K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Operations Research (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. Solve the following linear programming problem using graphical method 14M
    $\max imize\ z = 3x_1 + 5x_2$
    $subject\ to\ 3x_1 + 5x_2 \leq 15, 5x_1 + 2x_2 \leq 10\ and\ x_1, x_2 > 0$

    (OR)

2. Solve the following linear programming problem using Simplex method 14M
    $\max imize\ z = 6x_1 + 8x_2$
    $subject\ to\ 5x_1 + 10x_2 \leq 60,\ x_1 + 4x_2 \leq 40\ and\ x_1, x_2 > 0$

UNIT – II

3. Solve the following linear programming problem using dual simplex method 14M
    $\max imize\ z = x_1 + x_2$
    $subject\ to\ 2x_1 + x_2 \geq 2,\ -x_1 - x_2 \geq 1,$
    $and\ x_1, x_2 \geq 0$

    (OR)

4. Consider the following linear programming problem and solve 14M
    $\max imize\ z = 3x_1 + 2x_2 + 5x_3$
    $subject\ to\ x_1 + 2x_2 + x_3 \leq 43,\ 3x_1 + 2x_3 \leq 46,\ x_1 + 4x_2 \leq 42$
    $and\ x_1, x_2, x_3 \geq 0$

UNIT – III

5. Find the initial solution of the given problem of transportation using least cost method and vogel's approximation method. 14M

	1	2	3	4	Supply
1	10	22	0	22	8
2	15	20	12	8	13
3	20	12	10	15	11
Demand	5	11	8	8	

    (OR)

6. Determine the initial basic feasible solution for the following transportation problem. 14M

    Destination

		1	2	3	4	Supply
	1	3	1	7	4	300
Source	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	

    Using I) North-West Corner cell method II) Least Cost cell methodand III) VAM

UNIT – IV

7. Find the sequence that minimizes the total time required to perform the following jobs on three machines in the order ABC. The processing time (hours) are given as follows.   14M

Job	1	2	3	4	5	6
Machine – A	4	13	6	3	10	12
Machine – B	9	7	5	7	4	2
Machine –C	14	15	10	13	9	14

(OR)

8. A travelling sales man has to visit 5 cities. He wishes to start from a particular city, visit each city once and then return to his starting point cost of going from one city to another city is shown below.   14M

	To city			
	A	B	C	D
A	**20**	46	16	40
From city B	41	**20**	50	40
C	82	32	**20**	60
D	40	40	36	**20**

UNIT-V

9. Explain the Design of Minimum Cost Drianage system   14M

(OR)

10. Alpha logistics company has to load a cargo out of four items whose details are shown in table   14M

Item (i)	1	2	3	4
Weight w_i /Unit (in tons)	2	1	4	3
Return r_i/unit (in rupees)	1000	400	2100	1400

The maximum weight of the cargo is 7 tons. Find the optimal cargo loading using dynamic programming method such that the total return is maximized.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Water Supply Engineering (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 population forecasting methods? List down the physical and chemical characteristics of water. — 7M

   (b) In a town it has been decided to provide 200 lit per head per day in 21st century. Estimate the domestic water requirements of this town in year AD 2000 by projecting the population of the town by incremental increase method — 7M

Year	1940	1950	1960	1970	1980
Population	2,37,98,624	4,69,78,325	5,47,68,437	6,37,67,823	7,20,77,421

(OR)

2. (a) What is design period? And what are factors governing it? — 7M

   (b) Water supply scheme has to be designed for a city having a population of 1,00,000. Estimate the important kinds of drafts which may be required to be recorded for an average water consumption of 280Lpcd. Also record the required capacities of the major components of the proposed water works system for the city using a river as the source of supply. Assume suitable figures and data where needed. — 7M

UNIT – II

3. (a) Explain briefly about characteristics of water? — 7M

   (b) What is a river intake? What are the factors which governs the locations of an intake structure on meandering rivers? — 7M

(OR)

4. (a) What is an intake structures? Enumerate the various type of intakes, and discuss in details any two of them? — 8M

   (b) Write short notes on waterborne diseases and its preventive measures? — 6M

UNIT – III

5. (a) Explain briefly the following process — 8M
      i)   Break point chlorination   ii) Super chlorination

   (b) Explain briefly about Defluorination and Removal of Odours? — 6M

(OR)

6. (a) Find the settling velocity of discrete particles in water under the conditions when Reynolds number is less than 0.5. Thye diameter and specific gravity of the particle is $6*10^3$cm and 2.65. Water temperature is 20^0c (Kinematic viscosity is $1.010*10^{-2}$ cm^2/sec) — 8M

   (b) Explain briefly about the sedimentation tanks and design the continuous flow sedimentation tank? — 6M

UNIT – IV

7. (a) What are the effects of excess concentration of Fluoride in water? And list the methods available for defluoridation and explain any one of them. — 8M

   (b) Explain the various methods of removing excess Iron and Manganese from Ground water. — 6M

(OR)

8. (a) Why and what pretreatment is required in the feed water to RO plant? — 8M

   (b) Explain the techniques adopted in RO reject management — 5M

UNIT-V

9. (a) Summarize the role of computer application in water supply system. — 7M

   (b) Discuss Hardy-cross method and Equivalent pipe method to analyze complex pipe network. — 7M

(OR)

10. (a) Explain in detail about Wastewater detection method. — 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Concrete Technology (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 various tests on cement in detail.   14M

(OR)

2.   (a)   Write short note on chemical composition of cement.   7M

(b)   Define hydration of cement. What are the Bogues's compounds

UNIT – II

3.   (a)   Explain about the heavy weight and normal weight aggregates and their applications.   7M

(b)   What is the influence of moisture content and deleterious substances in the aggregates on the   7M
properties of concrete?

(OR)

4.   (a)   What are the tests for measuring workability of concrete?   5M

(b)   Mention the factors influencing the workability of concrete.   9M

UNIT – III

5.   (a)   Explain various factors affecting creep   7M

(b)   Define Shrinkage and factors affecting shrinkage   7M

(OR)

6.   (a)   Write short note on chemical attack on concrete   7M

(b)   Discuss about the resistance of concrete to fire.   7M

UNIT – IV

7.   (a)   Discuss about the influence of temperature on the curing of concrete.   7M

(b)   Discuss in detail about High pressure steam curing   7M

(OR)

8.   (a)   Discuss about the rebound hammer test, ultra-sonic pulse velocity tests.   10M

(b)   Write a short note on abrasion in concrete.   4M

UNIT-V

9.   (a)   Define the term mix design of concrete and explain its significance.   7M

(b)   What are the factors to be considered while doing mix design of concrete?   7M

(OR)

10.   Distinguish between the IS and ACI methods of mix-design   14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Hydrology (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 three methods of determining the average depth of rainfall over an area. Discuss the merits and demerits of each method **8M**

(b) Rain gauge station X did not function for a part of a month during which a storm occurred. The storm produced rainfalls of 84, 70 and 96mm at three surrounding stations A, B and C respectively. The normal annual rainfalls at the stations X, A, B and C respectively are 770, 882, 736 and 944 mm. Estimate the missing storm rainfall at station X **6M**

(OR)

2. **(a)** The average annual rainfalls at 4 existing rain gauge stations in a basin are 105, 79, 70 and 66 cm. If the average depth of rainfall over the basin is to be estimated within 10% error, determine the additional number of gauges needed **7M**

(b) How is the double mass curve technique used to check the consistency and adjust the rainfall record at a suspicious station? **7M**

UNIT – II

3. **(a)** Describe various methods of reducing evaporation from a water body **7M**

(b) In Horton's infiltration capacity curve, initial infiltration capacity = 2 cm/h and final capacity = 0.3 cm/h. If rainfall intensity is more than infiltration capacity, what is the total depth of infiltration in a duration of 0h to 4h, if decay constant k = 0.8/h **7M**

(OR)

4. **(a)** Discuss the factors affecting evaporation. **7M**

(b) Describe how infiltration capacity rate can be measured using a double ring infiltrometer **7M**

UNIT – III

5. **(a)** Explain the different methods of separation of base flow from total runoff? **6M**

(b) Define the term unit hydrograph. What are the assumptions, limitations and applications of unit hydrograph theory **8M**

(OR)

6. **(a)** What is flow mass curve? How it is constructed? What are the uses of flow mass curve **8M**

(b) Write a short note on Synthetic unit hydrograph **6M**

UNIT – IV

7. **(a)** Explain the method of design flood estimation using the rational method **5M**

(b) Differentiate between **9M**
   (i) Hydraulic routing and hydrologic routing   (ii) Channel routing and reservoir routing
   (iii) Prism storage and wedge storage

(OR)

8. **(a)** Explain the various methods of flood control **7M**

(b) Explain the method of determining the Muskingum parameters k and x of a reach from a pair of observed inflow and outflow hydrographs **7M**

