

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. V Sem. (R15) Supple. Examinations of October 2020

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
 Maximize $Z = 100X_1 + 80X_2$ subject to
 $5X_1 + 10X_2 \leq 50$
 $8X_1 + 2X_2 \geq 16$
 $3X_1 - 2X_2 \geq 6$
 $X_1 \text{ and } X_2 \geq 0$

(OR)

2. Solve the following Lp problem using simplex method 14M
 Maximize $Z = 6X_1 + 8X_2$ subject to
 $5X_1 + 10X_2 \leq 60$
 $4X_1 + 4X_2 \leq 40$
 $X_1 \text{ and } X_2 \geq 0$

UNIT – II

3. (a) Explain duality and formulation of dual problem 6M
 (b) Form the dual of the following primal problem 8M
 Minimize $Z = 20X_1 + 40X_2$ subject to
 $20X_1 + X_2 \geq 40$
 $20X_1 + 3X_2 \geq 20$
 $4X_1 + 15X_2 \geq 30$

(OR)

4. Consider the following linear programming problem and solve it using its dual solution 14M
 Minimize $Z = 40X_1 + 30X_2 + 25X_3$ subject to
 $4X_1 + 2X_2 + 5X_3 \geq 30$
 $3X_1 + 6X_2 + X_3 \geq 20$
 $X_1 + 3X_2 + 6X_3 \geq 36$
 $X_1, X_2 \text{ and } X_3 \geq 0$

UNIT – III

5. Obtain the initial basic feasible solution by using Vogels Approximation Method (VAM) for the following data 14M

		Destination				Supply
		1	2	3	4	
Source	1	3	1	7	4	300
	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	1200

(OR)

6. Obtain the initial basic feasible solution by using least cost cell method for the following data 14M

		Destination				Supply
		1	2	3	4	
Source	1	3	1	7	4	300
	2	2	6	5	9	400
	3	8	3	3	2	500
Demand		250	350	400	200	1200

UNIT – IV

7. Four jobs 1, 2, 3 and 4 are to be processed on each of the five machines A, B, C, D and E in the order ABCDE. The processing times in minutes are given. Find the total minimum elapsed time if no passing of jobs is permitted. 14M

Job	A	B	C	D	E
1	7	5	2	3	9
2	6	6	4	5	10
3	5	4	5	6	8
4	8	3	3	2	6

(OR)

8. Explain about the travelling sales man problem 14M

UNIT-V

9. An organization is planning to diversity its business with a maximum outlay of Rs.5 crores. It has identified three different locations to install plants. The organization can invest in one or more of these plants subject to the availability of the fund. The different possible alternatives and their investment and present worth of returns during the useful life of each of these plants are summarized in table. The first row of table has zero cost and zero return for all the plants. Hence, it is known as do-nothing alternative. Find the optimal allocation of the capital to different plants which maximize the corresponding sum of the present worth of returns. 14M

Table

Alternative	Plant 1		Plant 2		Plant 3	
	Cost	Return	Cost	Return	Cost	Return
1	0	0	0	0	0	0
2	1	15	2	14	1	0
3	2	18	3	18	2	7
4	4	28	4	21	--	--

(OR)

10. Alpha logistic company has to load a cargo out of four items whose details are shown in table. The maximum weight of the cargo is 7 tons. Find the optimal cargo loading using dynamic programming method such that the total return and maximized. 14M

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

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. V Sem. (R15) Supple. Examinations of October 2020

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) Explain the need for protected water supply system. 7M
 (b) Explain the fluctuations in demand of water. 7M
 (OR)
2. (a) What is design period in designing water supply scheme? Explain factors governing on design period 7M
 (b) Calculate the population of a city for the year 2031, using any two methods based on the following data. 7M
 Year : 1971 1981 1991 2001 2011
 Population: 1.5 1.76 2.25 3.05 4.62
 (In Lakhs)

UNIT – II

3. (a) Explain the various sources of water and their suitability in terms of quantity and quality. 7M
 (b) Explain the following chemical characteristics of water 7M
 Ph, ii) Hardness and iii) chloride i)
 (OR)
4. (a) Write a note on water quality standards 7M
 (b) Explain the various water borne diseases 7M

UNIT – III

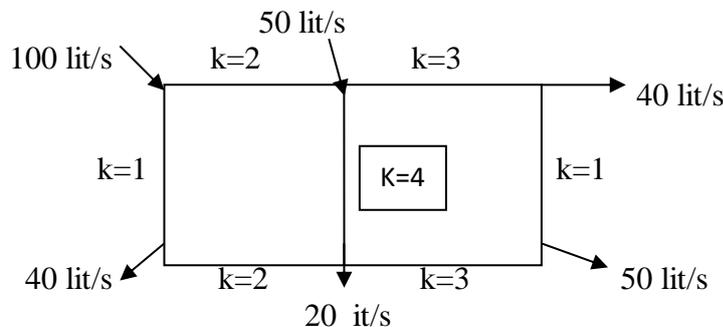
5. (a) Design a sedimentation tank to treat 10 MLD of water. Make suitable assumption 7M
 (b) Explain the jar test apparatus for determining optimum dosage of coagulant. 7M
 (OR)
6. (a) Design with suitable assumptions, a set of rapid sand filters to treat 5 MLD of water 7M
 (b) Explain the various methods of disinfection 7M

UNIT – IV

7. (a) Describe with help of neat sketch the removal of Iron and Manganese from water 7M
 (b) Describe the procedure of lime-soda process for water softening 7M
 (OR)
8. (a) Write a note on i) Defluoridation and ii) Desalination 7M
 (b) Discuss the importance of rain water harvesting and its methods. 7M

UNIT-V

9. (a) Explain the systems of water distribution. 7M
 (b) Explain the systems of plumbing for house drainage. 7M
 (OR)
10. (a) Explain the principles design of water supply in building 6M
 (b) Estimate the flow in each of the pipes of distribution network given below using Hardy cross method. Use Darcy Weisbach formula for head loss. K value of each pipe is indicated. 8M



K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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. (a) Explain below terms briefly 8M
(i) Water cement ratio, (ii) Hydration of cement
(iii) Fineness of cement, (iv) Physical tests of cement
(b) Classify various types of mineral admixtures and discuss in detail about them. 6M
(OR)
2. (a) Explain about accelerators, retarders and plasticizers 7M
(b) Explain the laboratory tests of cement 7M

UNIT – II

3. (a) Define grading ,different grading requirements and surface area of aggregate 7M
(b) Identify the factors influencing workability of concrete and write a short note on them. 7M
(OR)
4. (a) Explain about segregation and bleeding. 7M
(b) Define Alkali-Aggregate reaction and explain how we can control. 7M

UNIT – III

5. (a) Define shrinkage and Explain in detail the classification of shrinkage. 7M
(b) Explain about the thermal properties of concrete. 7M
(OR)
6. (a) Explain relation between Modulus of elasticity and strength 7M
(b) Define creep and explain how creep is measured and also the factors influencing creep 7M

UNIT – IV

7. (a) Explain the importance of non-destructive tests? 7M
(b) Explain briefly the maturity concept of concrete. 7M
(OR)
8. (a) Explain about split tensile strength and flexural strength of concrete. 7M
(b) Discuss the factors affecting the strength of concrete. 7M

UNIT-V

9. (a) Explain the design steps of a mix design by IS code method 7M
(b) Discuss the quality control of concrete 7M
(OR)
10. Design a concrete mix of M30 grade. Take a standard deviation of 5MPa. The specific gravities of coarse aggregate and fine aggregate are 2.8 and 2.7 respectively. The bulk density of coarse aggregate is 1600 kg/m³ and fineness modulus of fine aggregate is 2.70. A slump of 60mm is necessary. The water absorption of coarse aggregate is 2% and free moisture in fine aggregate is 1%. Design the mix by using IS code method. Assume missing data suitably. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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 a procedure for supplementing the missing rain fall data. 7M
 (b) A catchment has four sub-areas. The annual precipitation and evaporation from each of the sub-areas. Assume that there is no change in the ground water storage on an annual basis and calculate for the whole catchment the values of annual average (1) precipitation and (2) evaporation. What are the annual runoff coefficient for the sub-areas and for the total catchment taken as a whole? 7M

Sub-area	Area [m ²]	Annual precipitation [mm]	Annual evaporation [Mm]
A	10.7	1030	530
B	3.0	830	438
C	8.2	900	430
D	17.0	1300	600

(OR)

2. (a) Describe the different methods of recording of rainfall. 7M
 (b) A catchment areas has seven rain gauge station. In a year the annuals rainfall recorded by the gauges are as follows: 7M

Station	P	Q	R	S	T	U	V
Rainfall (cm)	130.0	142.1	118.2	108.5	165.2	102.1	146.9

For a 5% error in the estimate of the mean rainfall, calculate the minimum number of additional station required to be established in the catchment.

