIGTERM and SIGKILL.   7M

UNIT – IV

7. (a) Differentiate the variables in Korn shell and C shell.   7M
   (b) Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.   7M

(OR)

8. (a) Explain process execution metacharacters with examples.   7M
   (b) Explain any five File Tests options in shell script and give examples.   7M

UNIT-V

9. (a) Write the syntax and explain the following : i) msgget() ii)shmget()   8M
   (b) Explain different types of Internet sockets available in Linux system.   6M

(OR)

10. (a) Explain solution with Master and Slave processor   7M
    (b) Define a Semaphore. Write a C program to create a semaphore and print its ID.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) How to creating Android virtual devices? **7M**
   (b) How to understanding the Android Software stack? **7M**

(OR)

2. (a) Explain about Text view control using Android? **7M**
   (b) Discuss in detail about android emulator? **7M**

UNIT – II

3. (a) Discuss in detail about Android Project Files? **7M**
   (b) Write a short notes on Utility of Android API? **7M**

(OR)

4. (a) How understanding the role of Android Application Components? **7M**
   (b) What are the role of the android manifest file? **7M**

UNIT – III

5. (a) Write short notes on **7M**
   (i) Linear Layout
   (ii) Relative Layout
   (iii) Absolute Layout
   (b) How to use switching states with toggle buttons. **7M**

(OR)

6. (a) How to Adapting to screen orientation with suitable example. **7M**
   (b) How to Playing video and Displaying progress with Progress Bar. **7M**

UNIT – IV

7. (a) What is mean by DDMS give one example. **7M**
   (b) Discuss in detail about Fragments? **7M**

(OR)

8. (a) How to use Grid view control **7M**
   (b) How to creating fragments with java code explain with suitable example **7M**

UNIT-V

9. (a) Write about creating interface menus and action bars. **7M**
   (b) How to applying a context menu to a list view **7M**

(OR)

10. (a) How to creating menus through XML? **7M**
    (b) Illustrate creating a data entry form. **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) What is Sampling? Explain about various Sampling approaches.   7M
   (b) Describe the Process of Knowledge discovery in Databases.   7M

(OR)

2. (a) Discuss the following: 6M
        i) Spatial data   ii)Time Series data   iii) Temporal data
   (b) Explain the various OLAP operations in the Multidimensional Data model.   8M

UNIT – II

3. (a) Explain how to generate the decision tree by writing algorithm for decision tree   7M
        induction.
   (b) Explain the methods used to evaluate the performance of a classifier.   7M

(OR)

4. (a) Explain about Holdout and Random subsampling methods.   7M
   (b) Write the general approach for solving a classification problem.   7M

UNIT – III

5. (a) Explain about k-nearest neighbor classification by writing the algorithm.   7M
   (b) State Bayes theorem. Discuss how Bayes theorem is used for classification.   7M

(OR)

6. (a) What is Rule based classification. How can you evaluate the quality of a classification 7M
        rule?
   (b) Write Sequential covering algorithm.   7M

UNIT – IV

7. Explain Apriori algorithm for frequent item sets generation with an example.   14M

(OR)

8. (a) Define Support and confidence of an association rule. How can you formulate the   7M
        Association mining problem?
   (b) With an example, Explain the procedure to generate rules from a given frequent item 7M
        set.

UNIT-V

9. (a) What is cluster analysis? Explain various types of clusters.   7M
   (b) Compare K-means and DBSCAN algorithms.   7M

(OR)

10. (a) Discuss about BIRCH clustering technique.   7M
    (b) Explain about classification of points according to Centre-based density.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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 computer security? Explain different types of security attacks with appropriate diagrams. 7M
   (b) Describe different terms in symmetric and asymmetric cryptography. 7M

(OR)

2. (a) Define steganography and explain the techniques used in steganography. 7M
   (b) Explain Hill Cipher encryption technique with an example. 7M

UNIT – II

3. (a) With neat illustration explain AES algorithm? 7M
   (b) Discuss any two block cipher modes of operations with a diagram. 7M

(OR)

4. (a) Write short notes on i) Quadratic Congruence ii) factorization 7M
   (b) Explain Linear congruence with an example. 7M

UNIT – III

5. (a) Perform Encryption and Decryption using the RSA algorithm.
   $p = 11, q = 13, e = 11, m = 7$ 7M
   (b) Explain in detail about ELGamal Cryptosystem 7M

(OR)

6. (a) List out the applications of cryptographic Hash – functions. Discuss briefly on Hash functions based on Cipher Block Chaining technique. 7M
   (b) Discuss Secure Hash Algorithm. 7M