UNIT-V

9. **(a)** Define porosity, specific yield and specific retention and obtain a relation between them **7M**

(b) A 8 cm radius well penetrates 30 m below ground water table. After a long period of pumping at a rate of 3.5 m^3/s, the draw downs in the observation wells at 12 m and 36 m from the centre of the pumped well are 1.2 m and 0.5 m respectively. Determine the transmissibility of the aquifer, if the radius of influence= 280m **7M**

(OR)

10. **(a)** Explain the following: i) Specific yield and specific retention **8M**
   ii) Hydraulic conductivity and Transmissibility   iii) Darcy's law and its validity

(b) State and discuss the assumptions and limitations of Dupit's theory **6M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Geo-Technical Engineering - II (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)	Describe open excavation methods of exploration. What are their advantages and Disadvantages?	8M
	(b)	What is a bore log? Give a typical example	6M

(OR)

2.	(a)	How soil samples are classified based on the amount of disturbance in sampling?	4M
	(b)	Write briefly about the Standard penetration test conducted in the field. What are the corrections to be made to the standard penetration value?	10M

UNIT – II

3.	Explain the culmann's graphical method for active earth pressure	14M

(OR)

4.	(a)	Write the assumptions made in rankine's earth pressure theory	6M
	(b)	Derive the expression for passive earth pressure using rankine's theory	8M

UNIT – III

5.	A strip footing 2 m wide is to be laid at a depth of 4 m in a purely cohesive soil($C=150kN/m^2$: $Y=19kN/m^3$) . Determine the ultimate bearing capacity from: (i) Terzaghi's theory. (ii) Skempton's theory.	14M

(OR)

6.	(a)	Explain IS code method for determining soil bearing capacity.	8M
	(b)	What are the assumptions in Terzaghi's theory for shallow foundations?	8M

UNIT – IV

7.	(a)	Explain the procedure to determine the load carrying capacity of a pile group using the static formula?	7M
	(b)	Discuss the types of Piles and their structured characteristics with uses.	7M

(OR)

8.	(a)	Explain different classifications of piles with neat sketches.	7M
	(b)	) Explain Indian standard method of conducting a pile load test with a sketch. How do you estimate safe load carrying capacity from the results of pile load test	7M

UNIT-V

9.	(a)	Derive the expression for the factor of safety of an infinite slope in cohesive soils.	7M
	(b)	Explain Taylor's stability number and how it is modified for different stability conditions of canal slope.	7M

(OR)

10.	Find the factor of safety of a slope of infinite extent having a slope angle = 25°. The slope is made of cohesive soil. The soil made of clay having c' - 30 kN/m2 , φ' = 20°, e = 0.65 and Gs = 2.7 and under the following conditions: (i) when the soil is dry, (ii) when water seeps parallel to the surface of the slope, and (iii) when the slope is submerged.	14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Mechanics of Materials - II (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) Derive expression for principal stress and their plane for a two-dimensional stress system.   **7M**
    (b) Derive the expression for Maximum Energy Theory   **7M**
    (OR)
2. At a point in a material subjected to two-dimensional stress, one of the principal   **14M**
    stresses are 60 MN/m^2, tensile on a plane at 60^0 to this principal plane, the normal
    stress is zero. Determine
    (i)   The other principal stress
    (ii) The shear stress on the plane of zero normal stress and
    (iii) The planes on which the normal shear is equal in magnitude.

UNIT – II

3. Differentiate between thick cylinder and thin cylinder. Find and expression for the radial pressure and   **14M**
    hoop stress at any point in case of thick cylinder.
    (OR)
4. A cylindrical shell 3 m long which is closed at the ends has an internal diameter of   1m and a wall   **14M**
    thickness of 15 mm. Calculate the circumferential and longitudinal
    stresses induced and also change in the dimensions of the shell if it is subjected to an
    internal pressure of 1.5 MN/ m^2. Take E=200 GN/m^2 and $\frac{1}{m} = 0.3$

UNIT – III

5. (a) Write a note on effective length of column.   **4M**
    (b) Derive the Euler's equation for buckling load of an elastic column with both ends fixed   **10M**
    (OR)
6. (a) Derive Secant formula for columns under eccentric loading   **7M**
    (b) Determine the ratio of strength of a solid steel column to that of a hollow column   **7M**
         of internal diameter equal to of its external diameter. Both the columns have the
         same cross section, length and end conditions.

UNIT – IV

7. An of rectangle section is 10 m high. It has top width of 0.15m and   **14M**
    bottom width of 0.25 m. The face exposed to soil has a slope of 1 horizontal to
    10 vertical. Calculate the pressure intensities at the base if the retaining wall retains
    soil to a height of 7 m. Specific weight of RCC is 25 kN/m^3.
    (OR)
8. (a) Explain the following (a) Core of a section (b) Combined stresses (c) Eccentric   **7M**
         loading (d) Slenderness ratio
    (b) Determine   the   stress   at   all   corners   of   a   rectangular   cross   section   **7M**
         1200   mm   X   800   mm   due   to   a   100kN   compressive   load   acting   at   an   eccentricity
         60mm   with   respect   to   both   centroidal   axes   of   the   cross   section   in   the   first
         quadrant.

UNIT-V

9. (a) What is unsymmetrical loading?   **2M**
    (b) Determine the principal moments of inertia for an unequal angle section 200 x 150 x 10 mm.   **12M**
    (OR)
10. A cantilever beam consists of 90 mm * 60 mm*8 mm unequal angle section with the   **14M**
    shorter leg horizontal. It carries a concentrated load of 5kN at 1m from the support and in a plane
    making 30^0 with respect to vertical. Determine the maximum stress at support section and find the
    neutral axis of the section.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Signals and Systems (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) Describe Analogy between vectors and signals in detail   **7 M**
   (b) Define Signal? Classify the signals in terms of continuous and discrete   **7 M**
   (OR)
2. (a) Analyze Trigonometric Fourier series and Exponential Fourier series   **9M**
   (b) Discuss Orthogonality in complex functions

UNIT – II

3. (a) Determine the Fourier transforms of two-sided exponential signal   **14 M**
   (OR)
4. (a) Find the Fourier transform of the function $x(t) = [u(t+2) - u(t-2)]\cos 2\pi t$ using frequency convolution property.   **7 M**
   (b) Find the Fourier transform of the function $x(t) = t\,e^{-2t}\,u(t)$ using frequency differentiation property.   **7M**

UNIT – III

5. Test the stability of the LTI systems given below (i) $h(t) = e^{-5t}$ (ii) $h(t) = e^{-4t}\,u(t)$ **14 M**
   (iii) $h(t) = t\cos t$ (iv) $h(t) = t\,e^{-3t}\,u(t)$
   (OR)
6. (a) Explain Transfer function of a LTI system in detail   **7M**
   (b) What is System? Brief out the classification of Systems   **7 M**

UNIT – IV

7. (a) Analyze the effect of under sampling in communication.   **7M**
   (b) What is the importance of sampling theorem in communication? Explain.   **7 M**
   (OR)
8. (a) State and prove the following properties of DTFT.   **8M**
   (i) Time shifting (ii) Convolution in time
   (b) Discuss about System analysis using DTFT   **6 M**

UNIT-V

9. (a) Find the Laplace transform of: $x(t) = e^{-(t-2)}(t-2)\,u(t-2)$ **7 M**
   (b) List any three Laplace transformable pairs   **7 M**
   (OR)
10. (a) Analyze the various constraints on ROC for various classes of discrete time signals   **7 M**
    (b) Brief out the analysis of LTI system using z-transform   **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Electrical Machines - 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 principle of operation of a synchronous generator and its types. Also list the differences between them. **7M**
   (b) List the advantages of making field system rotating and armature stationary in case of synchronous alternators. **7M**

(OR)

2. (a) What is meant by Pitch Factor and Distribution Factor? How these two does affects the generated EMF of a alternator? **7M**
   (b) A3-phase 16 pole alternator has the following data: number of slots=192, conductors per slot=8, coil span is 10 slots, speed of the alternator=375 rpm, flux per pole=55 milli webers. Calculate phase and Line voltages. **7M**

UNIT – II

3. (a) Explain how regulation of a synchronous generator is determined with the help of phasor diagrams and X_d & X_q. **14M**

(OR)

4. (a) Derive the expression for power developed in a salient pole synchronous machine as a function of load angle. **9M**
   (b) Why two reaction theory is applied only to salient pole machines. Explain. **5M**

UNIT – III

5. (a) Briefly discuss about synchronization of alternators. **4M**
   (b) Discuss the effect of change in excitation in the parallel operation of alternators. **10M**

(OR)