UNIT – II

3. (a) Describe the different types of evaporation in common use. 7M
 (b) The rainfall on five successive days on a catchment were 2,6,9,5 and 3 cm. if the ϕ index for storm can be assumed as 3 cm/day, find the total surface runoff. 7M

(OR)

4. (a) Explain briefly: 6M
 (i) Infiltration capacity m (ii) ϕ -index, (iii) W-index
 (b) In a 140-min storm the following rates of rainfall were observed in successive 20-min intervals: 3.0, 3.0, 9.0, 6.6, 1.2, 1.2 and 6.0 mm/h. assuming the ϕ index value as 3.0 mm/h and an initial loss of 0.8 mm, determine the total rainfall, net runoff and W-index for the storm. 8M

UNIT – III

5. (a) What is flow duration curve? What information can be gathered form the study of the flow duration curve of a stream at a site? 7M
 (b) What is a unit hydrograph? List the assumption involved in the unit hydrograph theory. 7M

(OR)

6. (a) Sketch a typical flow mass curve and explain how it could be used for the determination of the safe yield from a given storage. 7M

(b) Using the 6-h unit hydrograph, derive a 12-h unit hydrograph for the catchment. 7M

Time hr	0	6	12	18	24	30	36	42	48	54	60	66
6h-UH m ³ /s	0	20	60	150	120	90	66	50	32	20	10	0

UNIT – IV

7. From the historical data of annual flood peak of a catchment the mean and standard deviation are estimated as 20000 m³/s and 10,000 m³/s. An existing structure on this catchment has been designed for 40000 m³/s. what could be its return period. Assume Gumbel's extreme value distributed with $\sigma_n = 1.06$ and $\bar{y}_n = 0.52$. 14M

(OR)

8. (a) What are the methods of estimating design flood? What are their limitations? 7M

(b) Write down the two basic differential equations of hydraulic routing method and explain each term. 7M

UNIT-V

9. (a) Explain about specific capacity of a well. 5M

(b) Two tube wells penetrating fully a 10 m thick aquifer are located 200 m apart. The diameter of each well is 30 cm and the depression head for each is 5 m. Radius of influence for each well is 300 m. Coefficient of permeability 10⁻³ m/sec. Are the wells interfering with each other? What is the discharge when only one well is working? 9M

(OR)

10. (a) Derive the relation between the coefficient of permeability (K) and coefficient of transmissibility (T). 7M

(b) A tube well penetrates full 8 m thick water bearing unconfined stratum. The coefficient of permeability is 0.004 m/sec. The well radius is 15 cm and is to work under a drawdown of 3 m. Calculate percentage increase in discharge if radius of well is doubled. Radius of zero drawn is 400 m. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) What are the stages of soil investigation? State the objective of each stage. 7M
 (b) Explain (a) Split spoon sampler (ii) Number and depth of exploration. 7M
 (OR)
2. (a) Explain the terms inside clearance and outside clearance as applied to a sampler. Why are they provided? 7M
 (b) Explain the electrical resistivity method of soil exploration. 7M

UNIT – II

3. (a) Differentiate between active earth pressure and passive earth pressure. 6M
 (b) An L- shaped retaining wall is constructed to retain dry sand. The unit weight of sand is 17 kN/m^3 and $\phi = 32^\circ$. The base of the wall is placed 6 m below the top level of the backfill. The thickness of the base and that of the stem is 0.4 m. The base width is 3.5m. The angle of friction between the concrete and the material can be taken as 20° . Check the stability of retaining wall against overturning and sliding. 8M
 (OR)
4. (a) Explain Rebhann's graphical method for the determination of active earth pressure. 8M
 (b) A 5 m high masonry retaining wall has to retain a backfill of sandy soil having a unit weight of 18.2 kN/m^3 and an angle of internal friction of 32° . The surface of the backfill is inclined upwards at 10° to the horizontal. Determine the magnitude and point of application of the resultant active thrust on the wall. 6M

UNIT – III

5. (a) Explain various types of shear failure. 6M
 (b) Determine the gross load that can be safely carried by a square footing of width 2.2 m. The footing is to be founded at a depth of 1.2 m below the ground level. The properties of the soil are : $\gamma = 16.8 \text{ kN/m}^3$, $c = 12 \text{ kPa}$, $\phi = 20^\circ$. Factor of safety = 3.0. Terzaghi's bearing capacity factors for $\phi = 20^\circ$ are $N_c = 11.8$, $N_q = 3.8$, $N_\gamma = 1.3$. 8M
 (OR)
6. (a) Explain the effect of water table and shape of foundation on bearing capacity. 7M
 (b) Discuss the allowable settlements of foundations. Also explain the bearing capacity determination based on settlement. 7M

UNIT – IV

7. (a) Explain the classification of piles based on function and load transfer. 7M
 (b) A square pile group of 9 piles of 25 cm diameter is arranged with a pile spacing of 1 m. The length of the piles is 9 m. Unit cohesion of the clay is 75 kN/m^2 . Determine the group capacity. Assume adhesion factor of 0.75. 7M

(OR)

8. (a) Discuss the dynamic formulae to determine the pile capacity along with the basis. 7M
(b) A 300 mm square pile, 15 m long, is driven in a deposit of medium dense sand ($\phi = 36^\circ$, $N_q = 42$, $N_\gamma = 40$). The unit weight of sand is 15 kN/m^3 . What is the allowable load with a factor of safety of 3? Assume lateral earth pressure coefficient = 0.6. 7M

UNIT-V

9. (a) Explain the Taylor's stability number and stability curves. 7M
(b) Explain the stability analysis of infinite slopes in cohesive soils. 7M

(OR)

10. (a) Describe the method of slices for the stability analysis of finite slopes. 7M
(b) A cutting 5 m deep is made in a clay at a slope of 45° . The unit weight of clay is 18.2 kN/m^3 and the angle of shearing resistance is 10° . What is the value of cohesion necessary to give a factor of safety of 1.5 with respect to cohesion? Taylor's stability number is 0.108. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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) Define and explain the maximum principle strain theory of failure. 7M
(b) A piece of material is subjected to two perpendicular tensile stresses of 100 MPa and 60MPa. Determine the plane on which the resultant stress has maximum obliquity with the normal. Also find the resultant stress on the plane. 7M
- (OR)
2. (a) Briefly illustrate the shear strain energy theory. 7M
(b) Determine the diameter of a bolt which is subjected to an axially pull of 10 kN together with a transverse shear force of 5000 N, when the elastic limit in tension is 300 N/mm^2 , factor of safety = 3 and poisson's ratio = 0.3 using,
(i) Maximum principal stress theory, (ii) Maximum principal strain theory
(iii) Maximum shear stress theory, (iv) Maximum strain energy theory
(v) Maximum shear strain energy theory

UNIT - II

3. A cylindrical thin shell, 80 cm in diameter and 3 m long, is having 1cm metal thickness. If the shell is subjected to an internal pressure of 2.5 MPa. Determine 14M
(i) Change in diameter, (ii) Change in length, (iii) Change in volume.
Take $E = 200 \text{ GPa}$, Poisson's ration = $1/4$
- (OR)
4. (a) A hollow cylinder has an external diameter of 250 mm and thickness of the wall is 50mm. The cylinder is subjected to an internal fluid pressure of 35Mpa and external pressure of 3.5Mpa. Calculate the maximum and minimum circumferential stresses and plot the variation of the same across the wall thickness. 7M
(b) Illustrate Lamé's formula for finding the hoop stress and radial pressure in a thick cylinder. 7M

UNIT - III

5. (a) A rectangular of width 200mm and of thickness 150mm carries a point of 240 kN at an eccentricity of 10mm along the width of the column. Determine the maximum and minimum stresses on the section. 7M
(b) A short column of rectangular cross-section 80mm X 60mm carries a load of 40 kN at a point 20mm from the longer side and 35mm from the shorter side. Determine the maximum compressive and tensile stresses in the section. 7M
- (OR)
6. (a) Derive the equation for the Euler's crippling load for a column with one end fixed and the other end pinned. 7M
(b) A bar of length 4m when used as a simply supported beam and subjected to a UDL of 30 kN/m over the whole span deflects by 15 mm at the centre. Determine the crippling loads when it is used as a column with the following conditions: 7M
(i) Both ends pin pointed, (ii) One end fixed and the other hinged
(iii) Both ends fixed

UNIT - IV

7. A square chimney 25 m high, having an opening of l by l is subjected to a horizontal wind pressure of 1.5 kN/m^2 . Find the necessary thickness of brick work at base if the density of the masonry is 21 kN/m^3 and the max permissible stress on brick masonry is limited to 0.8 N/mm^2 . 14M

(OR)

8. (a) A masonry dam of trapezoidal section is 10m high it has top width of 1m and bottom width of 7m. the face exposed to water has a slope of 1 horizontal to 10 vertical. Calculate the pressure intensities at the base if the dam retains water to a height of 9m. specific weight of masonry is 20 kN/m^3 . 7M

(b) Show the core of a rectangular section and a circular section with salient values. 7M

UNIT-V

9. A cantilever beam consists of $90\text{mm} \times 60\text{mm} \times 8\text{mm}$ unequal angle section with the shorter leg horizontal. It carries a concentrated load of 5 kN at a distance of 1m from the support and in a plane making 30° with respect to vertical. Determine the maximum stress at support section and also find the neutral axis of the section. 14M

(OR)

10. (a) Explain in brief the method of locating shear centre 7M

(b) Explain in brief how stresses in beams due to unsymmetrical bending is considered. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020****SUB: Signals & 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) Classify the Signals based on continuous and discrete terminologies 7M
 (b) Enumerate the Basic operations on signals with examples and diagrams 7M
 (OR)
2. (a) Find the Fourier series representation of an impulse train given by 6M

$$x(t) = \sum_{n=-\infty}^{\infty} (\delta(t - nT))$$

 (b) Explain the concept of Signal approximation using orthogonal functions with necessary derivations 8M

UNIT - II

3. (a) State and Prove any three properties of Fourier transforms 7M
 (b) Determine the Fourier Transform of i) $\cos \omega t u(t)$ ii) $\sin \omega t u(t)$ 7M
 (OR)
4. (a) Find the Fourier Transform of Rectangular pulse. Sketch the signal and Fourier transform 7M
 (b) Explain the concept of Fourier transform of periodic signals 7M

UNIT - III

5. (a) Evaluate the Process of Distortion less transmission through LTI system 7M
 (b) Discuss Transfer function of a LTI system 7M
 (OR)
6. (a) Define System? Classify the Systems with neat sketches 7M
 (b) Analyze the concept of Transmission of signals through LTI systems 7M

UNIT - IV

7. (a) Derive Sampling theorem for various conditions with its statement. 9M
 (b) Describe the effect of under sampling with the help of diagram 5M
 (OR)
8. (a) What is Linear Shift Invariant (LSI) system? Explain. 7M
 (b) Explain Discrete time Fourier transform with necessary equations. 7M

UNIT-V

9. (a) State and Prove the properties of Laplace Transforms 7M
 (b) Evaluate the Laplace Transform for the given signals 7M
 i. $\cosh^2(t)$ ii. $t^2 e^{-3t}$
 (OR)
10. (a) Define ROC with respect to Z-Transform and derive its properties 7M
 (b) Give an analysis of LTI system using z-transform 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. V Sem. (R15) Supple. Examinations of October 2020

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) What is the synchronous impedance method? Why the method is called so? What are the limitations of this theory? 6M
- (b) The following OCC was obtained in case of a 3-phase, 6kV alternator running at normal speed. 8M

I_f (A)	14	18	23	30	43
E_{OL} (kV)	4.0	5.0	6.0	7.0	8.0

The field current is 17A when armature is short-circuited and the full-load current is flowing. Using synchronous method, determine the voltage regulation of the alternator supplying the full-load of 200 kVA at 0.707 lagging. Neglect armature resistance.