UNIT – IV

7. (a) Explain two approaches to digital signature. 7M
   (b) Discuss briefly on Schnorr digital signature scheme. 7M

(OR)

8. (a) Define Message Authentication code and explain requirements for MAC. 7M
   (b) Explain in detail about HMAC 7M

UNIT-V

9. (a) What is meant by user authentication? Explain the principles of Remote user authentication. 7M
   (b) Distinguish between Kerberos version 5 and version 4? 7M

(OR)

10. (a) Discuss three configurations of firewall? 7M
    (b) Write short notes on i) Trapdoors ii) Trojan horses 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Semester (R15) Supplementary Examinations of August – 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) Write properties of algorithms and explain about time complexity and space complexity. 7M
    (b) Sort the list of numbers using selection sort: 20,12,10,15,2 7M

(OR)

2. (a) Explain bubble sort algorithm and simulate it for the following data: 4,9,5,1,0 7M
   (b) Write short notes on Brute force string matching with an example. 7M

UNIT-II

3. (a) Discuss binary search algorithm and analyze its time complexity. 7M
    (b) Write and solve recurrence relation for Strassen's matrix multiplication. 7M

(OR)

4. (a) Briefly explain about Minimum spanning tree with an example. 7M
    (b) Compute the optimal solution for knapsack problem using greedy method N=3, M= 20, (p1,p2,p3)= (25,24,15), (w1,w2,w3) =(18,15,10). 7M

UNIT – III

5. (a) Construct optimal binary search tree for (a1, a2, a3, a4) = (do, if,read, while), p(1 : 4) = (3,3,1,1)   q(0 : 4)= (2,3,1,1,1). 7M
    (b) Explain an Optimal binary search tree with an example. 7M

(OR)

6. (a) Solve the solution for 0/1 knapsack problem using dynamic programming N=3 , m=6 profits (p1,p2,p3) = (1,2,5) weights (w1,w2,w3) = (2,3,4) 7M
    (b) Explain All pairs shortest path algorithm. 7M

UNIT – IV

7. (a) Explain the Graph Traversal Techniques. 7M
    (b) Identify Hamiltonian cycle from the following graph 7M
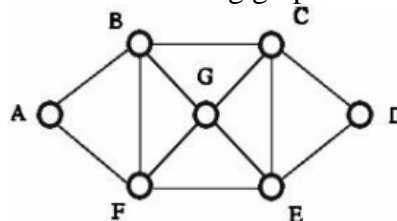
(OR)

8. (a) Describe control abstraction for LC Search 7M
    (b) Write an algorithm for N-queens problem using backtracking 7M

UNIT-V

9. (a) Draw the portion of state space tree generated by FIFO knapsack for the instance N=4 , (P1, P2, P3, P4)= (10, 10, 12, 18) , (w1, w2,w3,w4) = (2, 4, 6, 9) , m=15 7M
    (b) Write non deterministic algorithm for sorting and searching 7M

(OR)

10. (a) Distinguish NP- hard and NP-complete problems 7M
    (b) Explain 3CNF satisfiability problem 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. VI Sem. (R15) Supplementary Examinations of August – 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) Why UML gained more importance in Modeling? Explain the principles of modeling?   8M
   (b) How to model a system's Architecture?   6M

(OR)

2. (a) Write about Stereotypes and Tagged values   6M
   (b) Discuss the building blocks of the UML.   8M

UNIT – II

3. Explain Interfaces, Types and Roles.   14M

(OR)

4. (a) What is use of Advanced Classes? Explain its properties.   7M
   (b) Write short notes on Object Diagrams   7M

UNIT – III

5. (a) Explain how Actors are related to Usecase Diagrams?   7M
   (b) How Collaboration diagram differs from Sequence Diagram, explain with an example   7M

(OR)

6. (a) Define Use case? What are the points to be considered to model the context of a system using Use case diagram?   8M
   (b) Draw the Sequence diagram for ATM system   6M

UNIT – IV

7. Write short notes on i)Events and Signals ii)Process and Threads iii)State Diagrams   14M

(OR)

8. (a) Give brief discussion about various kinds of events?   7M
   (b) Define a state? What are the important parts of a state?   7M

UNIT-V

9. (a) List and explain the various kinds of components supported by UML   7M
   (b) Write short notes on Common uses of Component Diagram?   7M

(OR)

10. Explain about Deployment diagram? How it is useful in modeling of an embedded system? Draw the Deployment Diagram for Library System?   14M