6. (a) What is Infinite bus? What are the conditions to be considered for connecting alternators in parallel? **4M**
   (b) A 3000 kva, 3-phase star connected, 6,600 volt, 8 pole , 50Hz alternator has a synchronous reactance of 20 % and is running in parallel with infinite bus. Calculate the synchronizing power and the corresponding synchronizing torque per mechanical degree of phase displacement at no-load, 0.8 power-factor lagging. **10M**

UNIT – IV

7. (a) Explain the working and operation of a 3-phase synchronous motor. **7M**
   (b) Why synchronous motor is not a self starting motor? Discuss various methods that are generally used to start the synchronous motor. **7M**

(OR)

8. (a) What is hunting? How it is compressed. **4M**
   (b) What is a synchronous condenser? Explain its operation with phasor diagrams .What are its applications. **10M**

UNIT-V

9. Discuss in detail about different types of single phase induction motors along with their characteristics and applications. **7M**

(OR)

10. Explain the double revolving field theory and cross field theory related to 1-phase induction motors. **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
### *SUB: Power Systems - II (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) Find the regulation and efficiency of medium transmission line by nominal π method   7M
    (b) A100 kilometres long, 3 phase, 50 hertz, transmission line has following line constants   7M
        Resistance/phase/km = 0.2 Ω, Reactance/phase/km = 0.4 Ω and admittance is 2.5 X 10-6
        Siemen/km/phase.
        If the line supplies load of 20 MW at 0.9 p.f. lagging at 110 kV at the receiving end, calculate
        by nominal T method:
            i)   current and voltage at sending end   ii) Transmission efficiency

(OR)

2. (a) Define the terms   4M
                i)   Surge impedance
                ii)   Surge impedance loading
                iii)   Ferranti effect
                iv)   Skin effect
    (b) A balanced 3 Phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by   10M
        means of transmission line. The series impedance of single conductor is (20 + j52) Ω and the
        total phase neutral admittance is 315 X 10-6 siemen. Using nominal T method determine:
        I.   A, B, C and D constants of line   II.   Sending end voltage   III.Regulation of line

UNIT – II

3. (a) A single phase two winding transformer is rated 20 kVA, 480/120 V at 50 HZ. The equivalent   7M
        leakage impedance of the transformer referred to L.V. side is 0.0525$\angle$78.3 Using transformer
        ratings as base values. Determine the per unit leakage impedance referred to the H.V. side and
        L.V. side.
    (b) Two generators rated at 15 MVA, 13.2 kV and 20 MVA, 13.2 kV respectively are connected   7M
        in parallel to a bus. The bus bars feed two motors rated 10 MVA and 15 MVA respectively.
        The rated voltage of the motors is 12 kV. The reactance of each generator is 15% and that of
        each motor is 18% on their own ratings. Assume 80 MVA, 22 kV base and draw the reactance
        diagram.

(OR)

4.   A 100 MVA, 13.8 kV, 3-Ø generator has a reactance of 20%. The generator is connected to a   14M
        3-Ø transformer T_1 rated 100 MVA 12.5 kV / 110 kV with 10% reactance. The H.V. side of
        the transformer is connected to a transmission line of reactance 100 Ω. The far end of the line
        is connected to a step down transformer T2 made of three single-phase transformers each rated
        30 MVA, 60/10 kV with 10% reactance the generator supplies two motors connected on the
        L.V. side T_2. The motors are rated at 25 MVA and 50 MVA both at 10 kV with 15%
        reactance. Draw the reactance diagram showing all the values in per unit. Take generator
   rating as base.

UNIT – III

5. (a) A three-phase short circuit occurs at F in the system shown below. Calculate the fault MVA. **7M**
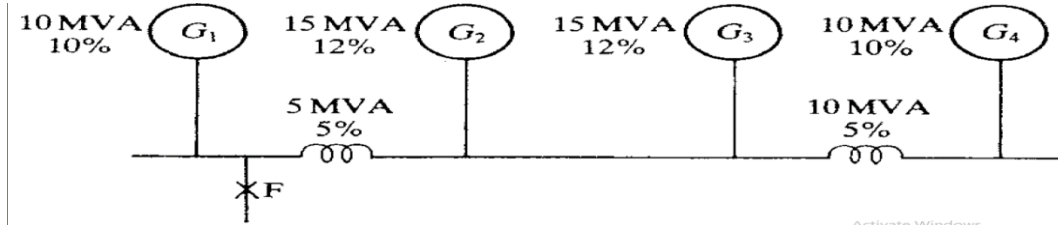
(b) A-3-phase, 25 MVA, 11 kV alternator has internal reactance of 6%. Find the external reactance per phase to be connected in series with the alternator so that steady state short circuit current does not exceed six times the full load current **7M**

(OR)

6. A 100 MVA,11 kV generator with X"= 0.20 p.u is connected through a transformer and line to a bus bar that supplies three identical motor as shown in fig. and each motor has X"=0.20 p.u and X'=0.25 p.u on a base of 20 MVA, 33 kV. The bus voltage at the motors is 33 kV. The two transformers are identical with 100 MVA rating having a reactance of 0.1 p.u . when a three phase balanced fault occurs at the point F. **14M**
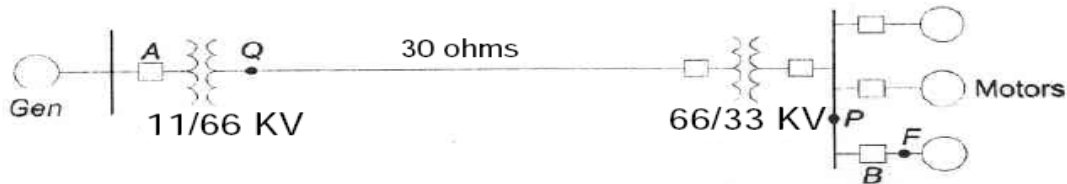
Calculate
a. Sub-transient current in the fault
b. Sub-transient current in the circuit breaker B

UNIT – IV

7. (a) Prove that all sequence networks are connected in series in case of L-G fault and obtain the expression for fault current. **10M**

(b) The positive, negative and zero sequence per unit impedances of a no loaded alternator is j0.1, j0.05 and j0.01.Find the magnitude of a fault current in per unit when the alternator affected with line to ground fault. **4M**

(OR)

8. Draw the positive, negative and zero sequence networks for the below given power system network. **14M**
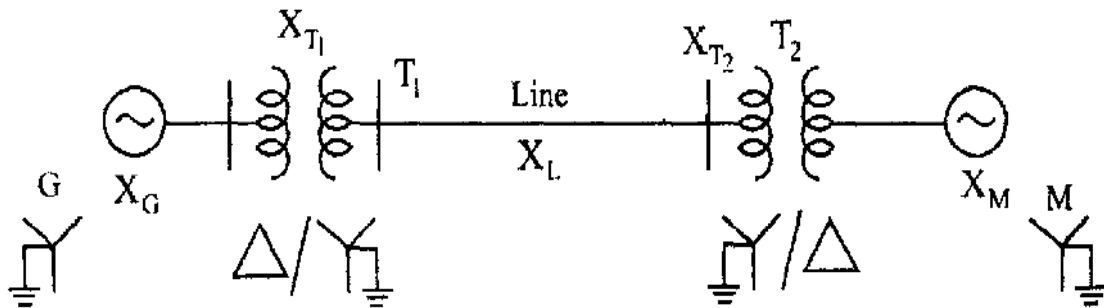
UNIT-V

9. Explain the performance of ungrounded system during a line to ground fault. **14M**

(OR)

10. (a) Explain the effect of resonant grounding on power system network and where it is preferred. **7M**

(b) What are the various types of neutral groundings? **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Power Electronics (EEE)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) Define the terms (i) Minimum gate voltage and current (ii) Maximum gate voltage and current by plotting the gate characteristics of SCR. **7M**

    (b) Explain the causes of unequal voltage sharing in series operation of SCR and unequal current sharing in parallel operation of SCR's. **7M**

(OR)

2. (a) Explain various turn ON and turn OFF methods of SCR? **8M**

    (b) What is commutation? Compare between line and forced commutation **6M**

UNIT – II

3. (a) Explain the operation of single phase full wave mid-point converter with R-Load with the help of circuit and output waveforms with respect to supply voltages. Derive the output voltage for α= 45° **7M**

    (b) A Single phase converter employs two SCRs and centre-tapped transformer with turn's ratio 2:1. The load is inductive(R=10 Ohms and L=1mH) and delay angle is 40°. Determine the average load voltage, average load current. Supply voltage is 230V at 50Hz. The load current can be assumed to be ripple free. **7M**

(OR)

4. (a) Explain the operation of single phase dual converter with non-circulating current mode and circulating current mode. Derive the expression for circulating current. **10M**

    (b) Compare single phase and three phase dual converters. **4M**

UNIT – III

5. (a) Explain the operation of single phase AC voltage controller with RL load. Derive the expression for RMS output voltage **7M**