(OR)

2. (a) What are the different types of armature windings? Write the differences between integral slot and fractional winding? 6M
- (b) A 3-phase star connected alternator, on open circuit is required to generate a line voltage of 3600 V, 50 Hz, when driven at 500 rpm. The stator has 3 slots per phase per pole and 10 conductors per slot. 8M
- Calculate:
- The number of poles
 - The useful flux per pole.

All the conductors in a phase are connected in series and the coils to be full pitch.

UNIT – II

3. (a) How will you determine the 'd' and 'q' axes reactances of a synchronous machine in your laboratory. Explain. 8M
- (b) A 50 Hz, 3-phase, 480V, delta connected salient pole synchronous machine has $X_d = 0.1$ ohm/phase and $X_q = 0.075$ ohm/phase. The generating is supplying 1200A at 0.8 p.f. lagging. Find the excitation emf. Neglect armature resistance. 6M

(OR)

4. (a) For a salient pole synchronous machine, derive an expression for power developed as a function of load angle. 10M
- (b) An alternator has a direct axis synchronous reactance of 0.7 per unit and a quadrature axis synchronous reactance of 0.4 per unit. It is used to supply full load at rated voltage at 0.8 p.f. find the total induced emf on open circuit. 4M

UNIT – III

5. (a) Explain the 'two bright one dark' & 'all dark' method of synchronization of alternators. 6M
- (b) Two 3-phase synchronous mechanically coupled generators operate in parallel on the same load. Determine the kW output and power factor of each machine under the following conditions. Synchronous impedance of each generator: $(0.2+j2)\Omega$ /phase. Equivalent impedance of the load: $(3+j4)\Omega$ /phase, induced emf per phase: $(2000+j0)$ volts for machine-1 and $(2200+j100)$ volts for machine-2. 8M

(OR)

6. (a) State the conditions required for parallel operation of 3-phase alternators. 6M
 (b) Two 750 kW alternators operate in parallel. The speed regulation of one set is 100 to 102% from full load to no-load and that of the other is 100 to 104%. How will the two alternators share a load of 1000 kW and at what load will one machine ceases to supply any portion of the load? 8M

UNIT – IV

7. (a) Point out the different methods of starting of a synchronous motor. Explain any one of them in detail. 8M
 (b) A factory has an average load of 300 kW at a power factor of 0.6 lagging. A synchronous motor with an efficiency of 88% is used to raise the combined power factor to 0.9 lagging and at the same time supply a mechanical load of 60kW. Calculate
 (i) total load kVA, (ii) kVA capacity of the synchronous motor.

(OR)

8. (a) What is a synchronous condenser? Explain how synchronous motor can be used as synchronous condenser with the phasor diagram. 7M
 (b) For a salient pole synchronous motor, working at lagging p.f., Show that $\tan\delta = I_a(X_q \cos\theta - r \sin\theta) / V_t - I_a(X_q \sin\theta + r \cos\theta)$ 7M

UNIT-V

9. (a) Explain the construction, working principle and application of the following single phase motors:
 (i) Resistor split phase motor, (ii) Capacitor split phase motor
 (iii) Capacitor start and run motor
 (b) Explain the working principle and applications of reluctance motor. 5M
 (OR)
10. (a) Describe the construction and working of repulsion motor. Write its merits and demerits as compared to series motor. 8M
 (b) Why cannot a shaded pole motor be made to rotate in the reverse direction? 6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) What do you understand by surge impedance loading? Explain. 6M
- (b) A star connected 440V, 50 Hz induction motor takes a line current of 40 A at a power factor of 0.8 lagging. Three mesh connected condensers are used to raise the power factor to 0.95. Find the kVA rating of the condenser bank and the capacitance of each condenser. 8M

(OR)

2. (a) Determine the A, B, C, D constants for a three-phase, 50 Hz transmission line of 250 km long having the following distributed parameters: 8M
 $l = 1.15 \times 10^{-3} \text{ H/km}$ $c = 7.8 \times 10^{-9} \text{ F/km}$ $r = 0.14 \text{ } \Omega/\text{km}$ $g = 0$.
- (b) Derive the voltage and current relation for a "T-shaped" medium transmission line. 6M

UNIT - II

3. (a) Discuss in brief about per-unit representation and their advantages. 8M
- (b) A three-phase, star connected system is rated at 50 MVA and 120 kV. Express 40,000 kVA of three-phase apparent power as a per-unit value referred to (i) the three phase system kVA as base and (ii) the per-phase system KVA as base. 6M

(OR)

4. (a) Draw a per-unit reactance diagram for the three-phase system shown in Figure 1. Choose a 20 MVA, 66 kV base at the transmission line. 8M

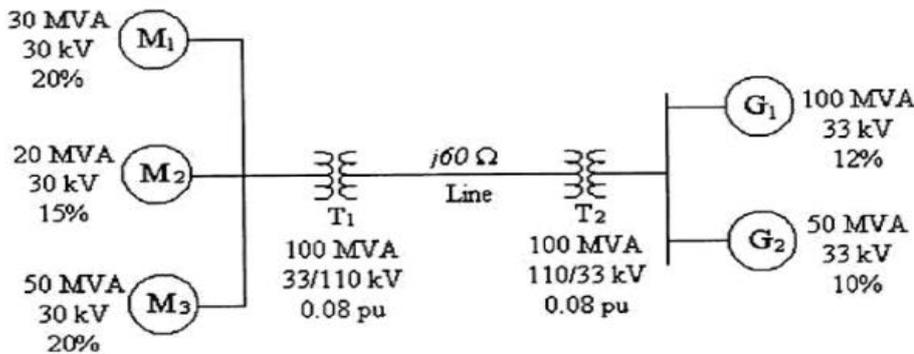


Fig.1

- (b) Discuss in brief about the single line diagram and its importance. What are the assumptions that are made while drawing a single line diagram? 6M

UNIT - III

5. (a) Explain the need for current limiting reactors and their location. 6M
- (b) An interconnected generator-reactor system is shown in Fig. 2. The base values for the given percentage reactances are the ratings of the individual pieces of equipment. A three-phase short-circuit occurs at point F. Determine the fault current and fault kVA if the busbar line-to-line voltage is 11 kV. 8M

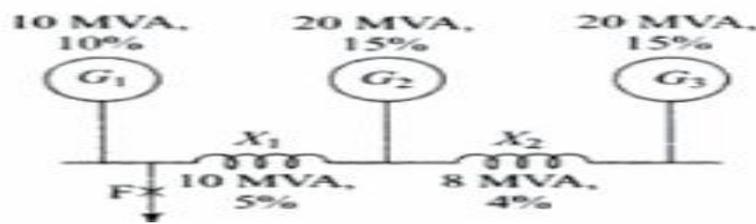


Fig. 2

(OR)

6. The two alternators X and Y operate in parallel and have the following capacity and percentage reactance. 14M

	Capacity	% Reactance
Alternator X	9000 kVA	8%
Alternator Y	11000 kVA	12%

The generating station is connected to a transmission line of 2000 km length through a step-up transformer of capacity 11000 kVA and having percentage reactance of 6%. The resistance and reactance of the transmission line per kilometer of its length are 0.003Ω and 0.02Ω respectively.

Find out the short circuit MVA for the three phase faults at the receiving end of the transmission line and also at the sending end. Let the operating voltage be 66 kV.

UNIT – IV

7. A 30 MVA, 13.8 kV, 3 phase alternator has a subtransient reactance of 15%, negative and zero sequence reactance of 15% and 5% respectively. The alternator supplies two motors over a transmission line having transformers at both ends as shown in Fig.3. The motors have rated inputs of 20 MVA and 10 MVA both 12.5 kV with 20% subtransient reactance, 20% negative reactance and 50% zero sequence reactance respectively. Current limiting reactors of 2 ohms each are in the neutral of the alternator and the large motor. The three phase transformers both are rated 35 MVA, 13.2 kV/115 kV Delta/Star with leakage reactance of 10% series reactance of the line is 80Ω . The zero sequence reactance of the line is 200Ω . Determine the fault current when LLL-G fault takes place at point P. Assume $V_f = 120$ kV. 14M

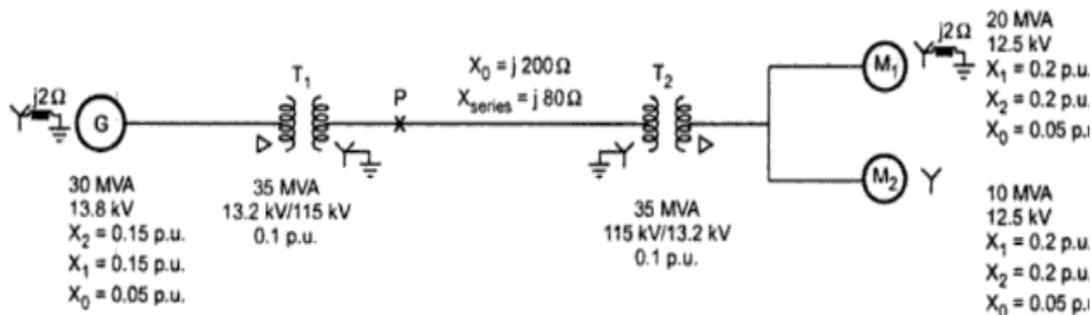


Fig. 3

(OR)

8. Derive the expression for terminal voltage and fault current in a 3-phase alternator, when there is a line-to ground fault at the far end of the alternator. Assume the generator is solidly earthed. 14M

UNIT-V

9. (a) Discuss in brief what are different factors that will influence the resistance of soil. 8M
 (b) Explain in brief about resistance earthing. 6M

(OR)

10. (a) In a 50 Hz, overhead line, the capacitance of one line to earth was $1.5 \mu\text{F}$. It was decided to use an earth fault neutralizer. Calculate the reactance to neutralize the capacitance of i) 200% of the length of the line ii) 90% of the length of the line iii) 95% of the length of the line. 9M
 (b) What are the advantages of neutral earthing? 5M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) Explain the turn on and turn off methods of SCR in detail. 7M
(b) Explain the need of static and dynamic equalization circuits of SCR in detail. 7M

(OR)

2. (a) Compare line and forced commutation techniques. 7M
(b) Plot and explain the gate characteristics of silicon-controlled rectifier. 7M

UNIT - II

3. (a) Explain the rectification mode of three phase fully controlled converter with RL load 7M
(b) Plot the curve between firing angle (α) and output voltage (V_o) in half and fully controlled converters. Explain the significance of rectification and inversion mode of phase-controlled converters. 7M

(OR)

4. (a) Explain the operation of single-phase half-controlled converter with RL load. Derive the average and rms output voltage of converter with relevant output waveforms. 7M
(b) A single-phase half-controlled bridge converter feeds an inductive load. Determine the average load voltage and load current for a firing angle of 30° and 120° respectively. The input a.c voltage is 230V and load resistance is 10ohms and inductive is 10mH. 7M

UNIT - III

5. (a) Explain the operation of single-phase ac voltage controller with RL load. Derive the expression for rms output voltage. 11M
(b) Compare the differences with ac voltage controller and TRIAC device. 3M

(OR)

6. (a) Explain the single-phase step down cyclo-converter with RL load whose output frequency is one-fourth of supply frequency. 11M
(b) Compare the differences between mid-point and bridge type cyclo-converters. 3M

UNIT - IV

7. (a) Explain the principle of operation of step-down chopper. Derive the expression of average and rms output voltage. 7M
(b) A DC chopper of input voltage 200V remains on for 25msec and off for 10msec. Determine average voltage which appears across the load. If the load is assumed to be resistive (R-10ohms), then find the RMS value of output voltage and power delivered to load. 7M

(OR)

8. (a) Briefly explain the operation of the following chopper circuits 7M
(i) Type A chopper (ii) Type B chopper
(b) A step-up chopper with pulse width of 150μ sec is operating on 220V DC supply, compute load voltage if blocking period of device is 40μ sec. 7M

UNIT-V

9. (a) Explain the principle of operation of basic parallel capacitor inverter 7M
(b) Briefly explain the following PWM techniques 7M

(i) Sinusoidal PWM (ii) Multiple pulse PWM

(OR)

10. (a) Explain the principle of operation of current source inverter with relevant waveforms. 7M
(b) Discuss about space vector modulation technique for harmonic reduction in inverter circuits. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) List the advantages and disadvantages of closed loop control systems. 6M
- (b) Write the differential equations governing the mechanical system shown in fig.1. draw the force –voltage analogous circuits. 8M

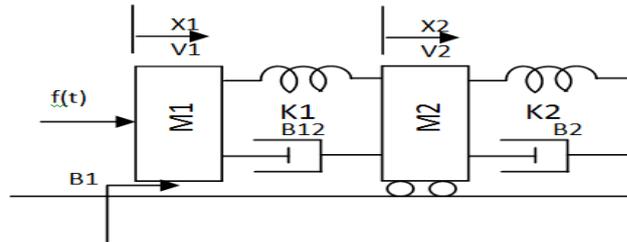


Fig.1

(OR)

2. (a) What is feed back? Explain briefly about the effects of feedback. 6M
- (b) Write the differential equations of the components of mechanical rotational system. 8M

UNIT – II

3. (a) What is the advantage of Block diagram reduction technique? Describe the rules involved in reduction. 6M
- (b) Simplify the following block diagram as shown in below figure.2 using block diagram reduction techniques. 8M

(OR)

4. (a) Explain the working principle of synchros transmitter and receiver. 6M
- (b) Determine the transfer function x_7/x_1 of the SFG shown in figure.3 using Mason's gain formula. 8M

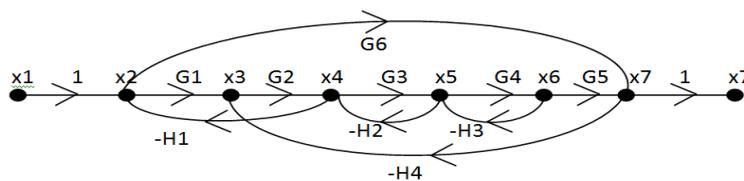


Fig.3

UNIT – III

5. (a) Derive the unit step response to a typical second order system. 6M
- (b) Derive the Expression for (i) rise time (ii) peak time (iii) peak over shoot (iv) settling time (v) Steady state error 8M

(OR)

6. (a) Sketch the root locus for the unity feedback system whose open loop transfer function is system $\frac{K(s+1.5)}{S(S+1)(S+5)}$. 7M

(b) A feedback system has open loop transfer function of $G(s) = \frac{Ke^{-s}}{S(S^2+5S+9)}$ 7M
determine the maximum value of the K for stability of closed loop system.

UNIT – IV

7. (a) Derive an expression for resonant peak and resonant frequency of the second order system. 6M

(b) Sketch the magnitude plot and phase plot for a system with transfer function 8M

$$G(s)H(s) = \frac{KS^2}{(1+0.2S)(1+0.02S)}$$

(OR)

8. (a) What is gain margin and phase margin? How stability analysis can be done using Bode plots? 7M

(b) Construct the Nyquist plot for a system whose open loop transfer function is given by 7M

$$G(s)H(s) = \frac{K(1+S)^2}{S^3}$$

find the range of values of K for which the system remains stable.

UNIT-V

9. (a) List the effects of the phase lead compensation. 6M

(b) List the limitations of single stage phase lead controls. 8M

(OR)

10. (a) Discuss in brief about effects and limitation of phase lag controls 6M

(b) Compensate the system with the open loop transfer function $G_f(S) = \frac{K}{S(S+1)(S+5)}$ 8M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) Draw the circuit diagram of two input 10K ECL OR/NOR gate and explain its function with the help of truth table.
- (b) What is interfacing? Explain interfacing between low voltage TTL and low voltage CMOS logic.

(OR)

2. (a) Explain how to estimate sinking current for low output and sourcing current for high output of CMOS gate.
- (b) Explain the terms transition time and propagation delay with reference to CMOS logic.

UNIT – II

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

(OR)

4. (a) Write the syntax of a VHDL component declaration and by making use of component declaration write a VHDL program for a prime-number detector.
- (b) Write the syntax of a VHDL process statement and by making use of process statements write a process-based dataflow VHDL architecture for the prime-number detector.

UNIT – III

5. (a) Draw the block diagram of Binary Adder and Subtractor and explain its operation in detail.
- (b) Design the procedure for converting Gray code to binary and draw its logic diagram.

(OR)

6. (a) Design a full subtractor with logic gates and write VHDL data flow program for the implementation of the above subtractor.
- (b) Design the logic circuit and write a data-flow style VHDL program for the following function. $f(X) = \sum p, q, r, s(1, 3, 4, 5, 6, 7, 9, 12, 13, 14)$

UNIT – IV

7. (a) Draw and explain the Dual priority encoder in detail.
- (b) Design a 16-bit comparator using 74x85 ICs.

(OR)

8. (a) Draw the circuit diagram of a barrel shifter which can shift 0, 1, 2 & 3 bit positions area as per the control signals S_1 and S_2 .
- (b) What do you mean by carry propagation delay? Explain the method used for fast addition?

UNIT-V

9. (a) Explain the operation of SIPO shift register with the help of timing diagram.
- (b) Design a PAL circuit diagram of a Boolean function $F(a,b,c,d) = \sum(0,1,2,4,6,8,10,12,14,15)$

(OR)

10. (a) Design a conversion circuit to convert a D flip-flop to J-K flip-flop? Write data-flow style VHDL program.
- (b) What is a PLD? Compare the three combinational PLDs?

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****SUB: COMPUTER ORGNIZATION (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 software. Explain the functions of software with a neat sketch. 8M
(b) Explain about Register transfer in detail. 6M

(OR)

2. Explain in detail various Logic and Shift micro operations. 14M

UNIT – II

3. (a) Compare direct and indirect address with a neat sketch. 6M
(b) Illustrate and explain program interrupt. 8M

(OR)

4. Explain in detail about design of control unit. 14M

UNIT – III

5. Explain briefly about the stack organization with example. 14M

(OR)

6. Describe briefly four segment instruction pipeline with example. 14M

UNIT – IV

7. Explain in detail Direct Memory Access (DMA) process. 14M

(OR)

8. Describe various modes of transfer in detail with neat sketch. 14M

UNIT-V

9. Explain in detail about virtual memory and address mapping using pages. 14M

(OR)

10. Explain briefly about cache coherence and solutions for cache coherence problems. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020****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) Find the radiation resistance of dipole antenna. 7M
(b) Find the directivity of the half-wave dipole. 7M
(OR)
2. Explain briefly about a half wave dipole and determine its radiation resistance 14M

UNIT – II

3. (a) What is Broad Side Array? 2M
(b) Derive the expressions for the radiation pattern for a broad side array of n Identical elements? 12M
(OR)
4. (a) What is end fire array? 2M
(b) Derive the expressions for the radiation pattern for an end fire array of n Identical elements? 12M

UNIT – III

5. (a) Explain measurement of directivity? 6M
(b) Explain in detail about a folded dipole antenna? 8M
(OR)
6. (a) Explain in detail about Horn antenna? 7M
(b) Explain in detail about Helical antenna? 7M

UNIT – IV

7. (a) Derive the expression for LOS range of Space wave propagation? 7M
(b) Explain super refraction? 7M
(OR)
8. (a) Explain about tropospheric propagation. 7M
(b) Explain the effect of earth's curvature on wave propagation. 7M

UNIT-V

9. (a) Derive the expression for MUF. 10M
(b) Explain the terms 'Virtual height' and Skip distance 4M
(OR)
10. (a) Explain the structure of ionosphere. 7M
(b) Derive the relation between MUF and skip distance? 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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) Derive the expression for the Quantization error. 7M
(b) With a neat sketch describe ADPCM concept. 7M

(OR)

2. (a) Explain in detail about sampling theorem. 7M
(b) What are the advantages and disadvantages of DM and ADM? Explain 7M

UNIT – II

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

(OR)

4. (a) Represent the binary sequence 100111010 using the following formats 7M
i) Bipolar ii) Unipolar Return to Zero
(b) Explain Nyquist criterion 7M