    (b) List some of the industrial applications of AC voltage controller. Enumerate its merits and demerits. **7M**

(OR)

6. (a) Explain the operation of 1-Φ to 1-Φ step-down cyclo converter of bridge configuration. Draw the relevant waveforms **7M**

    (b) Explain the principle of operation of multiphase chopper. **7M**

UNIT – IV

7. (a) Explain the operating principle of Basic chopper. Derive an expression for its average output voltage **7M**

    (b) Explain the various control strategies employed for control of output voltage of chopper **7M**

(OR)

8. (a) Explain Two – quadrant operation of chopper. **7M**

    (b) Derive the expression I_{min} and I_{max} for type A chopper by considering RLE load **7M**

UNIT-V

9. (a) Explain the operation of single phase half wave inverter with RL load. Derive the expression for RMS output voltage. **7M**

    (b) Discuss various control strategies of inverter **7M**

(OR)

10. (a) What is auxiliary commutation? Explain the procedure how commutation is achieved **7M**

    (b) Discuss about the single phase sinusoidal PWM technique for single phase bridge inverter. **7M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
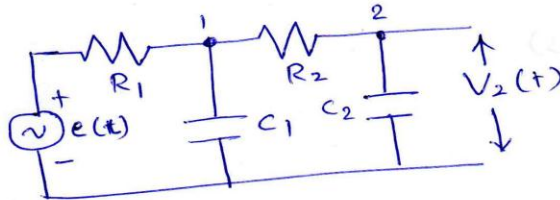### *SUB: Control Systems (EEE)*

Time: 3 Hours   Max. Marks: 70

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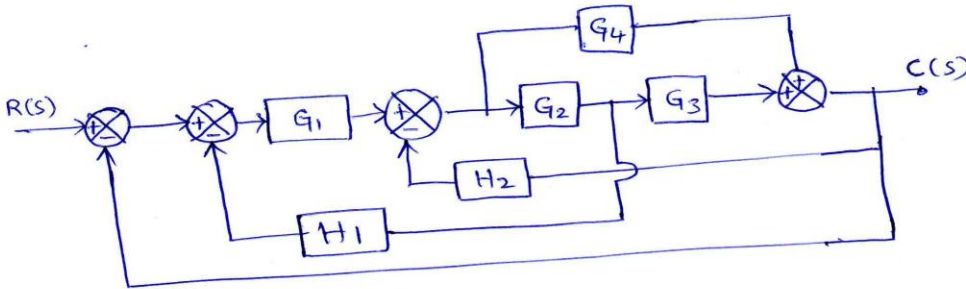### All questions carry Equal Marks.

UNIT – I

1. (a) Explain the open loop and closed loop Numerical control systems.   6M
    (b) Obtain the transfer function of the electrical network shown in figure.   8M

(OR)

2. (a) Obtain the transfer function of filed controlled DC motor.   7M
    (b) Find the closed loop transfer function of the system using masons gain formula. 7M

UNIT – II

3. (a) Derive the expression for response for unit step input of first order system having unity   6M
         feedback with $G(s) = \dfrac{1}{Ts}$.

    (b) Derive the expressions for Peak time and Peak overshoot in the time domain specifications.   8M

(OR)

4.   A unity feedback control system is characterized by the following open loop transfer function   14M
         $G(s) = \dfrac{0.4s+1}{s(s+0.6)}$. Determine its transient response for unit step input and sketch the

         response. Evaluate the maximum overshoot and the corresponding peak time.

UNIT – III

5. (a) Test the stability of the system with the following characteristic equation by   8M
         $S^7+9s^6+24s^5+24s^4+24s^3+24s^2+23s+15=0$.
    (b) Define asymptotes, centroid, breakaway and breakin points in root locus.   6M

(OR)

6.   A unity feedback system has an open loop function G (s) $=K/S(S^2+6S+10)$.make a rough   14M
         sketch of root locus plot by determining the following (i) Centroid, number and angle of
         asymptotes (ii) angle of departure of root loci from the poles, (iii) Breakaway points if any,
         (iv) points of intersection with jωaxis and (v) maximum value of K for stability

7. Sketch the bode plot for the following transfer function and determine the system gain K for the gain cross over frequency to be 5 rad/sec. 14M
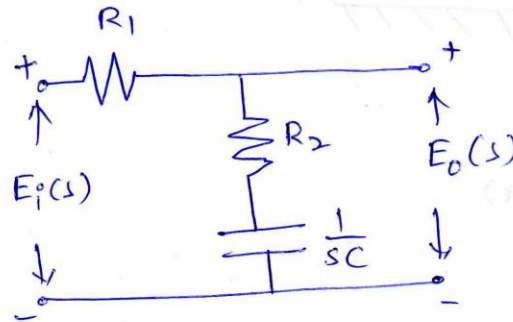
$$G(s) = \frac{Ks^2}{(1+0.2s)(1+0.02s)}$$

(OR)

8. Open loop transfer function of a unity feedback system is given by 14M

$$G(s) = \frac{(1+0.2s)(1+0.025s)}{s^3(1+0.005s)(1+0.001s)}$$ sketch the polar plot and determine the phase margin.

9. Obtain the frequency response of lag compensator electric circuit 14M

(OR)

10. A unit feedback system has an open loop transfer function G(s) = K/S(S+1)(S+5). Design a phase lag compensator to meet the following specifications. 14M

Velocity error constant ≥ 50 , Phase margin $\geq 20^\circ$

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Managerial Economics & Financial 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. Explain the relationship of Managerial economics with other disciplines.   14M
    (OR)
2. How an organization can forecast the demand? Discuss with examples   14M

UNIT – II

3. What is Break-Even Analysis? Explain the significance of Break Even analysis   14M
    (OR)
4. Discuss in detail about Isocost and Isoquants   14M

UNIT – III

5. Discuss the price-output determination under monopoly competition   14M
    (OR)
6. Distinguish the differences between Cost plus pricing and Marginal cost pricing   14M

UNIT – IV

7. What is Sole proprietorship? Explain it functions, advantages and disadvantages   14M
    (OR)
8. A company has to select one of the two following projects. The life of the two projects is 5   14M
    years. Both the project requires Rs. 1, 25,000 as an investment. The cash inflows of
    Project –P are Rs 50,000; Rs 40,000; Rs 30,000;20,000 and Rs 10,000 respectively
    Project –Q are Rs 10,000; Rs 20,000; Rs 30,000;40,000 and Rs 50,000 respectively
    Calculate PayBack Period and NPV of both the projects.

UNIT-V

9. Journalise the following transactions, post them into Ledger and prepare Trial Balance 2018.   14M
    Jan 1 Krishna started business with Rs 1,45,000
    Jan 7 Purchased Goods from Bharat Rs 52,000
    Jan 14Sold goods for cash Rs 85,000
    Jan 122cash Rs 52,000 paid to Bharat
    Jan 29 Owner withdraw cash Rs 25,000 for his personal use.
    (OR)
10. Operating Profit Rs 8,00,000   14M
    Equity capital Rs 12,00,000
    10% Debentures Rs 8,00,000
    Cash Rs 1,05,000
    Inventory Rs 22,400
    Debtors Rs 14,000
    Bills payable Rs 12,000
    Outstanding expenses Rs 5,500
    Fixed Assets Rs 3,00,000
    Short-term Investments Rs 2,000
    Calculate Solvency and Liquidity ratios

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Digital IC Applications (ECE)

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

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

UNIT - I

1. (a) Explain the following terms with reference to CMOS logic **7M**
   (i) Logic '0' and Logic '1' (ii) Noise margin (iii) Power supply rails (iv) Propagation delay.
   (b) Implement the following logic expression with CMOS AOI logic and explain its operation **7M** with the help of functional table. $P = \overline{WX} \cdot \overline{YZ}$

(OR)

2. (a) Draw the circuit diagram of two input 10K ECL OR/NOR gate and explain its function with **7M** the help of truth table.
   (b) Write short notes on (i) PROM and (ii) SROM **7M**

UNIT – II

3. (a) Define VHDL? Explain about Design Flow of VHDL? **7M**
   (b) Briefly explain about data-flow design elements. **7M**

(OR)

4. (a) Draw the VHDL program file structure and explain the same with the syntax of a VHDL **7M** entity declaration and architecture definition.
   (b) Write the syntax of VHDL function definition and write a VHDL function for converting **7M** STD_LOGIC_VECTOR to INTEGER.

UNIT – III

5. (a) Explain about combinational multipliers. **7M**
   (b) Explain clearly about 74 X 148 priority encoder with its logic symbol. **7M**

(OR)

6. (a) Write the syntax of a VHDL process statement and by making use of process statements write **7M** a process-based VHDL architecture for the prime-number detector.
   (b) Design a 32x1 multiplexer by sing 74x151 IC and explain its operation. Write VHDL **7M** program for the above design.