UNIT – III

5. (a) Explain Huffman coding with an example 7M
(b) Discuss in brief about continuous channel capacity. 7M

(OR)

6. (a) Explain the tradeoff between bandwidth and signal to noise ratio. 7M
(b) Write short notes on Hartley theorem and Fano coding 7M

UNIT – IV

7. (a) Describe the algebraic structure of cyclic codes. 7M
(b) What is a convolutional code? How is it generated? 7M

(OR)

8. (a) Give the matrix description for linear block codes 7M
(b) Write notes on syndrome decoding 7M

UNIT-V

9. (a) Explain the DPSK modulation technique with the help of a neat sketch. 7M
(b) Draw and explain the working of optimum receiver with a neat diagram. 7M

(OR)

10. (a) Explain the working of non-coherent FSK detector. 7M
(b) Differentiate coherent and non-coherent detection techniques. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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) Derive an expression for voltage gain for Dual Input Balanced Output Differential Amplifier. 7M
(b) Explain the Frequency Compensation techniques of OP-AMP in detail. 7M

(OR)

2. (a) Explain about Level Shifter. 7M
(b) Explain Input Bias Current compensation with a neat diagram. 7M

UNIT – II

3. (a) With a neat sketch explain the OP-AMP differentiator circuit. 7M
(b) Explain the operation of the Instrumentation amplifier. 7M

(OR)

4. (a) Derive the expression for Voltage Gain of practical Inverting amplifier. 7M
(b) Explain the operation of Precision Rectifiers with neat sketch. 7M

UNIT – III

5. (a) Explain the operation of the Square wave generator using op-amp. 7M
(b) Derive the transfer function for the Second order HPF, and also plot its frequency response. 7M

(OR)

6. (a) Explain the working of Monostable multivibrator using OP-AMP. 7M
(b) Derive the transfer function for the First order HPF, and also plot its frequency response. 7M

UNIT – IV

7. (a) Explain the working of Astable multivibrator using 555Timer. 7M
(b) Explain the block diagram of PLL with neat sketch. 7M

(OR)

8. (a) Explain the working of Monostable multivibrator using 555 IC Timer. 7M
(b) Explain two PLL applications. 7M

UNIT – V

9. (a) Explain the working of Weighted Resistor DAC. 7M
(b) Explain the working of a Successive Approximation ADC. 7M

(OR)

10. (a) Explain IC1408 DAC. 7M
(b) Explain the working of Parallel Comparator ADC. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020****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) Explain 8085 indirect addressing mode instructions? 8M
(b) Explain the use of 16 bit registers of 8085 Microprocessors? 6M
(OR)
2. (a) Write a delay Program in 8085 using 16 bit registers? 8M
(b) Explain timing diagram of I/O Write Cycle. ? 6M

UNIT – II

3. (a) Explain 8086 Interrupt vector table & INT n Instructions 8M
(b) What are the advantages of Segmentation 6M
(OR)
4. (a) Explain the minimum mode configuration along with functions of pins 8M
(b) List the instructions available with Direct addressing mode 6M

UNIT – III

5. (a) Write an 8086 ALP to add Positive numbers in an array 8M
(b) Compare Macros & Procedures? 6M
(OR)
6. (a) Write an ALP to Evaluate $\sum_{i=0}^n XiYi$, X & Y are arrays and Xi is numbers Stored at ith location 8M
(b) What is the Difference between DB & EQU Directives? 6M

UNIT – IV

7. (a) Draw the Block Diagram of 8251 & Explain control and Status words? 8M
(b) Explain various data transfer schemes 6M
(OR)
8. (a) What is the use of 8259 Peripheral. Explain its block diagram 8M
(b) Explain the Programming of 8257 DMA Controller 6M

UNIT-V

9. (a) Design a Address Decoder for Interfacing 32K RAM & 32K ROM with 8086? 8M
(b) Write an ALP to generate a Square Wave using DAC? 6M
(OR)
10. (a) Draw the Interfacing diagram of Stepper motor with 8086? 8M
(b) Write an ALP to Rotate stepper motor by 360 degrees 6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. V Sem. (R15) Supple. Examinations of October 2020

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) Suppose you are given three alternative designs for the layout of shop floor in a manufacturing organization. How will you decide which one of the three is the most appropriate? 7M
 (b) Define plant layout and explain about process layout with advantages and limitations and applications. 7M

(OR)

2. (a) Explain about fixed position layout with advantages and limitations and applications. 7M
 (b) Explain features, advantages, limitations suitability of product layout and process layout. 7M

UNIT – II

3. (a) State the various principles of motion economy. 7M
 (b) Explain various types of allowances used in time study. 7M

(OR)

4. (a) What are the benefits of job evaluation and its limitations? 7M
 (b) Explain about various types of symbols used in method study. 7M

UNIT – III

5. A department store manager wishes to make a work sampling study to estimate the Percentage time that the clerks are busy waiting for customers and percent time that they are idle. The current best guess is that clerks are idle 25 percent of the time. Determine the number of observation required if we wish to be 95 percent confident that the results is within ± 1.5 percent, given number of observations at 20% is 2995 and at 30% it is 3750 for the same precision. (a) Compare stop watch study and work sampling in terms of cost to make studies, representatives of samples taken and comparative accuracy. 14M
 b) Suppose an organization utilizes a variable based measurement system for process

(OR)

6. (a) List out the various methods of job evaluation. Explain any two of them in details. 7M
 (b) Explain steps in stop watch time study for determining standard time. 7M

UNIT – IV

7. (a) Draw a simo chart for in setting a letter in an envelope and sealing it. 7M
 (b) What do you understand by a flow process chart explain. 7M

(OR)

8. (a) Explain steps in critical path method 7M
 (b) Explain about the evaluation review techniques. 7M

UNIT-V

9. (a) Consider following problem involving activities from A to J 10M
 i) Construct the CPM network ii) Determine the critical path.
 iii) Compute total floats and free floats and non-critical activities.

ACTIVITY	Immediate predecessor (S)	Duration (Months)
A	-	1
B	A	4
C	A	2
D	A	2
E	D	3
F	D	3
G	E	2
H	F,G	1
I	C,H	3
J	B	2

(b) What do you mean by TQM? Describe the different stages in implementation of it. 4M

(OR)

10. (a) What do you understand by process control? Define control charts and its types. 7M

(b) The following are the inspection results of 10 lots, each lot being 300 items. Number defectives in each lot is 25, 30, 35, 40, 45, 35, 40, 30, 20 and 50. Calculate the average fraction defective and three sigma limit for P-chart and state whether the process is in control. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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) Derive an expression for the efficiency of Rankine 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) Explain the Rankine cycle with Superheated steam. 4M
(b) A steam turbine receives steam at 15 bar and 350⁰ 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 45⁰ C into superheated steam at a pressure of 12 bar and 275⁰ C. If the calorific value of fuel is 32760 kJ/kg of coal, determine 1. Equivalent evaporation from and at 100⁰ C, and 2. Thermal efficiency of the boiler. 10M

(OR)

4. (a) Describe with a neat sketch, water level indicator for a boiler. 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) Explain what is meant by critical pressure ratio of a nozzle. 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) What are the differences between Convergent and Convergent-divergent nozzle? 4M
(b) Calculate the throat area of nozzle supplied with steam at 10 bar and 200⁰ 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) Explain the principle of impulse turbine. 4M
(b) The following data relates to a single impulse turbine: Steam velocity=600 m/s, Blade speed=250 m/s, Nozzle angle =20⁰, Blade outlet angle = 25⁰. 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) Distinguish between impulse turbine and reaction turbine. 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° 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 advantages of a Condenser in a Steam power plant? 4M
(b) Explain the principles of operation of different types of Surface condensers. 10M
- (OR)
10. (a) Briefly explain different type of cooling towers. 4M
(b) What are the functions of an Air pump? Explain the construction and working of Edwards's air pump. 10M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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) Find the radiation resistance of dipole antenna. 7M
(b) Find the directivity of the half-wave dipole. 7M
(OR)
2. Explain briefly about a half wave dipole and determine its radiation resistance 14M

UNIT – II

3. (a) What is Broad Side Array? 2M
(b) Derive the expressions for the radiation pattern for a broad side array of n Identical elements? 12M
(OR)
4. (a) What is end fire array? 2M
(b) Derive the expressions for the radiation pattern for an end fire array of n Identical elements? 12M

UNIT – III

5. (a) Explain measurement of directivity? 6M
(b) Explain in detail about a folded dipole antenna? 8M
(OR)
6. (a) Explain in detail about Horn antenna? 7M
(b) Explain in detail about Helical antenna? 7M

UNIT – IV

7. (a) Derive the expression for LOS range of Space wave propagation? 7M
(b) Explain super refraction? 7M
(OR)
8. (a) Explain about tropospheric propagation. 7M
(b) Explain the effect of earth's curvature on wave propagation. 7M

UNIT-V

9. (a) Derive the expression for MUF. 10M
(b) Explain the terms 'Virtual height' and Skip distance 4M
(OR)
10. (a) Explain the structure of ionosphere. 7M
(b) Derive the relation between MUF and skip distance? 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) Derive the expression for the Quantization error. 7M
(b) With a neat sketch describe ADPCM concept. 7M

(OR)

2. (a) Explain in detail about sampling theorem. 7M
(b) What are the advantages and disadvantages of DM and ADM? Explain 7M

UNIT – II

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

(OR)

4. (a) Represent the binary sequence 100111010 using the following formats 7M
i) Bipolar ii) Unipolar Return to Zero
(b) Explain Nyquist criterion 7M

UNIT – III

5. (a) Explain Huffman coding with an example 7M
(b) Discuss in brief about continuous channel capacity. 7M

(OR)

6. (a) Explain the tradeoff between bandwidth and signal to noise ratio. 7M
(b) Write short notes on Hartley theorem and Fano coding 7M

UNIT – IV

7. (a) Describe the algebraic structure of cyclic codes. 7M
(b) What is a convolutional code? How is it generated? 7M

(OR)

8. (a) Give the matrix description for linear block codes 7M
(b) Write notes on syndrome decoding 7M

UNIT-V

9. (a) Explain the DPSK modulation technique with the help of a neat sketch. 7M
(b) Draw and explain the working of optimum receiver with a neat diagram. 7M