UNIT – IV

7. (a) Design a 16-bit comparator using 74X85 ICs. Write VHDL program for the above design. **7M**
   (b) Write a VHDL program for fixed point to floating point conversion. **7M**

(OR)

8. (a) Draw the block diagram of barrel shifter and explain its operation. **7M**
   (b) What is ALU and explain its operation along with circuit diagram in detail? **7M**

UNIT-V

9. (a) Design a conversion circuit and Write a data-flow style VHDL program to convert a D flip- **7M** flop to J-K flip-flop..
   (b) Design a self correcting 4 bit 8 state Johnson counter. **7M**

(OR)

10. Describe the internal structure, functional operation and timing of edge-triggered **14M** commercially available SSI 74x74 D flip-flop and model the same using behavioral-style VHDL program with preset and clear.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Computer Organization (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.	Illustrate and explain basic structure of computer and its functional units.	14M
	(OR)	
2.	Explain in detail about various micro operations with example.	14M

UNIT – II

3.	Explain in detail about instruction codes and instruction cycles with examples.	14M
	(OR)	
4.	Illustrate with neat sketch Control unit design and explain.	14M

UNIT – III

5.	Explain briefly about the register organization and stack organization with example.	14M
	(OR)	
6.	Explain in detail about pipelining and four segment instruction pipeline with example.	14M

UNIT – IV

7.	Explain Peripheral devices and I/O Interface in detail with example.	14M
	(OR)	
8.	Explain briefly data transfer and various modes of transfer in detail with neat sketch.	14M

UNIT-V

9.	Explain in detail about Interconnection structures and Inter process arbitration.	14M
	(OR)	
10.	Illustrate and explain shared memory multi processors in detail.	14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Antenna and Wave Propagation (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) Define 'Directivity', 'Gain', and 'Beamwidth' of an antenna. What is the directivity of a short current element? **7M**

    (b) A thin dipole antenna is $\lambda/15$ long. If its loss resistance is 1.5 Ω, Find radiation resistance and the efficiency. **7M**

(OR)

2. (a) Derive the expression for the radiation pattern of a center-fed $\lambda/2$ dipole antenna. Sketch the radiation pattern. **7M**

    (b) Determine the maximum effective aperture of a beam antenna having (HPBW) of 30^0 and 35^0 in perpendicular planes intersecting in the beam axis. Assume small side lobes. **7M**

UNIT – II

3. (a) Sketch & Describe the board-side array and its radiation pattern. Briefly explain how the pattern comes about. Is this array resonant? **7M**

    (b) For end-fire array consisting of several half wave length long isotropic radiators is to have a directive gain of 30. Find the array length and width of the major lobe (i.e., beam width between first nulls). What will be these values for a broad-side array? **7M**

(OR)

4. (a) What is an antenna arrays? What are the reasons for using antenna arrays? Explain in detail the behavior of broad-side and end-fire arrays. **8M**

    (b) Explain the working of a folded dipole antenna. **6M**

UNIT – III

5. (a) Write short note on Helical antenna. **7M**

    (b) Describe how the radiation pattern, radiation resistance and gain of a given antenna can be measured experimentally. **7M**

(OR)

6. Describe the construction and basic principles of operation of a helical antenna under **14M**

   a) Normal mode of operation and mention applications
   b) Axial mode of operation and mention applications

UNIT – IV

7. (a) Describe the significance of tropospheric and scatter propagation in microwave communication. **7M**

    (b) A 50kW transmitter employs a vertical grounded half-wave antenna with a directivity of 1.41 as compared to a short dipole. If the transmitter frequency is 1 MHz, Find the field ε_r =15 and σ = 10^{-3} mho/m **7M**

(OR)

8. (a) Explain briefly the terms 'skip distance', Maximum usable frequency' and 'Vertical height' as used in ionospheric propagation. **7M**

    (b) Explain how tropospheric ducts are formed. Discuss the mechanism of wave propagation inside the ducts. Sketch the waveform inside a duct of constant width when the frequency of the incoming wave is changed. **7M**

UNIT-V

9. (a) How does the earth's magnetic field affect ionospheric propagation? **7M**

    (b) Write short notes on "ground wave propagation". **7M**

(OR)

10. Derive expressions for ε_r and σ of the ionosphere. Obtain an expression for critical frequency f_c in terms of N_{max} the maximum ionization density. Describe a method of measurement of the critical frequency and virtual height of the ionosphere. **14M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Digital Communications (ECE)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1.	(a)	Explain about the noise in PCM systems.	7M
	(b)	Write the comparison between TDM and FDM	7M

(OR)

2.	(a)	Explain the working principle of Delta modulation systems.	7M
	(b)	With the help of neat block diagram, explain the Adaptive delta modulation.	7M

UNIT – II

3.	(a)	Define eye diagram. Draw the eye diagram for FSK	7M
	(b)	Explain the operation of the baseband digital transmission systems.	7M

(OR)

4.	(a)	Explain modified duobinary signaling scheme with the help of diagram.	7M
	(b)	Represent the binary sequence 101100110 using the following formats	7M
		i) Spilt Manchester code ii) Bipolar	

UNIT – III

5.	(a)	Define mutual information and list its properties	7M
	(b)	Explain the concept of entropy and its properties.	7M

(OR)

6.	(a)	Explain the trade-off between bandwidth and signal to noise ratio	7M
	(b)	Write short note on Shannon's theorem and its bound.	7M

UNIT – IV

7.	(a)	Explain how Parity checking can be used for error detection or error correction.	7M
	(b)	Describe the algebraic structure of cyclic codes.	7M

(OR)

8.	(a)	Give the matrix description for linear block codes.	7M
	(b)	What are the different methods of decoding of convolutional codes? Explain.	7M

UNIT-V

9.	(a)	Find the Probability of error of Optimum Filter	7M
	(b)	With a neat sketch explain the Base band signal receiver?	7M

(OR)

10.	(a)	Explain coherent detection of PSK signals and derive probability of error.	7M
	(b)	Explain DPSK and compare it with PSK.	7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Linear IC Applications (ECE)

Time: 3 Hours   Max. Marks: 70

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

UNIT - I

1. (a) List ideal characteristics of op-amp. Draw equivalent circuit of op-amp   6M
   (b) Derive the voltage gain for a DIBO Differential amplifier.   8M

(OR)

2. (a) Draw the block diagram of an Op-amp and explain each block.   6M
   (b) Explain the DC Characteristics of Op-Amp   8M

UNIT – II

3. (a) Construct a circuit to realize $V_{out} = -2V_1 + 3V_2 - 3V_3$.   7M
   (b) Explain Current to voltage converter   7M

(OR)

4. (a) Derive output equation and lower frequency limit for the circuit shown in figure. 7M
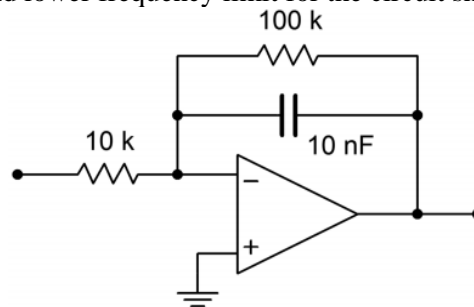
   (b) Draw the circuit diagram of Non-Inverting Amplifier and explain its operation.   7M

UNIT – III

5. (a) Draw the circuit diagram of Triangular waveform generator and Explain it operation 8M
   (b) Distinguish between passive and active filter.   6M

(OR)

6. (a) Design First order HPF for a cut off frequency 1KHz   8M
   (b) Explain operation of a comparator using op- amp and mention its limitations   6M

UNIT – IV

7. (a) Design and draw a Wien bridge oscillator circuit to have output frequency of 1khz. Assume 7M
      R1=1KΩ and C=0.01µF.
   (b) Configure a IC555 timer in Monostable mode and explain its operation.   7M

(OR)

8. (a) What is PLL? Explain the role of each basic building block of PLL.   7M
   (b) Explain how PLL can be used for FSK demodulation.   7M

UNIT-V

9. (a) Explain the working of R-2R Ladder Network DAC   8M
   (b) Define the following specification of ADC
       i.   Quantization error
       ii. Resolution   6M
       iii. Conversion time

(OR)

10.   Write short notes on
         i. Counter type ADC   7M
        ii. Parallel ADC   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Microprocessors and Interfacing (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 short notes on Development of Microprocessors	6M
	(b)	Explain in detail about timing diagrams of 8085	8M

(OR)

2.	(a)	How are clock signals generated in the 8085? What is the frequency of the internal clock? Explain.	8M
	(b)	Compare the instruction CALL and PUSH	6M

UNIT – II

3.	Draw and explain the register organization of the 8086 and explain typical applications of each register	14M

(OR)

4.	Draw the pin diagram of 8086 and explain in detail about each pin	14M

UNIT – III

5.	(a)	Explain in detail about debugging, Macros and Delay subroutines	7M
	(b)	Write an ALP Program to find the minimum and maximum values in a given series?	7M

(OR)

6.	Explain the functions of the assembler directives PTR, TYPE, SHORT, GLOBAL and LOCAL with examples for each.	14M

UNIT – IV

7.	(a)	Explain in detail about Programmable interrupt controller (8259)	7M
	(b)	Explain in detail about Programmable DMA Controller?	7M

(OR)

8.	(a)	Write short notes on (i) Synchronous (ii) Asynchronous Data transfer Schemes?	6M
	(b)	Explain in detail about 8251 USART with neat diagram?	8M

UNIT-V

9.	(a)	Interface two 16KB ROMs and two 8KB SRAMs with 8086 microprocessor	6M
	(b)	Write an ALP to rotate the rotor of the stepper motor for 105^0 in clockwise direction	8M

(OR)

10.	(a)	Explain in detail about Data acquisition	6M
	(b)	Explain in detail about Temperature Measurement and control	8M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Industrial Management (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) List various analytical methods for selection of plant location. Discuss any one method in detail. 　7M
   (b) Give the classification of material handling equipment. List Factors affecting selection of Material Handling Equipment. 　7M

(OR)

2. Define Production. Describe the characteristics, advantages, disadvantages and applications of different types of production. 　14M

UNIT – II

3. (a) Discuss the significance of various process chart symbols. 　7M
   (b) Explain the principles of motion economy as related to design of tools and equipment. 　7M

(OR)

4. (a) Define method study. Describe the steps involved in conducting method study. 　7M
   (b) Discuss the concept of micro motion study. 　7M

UNIT – III

5. (a) Discuss different types of allowances to be considered in time study. 　7M
   (b) Define work sampling. Explain advantages, disadvantages and applications of work sampling. 　7M

(OR)

6. (a) Explain various equipment used in Time study. 　7M
   (b) Estimate the standard time for the following data. Average time for the machine elements = 6 min. Average time for the manual elements = 4 min. Performance rating = 110%. Allowances = 10%. 　7M

UNIT – IV

7. Given the following data, crash the project if indirect cost is Rs.50/week. 　14M

Activity	1-2	2-3	2-4	2-5	3-5	4-5	5-6	6-7	6-8	7-8
Normal Time	3	3	7	9	5	0	6	4	13	10
Normal Cost	300	30	420	720	250	0	320	400	780	1000
Crash Time	2	3	5	7	4	0	4	3	10	9
Crash Cost	400	30	580	810	300	0	410	470	900	1200

(OR)

8. Given the following data of a project, 　14M
   a) Determine the Critical Path and expected project completion time.
   b) What is the probability that the project completion takes more than 41 days to complete.

Activity	1-2	1-3	1-4	2-5	3-5	3-7	4-6	5-7	6-8	7-8
a	2	8	10	6	14	3	8	1	6	1
m	3	12	14	10	20	5	12	1	10	3
b	10	20	16	12	26	7	20	1	12	7

UNIT-V

9. (a) Distinguish control charts for variables and control charts for attributes. 　7M
   (b) Explain the difference between inspection and quality control. 　7M

(OR)

10. Construct $\overline{X}$ and R charts from the following information and state whether the process is in control. For each of the following has been computed from a sample of 5 units drawn at an interval of half an hour from an ongoing manufacturing process. 　14M

Sample	1	2	3	4	5	6	7	8	9	10
$\overline{X}$	20	34	45	39	26	29	13	34	37	23
R	23	39	14	5	20	17	21	11	40	10

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Thermal Engineering - 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) What are the advantages of a regenerative feed heating in steam power cycle?   4M
   (b) The steam consumption of a steam engine is 20 tonnes per shift of 8 hours when developing 220 kW. Dry and saturated steam enters the engine at 10 bar pressure and leaves it at 0.1 bar pressure. Estimate the Rankine efficiency and the thermal efficiency of the engine.   10M

(OR)

2. (a) Derive an expression for the efficiency of Rankine cycle.   4M
   (b) A steam turbine receives steam at 15 bar and 350^0 C and exhausts to the condenser at 0.06 bar. Determine the thermal efficiency of the ideal Rankine cycle operating between these limits.   10M

UNIT – II

3. (a) Explain the working of a Babcock and Wilcox water tube boiler.   4M
   (b) A coal fired boiler plant consumes 400 kg of coal per hour. The boiler evaporates 3200 kg of water at 45^0 C into superheated steam at a pressure of 12 bar and 275^0 C. If the calorific value of fuel is 32760 kJ/kg of coal, determine 1. Equivalent evaporation from and at 100^0 C, and 2. Thermal efficiency of the boiler.   10M

(OR)

4. (a) Explain briefly the term boiler efficiency.   4M
   (b) Why the safety valves are needed in a boiler? Sketch and explain a Rams bottom spring loaded safety valve.   10M

UNIT – III

5. (a) Discus the process of super saturation in steam nozzels with the help of Enthalpy-Entropy diagram..   4M
   (b) Steam is supply to the nozzle at 3.5 bar and 0.96 dry. The steam enters the nozzle at 240 m/s. the pressure drops to 0.8 bar. Determine the velocity and dryness fraction of the steam when it leaves the nozzle.   10M

(OR)

6. (a) Derive an expression for velocity of flow through a nozzle.   4M
   (b) Calculate the throat area of nozzle supplied with steam at 10 bar and 200^0 C. The rate of flow of steam is 1.2 kg/s. Neglect friction and assumes the velocity at inlet to be small.   10M

UNIT – IV

7. (a) Distinguish between impulse and reaction turbine.   4M
   (b) The following data relates to a single impulse turbine: Steam velocity=600 m/s, Blade speed=250 m/s, Nozzle angle =20^0, Blade outlet angle = 25^0. Neglecting the friction, calculate the absolute velocity of steam leaving the blade and the work developed by the turbine for the steam flow rate of 20 kg/s.   10M

(OR)

8. (a) Discuss the advantages of a steam turbine over the steam engines.   4M
   (b) A reaction turbine runs at 300 r.p.m. and its steam consumption is 15400 kg/h. The pressure of steam is 1.9 bar, its dryness 0.93 and power developed by the pair is 3.5 kW. The discharge blade tip angle is 20^0 for both fixed and moving blades and the axial velocity of is 0.72 of blade velocity. Find the drum diameter and blade height. Take the tip leakage steam as 8%, neglect blade thickness.   10M

UNIT-V

9. (a) What are the requirements of a steam condensing plant?   4M
   (b) Explain the principles of operation of different types of Surface condensers.   10M

(OR)

10. (a) What are the advantages and limitations of surface condensers over jet condensers?   6M
    In a surface condenser, the pressure of steam is 12 KPa and the cooling water flow rate is 40
    (b) kg/kg of steam condensed. The condensate leaves at 44^0 C and the rise in temperature of circulating water is 14^0 C. Determine the dryness fraction of steam entering in to the condenser.   10M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Dynamics of Machinery - I (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) What do you understand by Simple gear train and discuss speed ratio and train velocity with suitable diagram?   7M
   (b) What do you understand by Reverted Gear Train and discuss speed ratio with suitable diagram?   7M

(OR)

2. (a) How the velocity ratio of epicyclic gear train is obtained by Algebraic method?   7M
   (b) In an epicyclic gear train, an arm carries two gears A and B having 36 and 45 teeth respectively. If the arm rotates at 150 r.p.m. in the anticlockwise direction about the centre of the gear A which is fixed, determine the speed of gear B. If the gear A instead of being fixed, makes 300 r.p.m. in the clockwise direction, what will be the speed of gear B? use tabular method only.   7M

UNIT – II

3. (a) Discuss briefly the various types of belts used for the transmission of power?   7M
   (b) Find the power transmitted by a belt running over a pulley of 600 mm diameter at 200 r.p.m. The coefficient of friction between the belt and the pulley is 0.25, angle of lap 160° and maximum tension in the belt is 2500 N.   7M

(OR)

4. (a) Describe with a neat sketch the working of a Multi plate friction clutch?   7M
   (b) Explain Cone Clutch with neat sketch and write advantages and disadvantages?   7M

UNIT – III

5. (a) A single block brake is shown in Fig. (a). The diameter of the drum is 250 mm and the angle of contact is 90°. If the operating force of 700 N is applied at the end of a lever and the coefficient of friction between the drum and the lining is 0.35, determine the torque that may be transmitted by the block brake.   7M