(OR)

10. (a) Explain the working of non-coherent FSK detector. 7M
(b) Differentiate coherent and non-coherent detection techniques. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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) Derive an expression for voltage gain for Dual Input Balanced Output Differential Amplifier. 7M
(b) Explain the Frequency Compensation techniques of OP-AMP in detail. 7M

(OR)

2. (a) Explain about Level Shifter. 7M
(b) Explain Input Bias Current compensation with a neat diagram. 7M

UNIT – II

3. (a) With a neat sketch explain the OP-AMP differentiator circuit. 7M
(b) Explain the operation of the Instrumentation amplifier. 7M

(OR)

4. (a) Derive the expression for Voltage Gain of practical Inverting amplifier. 7M
(b) Explain the operation of Precision Rectifiers with neat sketch. 7M

UNIT – III

5. (a) Explain the operation of the Square wave generator using op-amp. 7M
(b) Derive the transfer function for the Second order HPF, and also plot its frequency response. 7M

(OR)

6. (a) Explain the working of Monostable multivibrator using OP-AMP. 7M
(b) Derive the transfer function for the First order HPF, and also plot its frequency response. 7M

UNIT – IV

7. (a) Explain the working of Astable multivibrator using 555Timer. 7M
(b) Explain the block diagram of PLL with neat sketch. 7M

(OR)

8. (a) Explain the working of Monostable multivibrator using 555 IC Timer. 7M
(b) Explain two PLL applications. 7M

UNIT – V

9. (a) Explain the working of Weighted Resistor DAC. 7M
(b) Explain the working of a Successive Approximation ADC. 7M

(OR)

10. (a) Explain IC1408 DAC. 7M
(b) Explain the working of Parallel Comparator ADC. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020****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) Explain 8085 indirect addressing mode instructions? 8M
(b) Explain the use of 16 bit registers of 8085 Microprocessors? 6M
(OR)
2. (a) Write a delay Program in 8085 using 16 bit registers? 8M
(b) Explain timing diagram of I/O Write Cycle. ? 6M

UNIT – II

3. (a) Explain 8086 Interrupt vector table & INT n Instructions 8M
(b) What are the advantages of Segmentation 6M
(OR)
4. (a) Explain the minimum mode configuration along with functions of pins 8M
(b) List the instructions available with Direct addressing mode 6M

UNIT – III

5. (a) Write an 8086 ALP to add Positive numbers in an array 8M
(b) Compare Macros & Procedures? 6M
(OR)
6. (a) Write an ALP to Evaluate $\sum_{i=0}^n X_i Y_i$, X & Y are arrays and X_i is numbers Stored at i^{th} location 8M
(b) What is the Difference between DB & EQU Directives? 6M

UNIT – IV

7. (a) Draw the Block Diagram of 8251 & Explain control and Status words? 8M
(b) Explain various data transfer schemes 6M
(OR)
8. (a) What is the use of 8259 Peripheral. Explain its block diagram 8M
(b) Explain the Programming of 8257 DMA Controller 6M

UNIT-V

9. (a) Design a Address Decoder for Interfacing 32K RAM & 32K ROM with 8086? 8M
(b) Write an ALP to generate a Square Wave using DAC? 6M
(OR)
10. (a) Draw the Interfacing diagram of Stepper motor with 8086? 8M
(b) Write an ALP to Rotate stepper motor by 360 degrees 6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) Suppose you are given three alternative designs for the layout of shop floor in a manufacturing organization. How will you decide which one of the three is the most appropriate? 7M
- (b) Define plant layout and explain about process layout with advantages and limitations and applications. 7M

(OR)

2. (a) Explain about fixed position layout with advantages and limitations and applications. 7M
- (b) Explain features, advantages, limitations suitability of product layout and process layout. 7M

UNIT – II

3. (a) State the various principles of motion economy. 7M
- (b) Explain various types of allowances used in time study. 7M

(OR)

4. (a) What are the benefits of job evaluation and its limitations? 7M
- (b) Explain about various types of symbols used in method study. 7M

UNIT – III

5. A department store manager wishes to make a work sampling study to estimate the Percentage time that the clerks are busy waiting for customers and percent time that they are idle. The current best guess is that clerks are idle 25 percent of the time. Determine the number of observation required if we wish to be 95 percent confident that the results is within ± 1.5 percent, given number of observations at 20% is 2995 and at 30% it is 3750 for the same precision. 14M
- (a) Compare stop watch study and work sampling in terms of cost to make studies, representatives of samples taken and comparative accuracy.
- (b) Suppose an organization utilizes a variable based measurement system for process

(OR)

6. (a) List out the various methods of job evaluation. Explain any two of them in details. 7M
- (b) Explain steps in stop watch time study for determining standard time. 7M

UNIT – IV

7. (a) Draw a simo chart for in setting a letter in an envelope and sealing it. 7M
- (b) What do you understand by a flow process chart explain. 7M

(OR)

8. (a) Explain steps in critical path method 7M
- (b) Explain about the evaluation review techniques. 7M

UNIT-V

9. (a) Consider following problem involving activities from A to J

10M

i) Construct the CPM network

ii) Determine the critical path.

iii) Compute total floats and free floats and non-critical activities.

ACTIVITY	Immediate predecessor (S)	Duration (Months)
A	-	1
B	A	4
C	A	2
D	A	2
E	D	3
F	D	3
G	E	2
H	F,G	1
I	C,H	3
J	B	2

- (b) What do you mean by TQM? Describe the different stages in implementation of it.

4M

(OR)

10. (a) What do you understand by process control? Define control charts and its types.

7M

- (b) The following are the inspection results of 10 lots, each lot being 300 items. Number defectives in each lot is 25, 30, 35, 40, 45, 35, 40, 30, 20 and 50. Calculate the average fraction defective and three sigma limit for P-chart and state whether the process is in control.

7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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) Derive an expression for the efficiency of Rankine 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) Explain the Rankine cycle with Superheated steam. 4M
(b) A steam turbine receives steam at 15 bar and 350⁰ 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 45⁰ C into superheated steam at a pressure of 12 bar and 275⁰ C. If the calorific value of fuel is 32760 kJ/kg of coal, determine 1. Equivalent evaporation from and at 100⁰ C, and 2. Thermal efficiency of the boiler. 10M

(OR)

4. (a) Describe with a neat sketch, water level indicator for a boiler. 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) Explain what is meant by critical pressure ratio of a nozzle. 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) What are the differences between Convergent and Convergent-divergent nozzle? 4M
(b) Calculate the throat area of nozzle supplied with steam at 10 bar and 200⁰ 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) Explain the principle of impulse turbine. 4M
(b) The following data relates to a single impulse turbine: Steam velocity=600 m/s, Blade speed=250 m/s, Nozzle angle =20⁰, Blade outlet angle = 25⁰. 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) Distinguish between impulse turbine and reaction turbine. 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° 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 advantages of a Condenser in a Steam power plant? 4M
(b) Explain the principles of operation of different types of Surface condensers. 10M
- (OR)
10. (a) Briefly explain different type of cooling towers. 4M
(b) What are the functions of an Air pump? Explain the construction and working of Edwards's air pump. 10M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. V Sem. (R15) Supple. Examinations of October 2020

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 mean by a compound Epicyclic gear train? 4M
 (b) An Epicyclic gear train shown in figure -1 has a sun wheel S of 30 teeth and two planet wheels P-P of 50 teeth. The planet wheels mesh with the internal teeth of a fixed annular ring A. The driving shaft carrying the sun wheel, transmits 4 kW power at 300 rpm. The driven shaft is connected to an arm which carries the planet wheels. Determine the speed of the driven shaft and the torque transmitted, if the overall efficiency is 95%. 10M

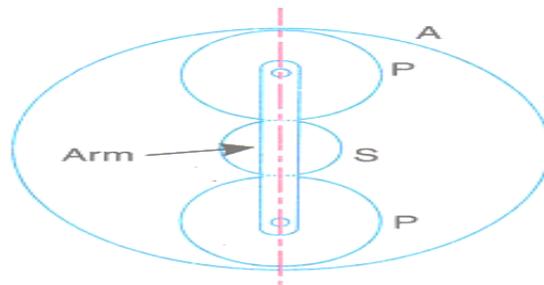


Figure - 1

(OR)

2. (a) Sketch and explain differential gear of an automobile. 7M
 (b) An Epicyclic gear train consists of an arm and two gears A and B having 30 and 40 teeth respectively. The arm rotates about the centre of the gear A at a speed of 80 rpm clockwise. Determine the speed of the gear B, if the gear A revolves at 240 rpm counter clockwise direction. 7M

UNIT - II

3. (a) Derive an expression for the ratio of tight side and slack side tensions incase of 'V' - belt drive. 7M
 (b) Derive an expression for maximum torque transmitted by cone clutch based on 'Uniform Pressure Intensity' Condition 7M
- (OR)
4. (a) Derive an expression for the length of the belt in an open belt drive. 7M
 (b) Derive an expression for maximum torque transmitted by cone clutch based on 'Uniform Rate of Wear' Condition. 7M

UNIT - III

5. (a) What do you mean by 'self- locking' of a braking system? Explain. 6M
 (b) Derive an expression for the ratio of maximum to minimum tension in the band of 'band and block' brake system 8M

(OR)

6. (a) A bicycle and rider of mass 100 kg are travelling at the rate of 16 km/h on a level road. A brake is applied to the rear wheel which is 0.9 m in diameter and this is the only resistance acting. How far will the bicycle travel and how many turns will it make before it comes to rest ? The pressure applied on the brake is 100 N and $\mu = 0.05$. 7M
 (b) Sketch and explain the working principle of Belt Transmission Dynamometer. 7M

UNIT – IV

7. The equation of the turning moment curve of a three crank engine is $(5000 + 1500 \sin 3\theta)$ N-m, where θ is the crank angle in radians. The moment of inertia of the flywheel is 1000 kg-m^2 and the mean speed is 300 r.p.m. Calculate : 1. power of the engine, and 2. the maximum fluctuation of the speed of the flywheel in percentage when (i) the resisting torque is constant, and (ii) the resisting torque is $(5000 + 600 \sin \theta)$ N-m. 14M

(OR)