Fig.(a)
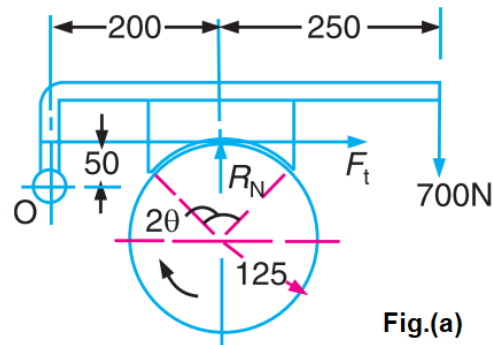
   (b) Describe with the help of a neat sketch the principles of operation of an internal expanding shoe?   7M

(OR)

6. (a) How to classify Transmission dynamometers and explain Epicyclic-train dynamometer?   7M
   (b) Describe the construction and operation of a prony brake absorption dynamometer.   7M

UNIT – IV

7. (a) Draw and explain the turning moment diagram of a Multi-cylinder Steam Engine.   7M
   (b) Determine following terms: 7M
   (i). Maximum Fluctuation of Energy, (ii) Coefficient of Fluctuation of Energy

(OR)

8. (a) The flywheel of a steam engine has a radius of gyration of 1 m and mass 2500 kg. The starting torque of the steam engine is 1500 N-m and may be assumed constant. Determine: 1. the angular acceleration of the flywheel, and 2. the kinetic energy of the flywheel after 10 seconds from the start.   7M

(b) Determine following terms: 7M
(i). Coefficient of Fluctuation of Speed, (ii) Energy Stored in a Flywheel

UNIT-V

9. (a) Derive an expression for the height in the case of a Watt governor. What are the limitations of a Watt governor?   7M

(b) Explain the terms and derive expressions for 'effort' and 'power' of a Porter governor.   7M

(OR)

10. (a) Define and explain the following terms relating to governors: 7M
(i). Stability,   (ii). Sensitiveness,   (iii). Isochronism, and (iv). Hunting.

(b) The upper arms of a Porter governor have lengths 350 mm and are pivoted on the axis of rotation. The lower arms have lengths 300 mm and are attached to the sleeve at a distance of 40 mm from the axis. Each ball has a mass of 4 kg and mass on the sleeve is 45 kg. Determine the equilibrium speed for a radius of rotation of 200 mm and find also the effort and power of the governor for 1 per cent speed change.   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Machine Tools (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) Differentiate the abrasive and adhesive tool wear?   **7M**
   (b) Explain any two work holding devices for lathe machine?   **7M**

(OR)

2. (a) Classify the types of chips during machining and explain them with suitable sketch?   **7M**
   (b) List out the various taper turning methods and explain any one with suitable sketch?   **7M**

UNIT – II

3. Sketch and explain the quick return mechanism used in shaper machine?   **14M**

(OR)

4. Make a simple sketch and compare the work and tool movement of shaper, planner and slotter? **14M**

UNIT – III

5. (a) Sketch and explain the upright drilling machine?   **7M**
   (b) Explain the nomenclature of twist drill with suitable sketch?   **7M**

(OR)

6. (a) Sketch and explain any two tool holding device used in drilling?   **7M**
   (b) Describe the principle and operation jig boring machine with suitable sketch?   **7M**

UNIT – IV

7. Explain the principle and operation of universal milling machine with proper sketch?   **14M**

(OR)

8. (a) Describe any three operations can be performed by using milling machine?   **7M**
   (b) Sketch and explain the differential indexing used in milling machine?   **7M**

UNIT-V

9. (a) Describe the steps for selecting the grinding wheel?   **7M**
   (b) Differentiate the wheel truing and wheel dressing?   **7M**

(OR)

10. (a) Sketch and explain the principle of surface grinding machine?   **7M**
    (b) How do you specify the grinding wheel?   **7M**

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

Time: 3 Hours   Max. Marks: 70 Answer

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

UNIT – I

1. Explain design process in design. Write briefly classifications of machine design. **14M**

(OR)

2. The diameter of a piston of the steam engine is 300 mm and the maximum steam pressure is 0.7 N/mm^2. If the maximum permissible compressive stress for the piston rod material is 40 N/mm^2, find the size of the piston rod. **14M**

UNIT – II

3. A mild steel shaft of 50 mm diameter is subjected to a bending moment of 2000 N-m and a torque T. If the yield point of the steel in tension is 200 MPa, find the maximum value of this torque without causing yielding of the shaft according to 1. The maximum principal stress; 2. The maximum shear stress; and 3. The maximum distortion strain energy theory of yielding. **14M**

(OR)

4. A machine component is subjected to a flexural stress which fluctuates between + 300 MN/m^2 and – 150 MN/m^2. Determine the value of minimum ultimate strength according to 1. Gerber relation; and 2. Soderberg relation. **14M**
Take yield strength = 0.55 Ultimate strength;
Endurance strength = 0.5 Ultimate strength; and factor of safety = 2.

UNIT – III

5. (a) What do you understand by the term welded joint? How it differs from riveted joint? **6M**
   (b) A plate 100 mm wide and 10 mm thick is to be welded with another plate by means of transverse welds at the ends. If the plates are subjected to a load of 70 kN, find the size of weld for static as well as fatigue load. The permissible tensile stress should not exceed 70 MPa. **8M**

(OR)

6. (a) Discuss on bolts of uniform strength giving examples of practical applications of such bolts. **7M**
   (b) Determine the safe tensile load for bolts of M 20 and M 36. Assume that the bolts are not initially stressed and take the safe tensile stress as 200 MPa. **7M**

UNIT – IV

7. Determine the diameter of hollow shaft having inside diameter 0.5 times the outside diameter. The permissible shear stress is limited to 200 MPa. The shaft carries a 900 mm diameter cast iron pulley. This pulley is driven by another pulley mounted on the shaft placed below it. The belt ends are parallel and vertical. The ratio of tensions in the belt is 3. The pulley on the hollow shaft weighs 800 N and overhangs the nearest bearing by 250 mm. The pulley is to transmit 35 kW at 400 r.p.m. **14M**

(OR)

8. A hollow steel shaft transmits 600 kW at 500 r.p.m. The maximum shear stress is 62.4 MPa. Find the outside and inside diameter of the shaft, if the outer diameter is twice of inside diameter, assuming that the maximum torque is 20% greater than the mean torque. **14M**

UNIT-V

9. Design and make a neat dimensioned sketch of a muff coupling which is used to connect two steel shafts transmitting 40 kW at 350 r.p.m. The material for the shafts and key is plain carbon steel for which allowable shear and crushing stresses may be taken as 40 MPa and 80 MPa respectively. The material for the muff is cast iron for which the allowable shear stress may be assumed as 15 MPa. **14M**

(OR)

10. Design a cotter joint to support a load varying from 30 kN in compression to 30 kN in tension. The material used is carbon steel for which the following allowable stresses may be used. The load is applied statically. Tensile stress = compressive stress = 50 MPa ; shear stress = 35 MPa and crushing stress = 90 MPa. **14M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Heat Transfer (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.		Derive the 3D General heat conduction equation in Rectangular co-ordinates	14M

(OR)

2.	(a)	Derive the equation for conductive thermal resistance, convective thermal resistance and radiative thermal resistance.	9M
	(b)	A hollow cylinder 5 cm ID and 10 cm OD has an inner surface temperature of 200 °C. and an outer surface temperature of 100 °C. Determine the temperature of the point halfway between the inner and the outer surfaces. If the thermal conductivity of the cylinder material is 70 W/mK determine the heat flow through the cylinder per linear meter.	5M

UNIT – II

3.		Derive the expression for heat transfer under transient mode.	14M

(OR)

4.	(a)	Explain the significance of the fin effectiveness and fin efficiency.	6M
	(b)	A 3 mm thick copper plate of 0.4 x 0.4 m² area at 300 °C. is suddenly dipped into oil at 20 °C. Calculate the time required for the plate to reach 40 °C. Assume h = 90 W/m²K, P = 8800 kg/m³, K = 350 W/mK, C_p= 380 J/kgK.	8M

UNIT – III

5.		Derive the equation for radiation heat transfer between two grey plane surfaces.	14M

(OR)

6.	(a)	Explain the mechanism of thermal radiation.	4M
	(b)	Two large parallel planes with emissivity of 0.3 and 0.5 are maintained at temperatures of 800 °C. and 300 °C. Determine the net radiant heat exchange per unit area between the planes. If a radiation shields having an emissivity of 0.05 on both sides is placed between the two planes, calculate the temperature of the shield and the heat transfer rate per unit area.	10M

UNIT – IV

7.	(a)	Write a note on continuity momentum and energy equation.	5M
	(b)	Explain the development of hydro-dynamic and thermal boundary layer over a flat plate.	9M

(OR)