8. A single cylinder, single acting, four stroke gas engine develops 20 kW at 300 r.p.m. The work done by the gases during the expansion stroke is three times the work done on the gases during the compression stroke, the work done during the suction and exhaust strokes being negligible. If the total fluctuation of speed is not to exceed ± 2 per cent of the mean speed and the turning moment diagram during compression and expansion is assumed to be triangular in shape, find the moment of inertia of the flywheel. 14M

UNIT-V

9. (a) Explain the terms (i) Stability, (ii) Effort and (iii) Power of a governor. 6M
(b) A Proell governor has all four arms of length 305 mm. The upper arms are pivoted on the axis of rotation and the lower arms are attached to a sleeve at a distance of 38 mm from the axis. The mass of each ball is 4.8 kg and are attached to the extension of the lower arms which are 102 mm long. The mass on the sleeve is 45 kg. The minimum and maximum radii of governor are 165 mm and 216 mm. Assuming that the extensions of the lower arms are parallel to the governor axis at the minimum radius, find the corresponding equilibrium speeds. 8M

(OR)

10. (a) Define the following terms relating to governors : 6M
i). Sensitiveness, ii). Hunting and iii). Isochronism.
(b) In a spring-controlled governor of the Hartung type, the length of the ball and sleeve arms are 80 mm and 120 mm respectively. The total travel of the sleeve is 25 mm. In the mid position, each spring is compressed by 50 mm and the radius of rotation of the mass centres is 140 mm. Each ball has a mass of 4 kg and the spring has a stiffness of 10 kN/m of compression. The equivalent mass of the governor gear at the sleeve is 16 kg. Neglecting the moment due to the revolving masses when the arms are inclined, determine the ratio of the range of speed to the mean speed of the governor. Find, also, the speed in the mid-position. 8M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) Explain simple turning operation on lathe with sketch 8M
(b) Define cutting speed, feed, depth of cut? 6M
(OR)
2. (a) Explain the significance of tool angles as per ASA system for a single point cutting tool 6M
(b) With the help of a neat sketch explain any one operations that are performed on a lathe 8M

UNIT – II

3. (a) Explain the working principle of planer with a neat sketch 10M
(b) What is role of step cone pulley in planar machine explain with drive arrangement 4M
(OR)
4. (a) Classify the shaper machines? 4M
(b) Explain working principle of shaper machine with neat sketch 10M

UNIT – III

5. (a) With the help of a neat sketch explain the nomenclature of a twist drill? 10M
(b) What is counterboring and countersinking? 4M
(OR)
6. (a) Explain the parts of a Jig boring machine with a neat sketch 10M
(b) How do you classify boring machines. 4M

UNIT – IV

7. (a) Explain the working mechanism of a universal dividing head with a neat sketch? 10M
(b) Explain face milling operation with diagram 4M
(OR)
8. (a) With the help of a neat sketch explain any two operations that are performed on a milling machine 10M
(b) What is the working principle involved in a milling operation with a diagram 4M

UNIT-V

9. (a) How a grinding wheel is marked. Describe the Indian standard marking system of a grinding wheel 8M
(b) Explain the working principle of honing with a neat sketch 6M
(OR)
10. (a) List the abrasives used in grinding wheel? explain 6M
(b) Explain cylindrical grinding machine with neat sketch 8M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA

B. Tech. V Sem. (R15) Supple. Examinations of October 2020

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. (a) Define preferred numbers and give some suitable examples for basic and derived series. 4M
 (b) A crane hook has a trapezoidal section at A-A as shown in Fig. Q1(b) Find the maximum stress at points P and Q. All dimensions are in mm. 10M

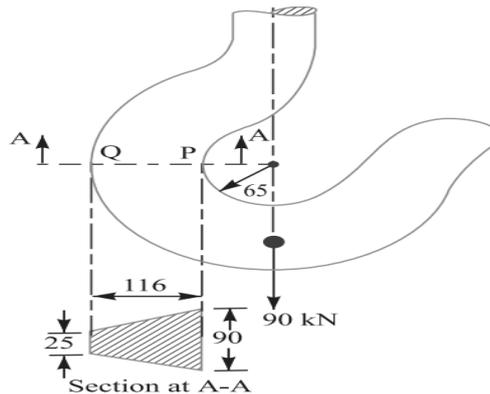


Fig. Q1(b)

(OR)

2. (a) Explain the mechanical properties of engineering materials: 4M
 i) Stiffness ii) Creep iii) Resilience iv) Malleability v) Fatigue
 (b) A pulley is keyed to a shaft midway between two bearings. The shaft is made of cold drawn steel for which the ultimate strength is 550 MPa and the yield strength is 400 MPa. The bending moment at the pulley varies from -150 N-m to $+400$ N-m as the torque on the shaft varies from -50 N-m to $+150$ N-m. Obtain the diameter of the shaft for an indefinite life. The stress concentration factors for the keyway at the pulley in bending and in torsion are 1.6 and 1.3 respectively. Take the following values:
 Factor of safety = 1.5; Load correction factors = 1.0 in bending, and 0.6 in torsion; Size effect factor = 0.85. 10M

UNIT – II

3. (a) A cylindrical shaft made of steel of yield strength 800 MPa is subjected to static loads consisting of bending moment 20 kN-m and a torsional moment 40 kN-m. Determine the diameter of the shaft using two different theories of failure, and assuming a factor of safety of 2. Take $E = 210$ GPa and poisson's ratio = 0.25. 10M
 (b) Explain the terms i) Stress Concentration factor ii) Notch sensitivity 4M

(OR)

4. (a) Derive soderberg's equation and state its application to different type of loadings. 6M
 (b) A circular bar of 500 mm length is supported freely at its two ends. It is acted upon by a central concentrated cyclic load having a minimum value of 20 kN and a maximum value of 50 kN. Determine the diameter of bar by taking a factor of safety of 1.5, size effect of 0.85, surface finish factor of 0.9. The material properties of bar are given by: ultimate strength of 650 MPa, yield strength of 500 MPa and endurance strength of 350 MPa. 8M

UNIT – III

5. (a) A solid circular beam, 25 mm in diameter, is welded to a support by means of fillet weld as shown in Fig.Q5(a). Determine the leg dimensions of the weld, if the permissible shear stress is 95 N/mm^2 10M

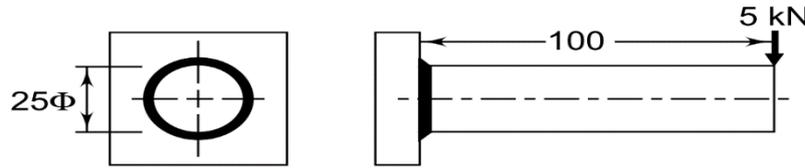


Fig. Q5(a)

- (b) Discuss on bolts of uniform strength giving examples of practical applications of such bolts. 4M
- (OR)
6. (a) Discuss the standard location of elements of a welding symbol. 4M
- (b) A steam engine cylinder of size $300 \text{ mm} \times 400 \text{ mm}$ operates at 1.5 N/mm^2 pressure. The cylinder head is connected by means of 8 bolts having yield point stress of 350 MPa and endurance limit of 240 MPa. The bolts are tightened with an initial preload of 1.8 times the steam lead. The joint is made leak-proof by using soft copper gasket which renders the effect of external load to be half. Determine the size of bolts, if factor of safety is 2 and stress concentration factor is 3. 10M

UNIT – IV

7. (a) Write the advantages of hollow shafts over the solid shafts. 4M
- (b) A hollow steel shaft is to transmit 20 kW at 300 r.p.m. The loading is such that the maximum bending moment is 1000 N-m, the maximum torsional moment is 500 N-m and axial compressive load is 15 kN. The shaft is supported on rigid bearings 1.5 m apart. The maximum permissible shear stress on the shaft is 40 MPa. The inside diameter is 0.8 times the outside diameter. The load is cyclic in nature and applied with shocks. The values for the shock factors are $K_t = 1.5$ and $K_m = 1.6$. 10M

(OR)

8. A machine shaft, supported on bearings having their centres 750 mm apart, transmitted 185 kW at 600 r.p.m. A gear of 200 mm and 20° tooth profile is located 250 mm to the right of left hand bearing and a 450 mm diameter pulley is mounted at 200 mm to right of right hand bearing. The gear is driven by a pinion with a downward tangential force while the pulley drives a horizontal belt having 180° angle of contact. The pulley weighs 1000 N and tension ratio is 3. Find the diameter of the shaft, if the allowable shear stress of the material is 63 MPa. 14M

UNIT-V

9. Design a bushed-pin type of flexible coupling to connect a pump shaft to a motor shaft transmitting 36 kW at 960 r.p.m. The overall torque is 25 percent more than mean torque. The material properties are as follows: 14M
- (a) The allowable shear and crushing stress for shaft and key material is 40 MPa and 80 MPa respectively.
- (b) The allowable shear stress for cast iron is 15 MPa.
- (c) The allowable bearing pressure for rubber bush is 0.8 N/mm^2 .
- (d) The material of the pin is same as that of shaft and key.
- Draw neat sketch of the coupling.