8.	(a)	In a straight tube of 50 mm diameter, water is flowing at a velocity of 15 m/sec. The tube surface temperature is maintained at 60 °C and the flowing water is heated from the inlet temperature 15 °C to an outlet temperature of 45 °C. Calculate, i) The heat transfer coefficient from the tube surface to water. ii) The length of the tube.	9M
	(b)	Define Grashoff number. What is its physical significance	5M

UNIT-V

9.		Draw a labeled pool boiling curve and explain.	14M

(OR)

10.		Derive an expression for LMTD in case of parallel flow double pipe heat exchanger.	14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Microprocessors & Interfacing (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 Development of microprocessors.	7M
	(b)	With neat diagram explain the architecture of 8086 micro processor.	7M

(OR)

2.	With neat diagram explain the maximum mode 8086 system and timings.	14M

UNIT – II

3.	(a)	Write an ALP to find out a biggest number from an array.	7M
	(b)	Write an ALP to find average value from the given array of a data.	7M

(OR)

4.	Explain stages of software development.	14M

UNIT – III

5.	(a)	With a block diagram explain the roll of DMA controller to transfer a data from I/O devices to memory or vice versa.	7M
	(b)	Explain about IEEE – 488.	7M

(OR)

6.	(a)	Describe the following data transfer schemes: (i) Asynchronous (ii) synchronous	7M
	(b)	With block diagram explain the operation of programmable interrupt controller 8259.	7M

UNIT – IV

7.	How do you interface a 4 phase stepper motor to 8086 microprocessor? draw the circuit and explain?	14M

(OR)

8.	Interface ADC to microprocessor. Draw the diagram clearly showing connections.	14M

UNIT-V

9.	(a)	compare the register set of 80486 microprocessor with the 80386 microprocessor.	7M
	(b)	Explain the memory paging mechanism of 80386 microprocessor.	7M

(OR)

10.	Explain in detail the Pentium memory management.	14M

| Q.P. Code: 656612 | SET - 2 |

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Advanced Computer Architecture (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 about five generations of electronic computers in detail? | 7M |
| | (b) | Write a note on Evolution of computer Architecture? | 7M |

(OR)

| 2. | (a) | Distinguish between Binary tree, Star tree and Binary fat tree in detail. | 7M |
| | (b) | Explain in detail about Omega Network using 2 x 2 switches? | 7M |

UNIT – II

| 3. | (a) | Explain about Gustafson's Law for Scaled problems? | 7M |
| | (b) | Explain about Scalable metrics with neat diagrams? | 7M |

(OR)

| 4. | (a) | Explain in detail about Write-Through and Write-Back caches with diagrams? | 7M |
| | (b) | What are the cache events and actions and explain each one? | 7M |

UNIT – III

| 5. | (a) | Write the development phases of the original Cray/MPP system | 7M |
| | (b) | Explain about the control processor in the CM-5 architecture? | 7M |

(OR)

| 6. | | With the help of diagram explain about CM-5 network architecture? | 14M |

UNIT – IV

| 7. | (a) | With the help of diagram explain the KSR-1 architecture in detail? | 7M |
| | (b) | Write about the evolution of dataflow computers. | 7M |

(OR)

| 8. | | Explain about MIT/Motorola *T prototype with suitable diagrams? | 14M |

UNIT-V

| 9. | (a) | Distinguish between synchronous and asynchronous message passing. | 7M |
| | (b) | Write about Object-Oriented Model. | 7M |

(OR)

| 10. | (a) | Write about System Deadlock and Shared-Resource Allocation. | 7M |
| | (b) | Explain about Domain Decomposition Techniques? | 7M |

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Compiler 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 about Lexical Analysis Generator lex.	7M
	(b)	Explain about Language processing system to analyze the source program	7M

(OR)

2.	(a)	Explain about various phases of a compiler	7M
	(b)	Discuss briefly about regular expressions.	7M

UNIT – II

3.	(a)	Discuss about shift reduce parsing	7M
	(b)	Define a context-free grammar. Write the grammar for simple arithmetic expressions.	7M

(OR)

4.	(a)	Define Left recursion. Eliminate left recursion for the following grammar.	7M

$E \rightarrow E + T \mid T$
$T \rightarrow T * F \mid F$
$F \rightarrow (E) \mid id$

	(b)	Write the rules to compute FIRST and FOLLOW.	7M

UNIT – III

5.	(a)	Discuss about S-Attributed definition and L- Attributed definitions.	7M
	(b)	Draw the annotated parse tree for 2*4	7M

(OR)

6.	(a)	Explain about Type expressions.	7M
	(b)	Write the rules for Type checking.	7M

UNIT – IV

7.	(a)	Define postfix notation and Three address code. Give examples	7M
	(b)	What is Activation record. Explain the various fields in the activation record.	7M

(OR)

8.	(a)	Convert the statement a= b * -c + b * -c into quadruples, triples, and indirect triples.	7M
	(b)	Discuss about the common three address instruction forms.	7M

UNIT-V

9.	(a)	Explain about various issues in the design of a code generator.	7M
	(b)	Discuss about various characteristics of peephole optimization	7M

(OR)

10.	(a)	Explain about Register allocation and assignment	7M
	(b)	Write the Code generation algorithm	7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Software Engineering (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 various characteristics of software.   7M
   (b) Describe software myths. Explain various types of software myths?   7M

(OR)

2. Explain briefly about generic process model.   14M

UNIT – II

3. (a) Discuss about requirement engineering in detail   7M
   (b) Design and develop a use case for library management   7M

(OR)

4. Explain in detail about eliciting requirements and validating requirements   14M

UNIT – III

5. Write short notes on
   a) Design process
   b) Design concepts

(OR)

6. Explain in design principles for class-based components,   14M

UNIT – IV

7. (a) Elaborate golden rules to form the basis for a set of user interface design principles.   10M
   (b) Explain briefly in detail user interface analysis and design   4M

(OR)

8. What is Testing? Write and explain short notes on   14M
   a) Unit Testing
   b) Integration Testing
   c) System Testing

UNIT-V

9. Write briefly about COCOMO model.   14M

(OR)

10. (a) Write and explain about software reverse engineering   7M
    (b) Discuss in detail about software maintenance process models   7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Computer Networks (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. What is a computer network? Name the reference models. Explain the OSI reference model? **14M**

(OR)

2. What is Network Hardware? Explain different types of networks in detail. **14M**

UNIT – II

3. (a) What is the maximum overhead in byte stuffing algorithm? Explain **7M**
    (b) Data link protocols almost always put the CRC in trailer rather than in a header.Why? **7M**

(OR)

4. (a) With the help of neat diagram, explain the architecture of classical Ethernet. **7M**
    (b) In the binary countdown protocol, explain how a lower numbered station may be starved from sending a packet. **7M**

UNIT – III

5. (a) Explain shortest path routing algorithm with example. **8M**
    (b) Elaborate on multicast routing protocol. **6M**

(OR)

6. (a) How Random Early Algorithm handles the Congestion problem. **5M**
    (b) What is Congestion Control? What are the causes of congestion control? Explain token bucket algorithm in brief **9M**

UNIT – IV

7. (a) What are the services provided by the transport layer? Explain various the methods to improve QoS. **7M**
    (b) Explain TCP proptocol's connection establishment and release. **7M**

(OR)

8. (a) Explain about the internet protocol UDP. **7M**
    (b) What are the difference between TCP and UDP? **7M**

UNIT-V

9. (a) What is DNS? Explain Working of DNS. **7M**
    (b) What is email privacy? Discuss the email security package PGP with its operation **7M**

(OR)

10. Write a short notes on the following: a) Web Proxies b) Server Farms c) SIP **14M**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supplementary Examinations of September – 2021
SUB: Web Technologies (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 in detail about XAMPP Server and its Installation?   10M

    (b)   Describe Web Server in detail?   4M

(OR)

2.   Explain the HTTP Client Server Architecture in Detail with a neat sketch?   14M

UNIT – II

3.   (a)   Explain in detail about Frames?   7M

    (b)   Create a simple HTML page which demonstrates the use of the various types of Frames?   7M

(OR)

4.   Describe Cascading Style Sheets and Explain types of CSS in detail?   14M

UNIT – III

5.   (a)   Describe

        i)   Secular Data type   ii) Compound Data types?   8M

    (b)   Explain Four Scope types of a Variable ?   6M

(OR)

6.   Explain implementation of OOPs Concepts in PHP?   14M

UNIT – IV

7.   (a)   Explain How Cookies can be created in PHP?   7M

    (b)   Describe some HTTP Cookies and its implementation in PHP?   7M

(OR)

8.   Explain When should we use Sessions in PHP with Examples?   14M

UNIT-V

9.   (a)   Describe Preventing Multiple Submissions on the Server Side   7M

    (b)   Describe Preventing Multiple Submissions on the Client Side   7M

(OR)

10.   Explain in detail about MVC Architecture?   14M