(OR)

10. (a) Design a knuckle joint to transmit 180 kN. The design stresses may be taken as 75 MPa in tension, 60 MPa in shear and 150 MPa in compression. 8M
- (b) Prove that a square key is equally strong in shear and compression. 6M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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. (a) Derive an expression for the heat conduction through a hollow cylinder from the general heat conduction equation. Assume steady state unidirectional heat flow in radial direction and no internal heat generation. 7M
- (b) A wall is constructed of several layers. The first layer consists of masonry brick 20 cm. thick of thermal conductivity 0.66 W/mK, the second layer consists of 3 cm thick mortar of thermal conductivity 0.6 W/mK, the third layer consists of 8 cm thick lime stone of thermal conductivity 0.58 W/mK and the outer layer consists of 1.2 cm thick plaster of thermal conductivity 0.6 W/mK. The heat transfer coefficient on the interior and exterior of the wall are 5.6 W/m²K and 11 W/m²K respectively. Interior room temperature is 22 °C and outside air temperature is -5 °C. Calculate i) Overall heat transfer coefficient ii) Overall thermal resistance iii) The rate of heat transfer. 7M

(OR)

2. (a) Derive an expression for critical thickness of insulation for cylinder 7M
- (b) Water flows at 50°C inside a 2.5 cm inside diameter tube such that $h_i = 3500 \text{ W/m}^2\text{°C}$. The tube has a wall thickness of 0.8 mm with a thermal conductivity of 16 W/m °C. The outside of the tube loses heat by free convection with $h_o = 7.6 \text{ W/m}^2\text{°C}$. Calculate the overall heat-transfer coefficient and heat loss per unit length to surrounding air at 20 °C 7M

UNIT – II

3. (a) What is the Biot number? Explain the importance of Biot number in unsteady state heat transfer. 7M
- (b) Alloy steel ball of 2 mm diameter heated to 800 °C is quenched in a bath at 100°C. The material properties of the ball are $K = 205 \text{ kJ/m hr K}$, $\rho = 7860 \text{ kg/m}^3$, $C_p = 0.45 \text{ kJ/kg K}$, $h = 150 \text{ KJ/ hr m}^2 \text{ K}$. Determine (i) Temperature of ball after 10 second and (ii) Time for ball to cool to 400 °C 7M

(OR)

4. (a) Define heat efficiency and effectiveness of the fin 7M
- (b) Find out the amount of heat transferred through an iron fin of length 50 mm, width 100 mm and thickness 5 mm. Assume $k = 58 \text{ W/m °C}$ and $h = 12 \text{ W/m}^2 \text{°C}$ for the material of the fin and the temperature at tip of the fin if the atmosphere temperature 20°C. 7M

UNIT – III

5. (a) Explain the following laws relevant to radiation heat transfer. 7M
- (i) Kirchhoff's law. (ii) Wien's displacement law.
- (iii) Planck's law. (iv) Stefan Boltzmann law.
- (b) Two very large parallel plates with emissivity 0.5 exchange heat. Determine the percentage reduction in the heat transfer rate if a polished aluminium radiation shield of $\epsilon = 0.04$ is placed in between the plates. 7M

(OR)

6. (a) What is a radiation shield? Why is it used? 7M
(b) Define irradiation and emissive power 7M

UNIT – IV

7. (a) Define Reynolds, Nusselt, and Prandtl numbers. Explain their importance in convective heat transfer. 7M
(b) A large vertical plate 5 m high is maintained at 100°C and exposed to air at 30°C. Calculate the convection heat transfer coefficient. 7M

(OR)

8. (a) What is the difference between free convection and forced convection? 7M
(b) Air at 20°C, at a pressure of 1 bar is flowing over a flat plate at a velocity of 3 m/s. If the plate is maintained at 60°C, calculate the heat transfer per unit width of the plate. Assuming the length of the plate along the flow of air is 2 m. 7M

UNIT-V

9. (a) What are the limitations of the LMTD method? How is the ϵ -NTU method superior to the LMTD method? 7M
(b) A counter flow double pipe heat exchanger using superheated steam is used to heat water at the rate of 10500 kg/h. The steam enters the heat exchanger at 180°C and leaves at 130°C. The inlet and exit temperatures of water are 30°C and 80°C respectively. If $U=814 \text{ W/m}^2\text{C}$. Calculate the heat transfer area. What would be the increase in area if the fluid flows were parallel? 7M

(OR)

10. (a) What is condensation? How does it occur? 7M
(b) Water is boiled at a rate of 30 kg/h in a copper pan, 30 cm in diameter at atmospheric pressure. Estimate the temperature of the bottom surface of the pan assuming nucleate boiling conditions. 7M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) With diagram explain the Flag registers of 8086? 7M
(b) With neat diagram explain the architecture of 8085 microprocessor? 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 with example, the addressing modes of 8086? 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: 7M
(i) Asynchronous (ii) synchronous
(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 pro– microprocessor. 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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 Flynn's classification with neat diagrams? 7M
(b) Explain about COMA model of a multi processor with neat diagrams? 7M

(OR)

2. (a) Explain about Role of compilers? 7M
(b) Differentiate between Hardware parallelism and software parallelism? 7M

UNIT – II

3. Explain about memory bounded speedup model? 14M

(OR)

4. Explain about Mean performance with formulas? 14M

UNIT – III

5. Explain about Backplane BUS specification with neat diagram? 14M

(OR)

6. Explain about Reservations and Latency analysis for Non linear pipeline processors? 14M

UNIT – IV

7. Explain about Crossbar Switch design with neat diagram? 14M

(OR)

8. Explain about Multiport memory with neat diagram? 14M

UNIT-V

9. Explain about Multithreading issues and solutions? 14M

(OR)

10. Explain about Scalable Coherence Interface with neat diagram? 14M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R15) Supple. Examinations of October 2020
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) What are the commonly used compiler construction tools? Explain 7M
(b) Define token, pattern and lexeme. Give examples for each. 7M

(OR)

2. (a) Explain about Lexical Analysis Generator lex. 10M
(b) Discuss briefly about regular expressions. 4M

UNIT – II

3. (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

(OR)

4. (a) Construct the LR(0) items for the below grammar. 10M
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$
(b) Briefly explain about Parse generator yacc. 4M

UNIT – III

5. (a) Explain about S-Attributed definition and L-Attributed definitions. 7M
(b) Draw the annotated parse tree for 3*5 7M

(OR)

6. (a) Define implicit conversion and explicit conversion. Draw the widening conversions and narrowing conversions for primitive data types in java. 8M
(b) Write the rules for Type checking. 6M

UNIT – IV

7. Explain about different storage allocation strategies 14M
(OR)
8. (a) Explain about quadruples, triples, and indirect triples. 6M
(b) Convert the statement $x = y * -z + y * -z$ into quadruples, triples, and indirect triples. 8M

UNIT-V

9. (a) Write the Code generation algorithm 7M
(b) Explain about different characteristics of peephole optimization 7M
- (OR)
10. Write the three-address code and construct the DAG for the below program fragment. 14M
- ```
begin
 PROD := 0;
 I := 1;
 do
 begin
 PROD := PROD + A[I] * B[I];
 I := I + 1;
 end
 while I <= 20
end
```



**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA****B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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 Layers of Software Engineering? 7M  
(b) Discuss in detail Evolutionary Process Model? 7M  
(OR)
2. (a) Explain in detail A Generic Process Model? 7M  
(b) Discuss in detail phases of Unified Process? 7M

**UNIT – II**

3. (a) What are the different UML Models the supplement the Use Case? 7M  
(b) How to develop use case? Develop a Use Case diagram for Safe Home Security Function? 7M  
(OR)
4. (a) Explain in detail different Data Modeling Concepts? 7M  
(b) Discuss in detail Scenario-Based Modeling? 7M

**UNIT – III**

5. (a) Define Component? Discuss briefly how to design Class-Based Components? 7M  
(b) Explain in detail Software quality Guidelines and Attributes? Discuss Evolution of Software design? 7M  
(OR)
6. (a) Explain in detail about software Architecture? 7M  
(b) Discuss in detail Typical Task set for Component –Level when it is applied for an Object-Oriented System? 7M

**UNIT – IV**

7. (a) Briefly discuss about the Interface Design Evaluation Cycle? 7M  
(b) Explain Boundary Value Analysis in Testing. 7M  
(OR)
8. (a) Explain in detail Golden rules for Software Design? 7M  
(b) What are the Some General Issues Associated with Testing? Explain. 7M

**UNIT-V**

9. (a) Discuss in detail Software Configuration Management? 7M  
(b) How to Estimate cost for Maintenance? 7M  
(OR)
10. Write a short note on COCOMO Model? 14M

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA****B. Tech. V Sem. (R15) Supple. Examinations of October 2020*****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. (a) What are the different layers in the OSI Reference Model? Explain the functionalities of each Layer in brief. 7M  
(b) What is network hardware? Explain in detail with respect to transmission technology and scale of networks. 7M

(OR)

2. (a) With a neat sketch, explain TCP reference model. 7M  
(b) Explain in brief about wireless LANs 802.11. 7M

**UNIT – II**

3. (a) What are the various types of error detection methods? 7M  
(b) Explain flow control mechanism using sliding window protocol. 7M

(OR)

4. (a) Explain the design and implementation of Stop and Wait protocol. 7M  
(b) Explain about the data link layer switching in detail. 7M

**UNIT – III**

5. (a) What is Congestion? Explain the causes and effects of congestion. 7M  
(b) Write the Network Layer design issues in detail. 7M

(OR)

6. (a) With an example, explain the Distance Vector Routing. 7M  
(b) Draw IPV6 datagram format, mention the significance of each field. 7M

**UNIT – IV**

7. (a) Explain how TCP controls congestion. 7M  
(b) With a neat diagram, explain UDP datagram 7M

(OR)

8. (a) How does UDP differ from TCP? List the applications of UDP. 7M  
(b) Discuss in detail about the connection establishment and release in TCP. 7M

**UNIT-V**

9. (a) What is DNS? What resource records are associated with it? Explain 7M  
(b) Explain the need of Uniform Resource Locator in WWW. 7M

(OR)

10. (a) Define domain name system. Explain DNS message format. 7M  
(b) What is electronic mail? Describe in brief about sending and receiving e-mail. 7M

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. V Sem. (R15) Supple. Examinations of October 2020**  
**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. Enumerate the steps to install XAMPP and WAMP on windows. 14M  
(OR)
2. (a) What is a Web Server? 4M  
(b) Explain in detail about any two Web Servers and explain in detail. 10M

**UNIT – II**

3. (a) Write a Java Script to display numbers from 1 to 10. 7M  
(b) Write a Java Script to add two integers. 7M  
(OR)
4. Discuss in detail about Cascading Style Sheets with an example HTML code 14M

**UNIT – III**

5. (a) Write in detail about continue statement with an example. 7M  
(b) Explain in detail about file inclusion statements with an example 7M  
(OR)
6. Explain in detail about constructors and destructors with an example 14M

**UNIT – IV**

7. (a) Discuss in detail how to implement a session. 6M  
(b) Write in detail about for storing simple data types and complex data types in sessions. 8M  
(OR)
8. Explain in detail about working with date and time. 14M

**UNIT-V**

9. Differentiate between GET and POST with PHP Code. 14M  
(OR)
10. (a) Write PHP code to connect to a MySQL Database. 7M  
(b) How to validate form input? Discuss in brief 7M