Subject Code- 1501501 **R15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B.Tech 5th Semester Regular Examinations, 2017 – Model Paper
Sub: MECHANICS OF MATERIALS -II
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any five questions, choosing one question from each unit.

UNIT-I

1. At a point in a material subjected to two dimensional stress, one of the principal stresses is 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 are equal in magnitude. (14M)

Or

2. Determine the diameter of a bolt which is subjected to an axially pull of 12 kN together with a transverse shear force of 6 kN, when the elastic limit in tension is 300 N/mm^2 , factor of safety =3 and poison'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 (14M)

UNIT-II

3. A cylindrical shell 3 m long which is closed at the ends has an internal diameter of 1 m and a wall 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 $\frac{1}{m} = 0.3$ (14 M)

Or

4. (a) Derive Lame's equation. (7 M)
   (b) A hollow cylinder has an external diameter of 250 mm and thickness of the Wall is 50 mm. The cylinder is subjected to an internal fluid pressure =35MPa And external pressure =3.5MPa. Calculate the maximum and minimum Circumferential stresses and plot the variation of the same across the wall thickness. (7 M)

UNIT-III

5. (a) Derive from fundamentals, the expression for Euler's crippling load for a strut fixed at one end and pin jointed at the other. (7 M)
   (b) A cylindrical column 150 mm external diameter, 100 mm internal diameter and 7 m long are hinged at both ends. Calculate the (i) Euler's Crippling load
   (ii) Crippling load as given by Rankin's formula. E=80 GPa ,σ_c=550 MPa and Rankin's constant $\alpha=\frac{1}{1600}$. (7 M)

Or

6. (a) Derive Secant formula for columns under eccentric loading. (7 M)
   (b) Determine the ratio of strength of a solid steel column to that of a hollow column of internal diameter equal to $\frac{3}{4}$ of its external diameter. Both the columns have the same cross section, length and end conditions. (7 M)

UNIT-IV

7. (a) Sketch the core of a rectangular section and a circular section with salient values. (4M)
   (b)Determine the stress at all corners of a rectangular cross section 1200 mm* 800 mm due to a 100 kN compressive load acting at an eccentricity 60 mm with respect to both centroidal axes of the cross section in the first quadrant . (10 M)

Or

8. (a) Explain the following (a) Core of a section (b) Combined stresses (c) Eccentric loading (d) Slenderness ratio. (4 M)
   (b) A masonry dam of trapezoidal section is 10 m high. It has top width of 1m and bottom width of 7 m. 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 9 m. Specific weight of masonry is 20 kN/ m^3. (10 M)

UNIT-V

9. Find the centroidal principal moments of inertia of an unequal 'L' angle section 70*50*7 mm. (14 M)

Or

10. A cantilever beam consists of 90 mm * 60 mm*8 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 30^0 with respect to vertical. Determine the maximum stress at support section and also find the neutral axis of the section. (14M)

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B.Tech 5th Semester Regular Examinations, 2017 – Model Paper
Sub: GEO-TECHNICAL ENGINEERING – 2
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any FIVE Questions choosing One Question from each Unit
All questions carry Equal Marks

Unit – 1

1	a	Describe with a neat sketch how will you carry out the wash boring method of soil exploration. What are its merits and demerits?	7 Marks
	b	Explain the terms 'inside clearance' and 'outside clearance' as applied to a sampler. Why are they provided?	7 Marks
		Or	
2		What are the various steps considered in the planning of sub-surface exploration programme? Describe the standard penetration test. In what way is it useful in foundation design?	14 Marks

Unit - 2

3	a	Discuss Culmann's method for the determination of active earth pressure.	7 Marks
	b	A gravity retaining wall retains 12 m of a backfill, $\gamma = 17.7$ kN/m^3 $\varphi = 25°$ with a uniform horizontal surface. Assume the wall interface to be vertical, determine the magnitude and point of application of the total active pressure. If the water table is a height of 6 m, how far do the magnitude and the point of application of active pressure changed?	7 Marks
		Or	
4	a	What are the design criteria to be satisfied for the stability of a gravity retaining wall? Indicate briefly how you will ensure the same.	7 Marks
	b	A trapezoidal masonry retaining wall 1 m wide at top and 3 m wide at its bottom is 4 m high. The vertical face is retaining soil ($\varphi = 30°$) at a surcharge angle of 20° with the horizontal. Determine the maximum and minimum intensities of pressure at the base of the retaining wall. Unit weights of soil and masonary are 20 kN/m^3 and 24 kN/m^3 respectively. Assuming the coefficient of friction at the base of the wall as 0.45, determine the factor of safety against sliding. Also determine the factor of safety against overturning.	7 Marks

Unit - 3

5	a	Describe Terzaghi's theory of bearing capacity of shallow strip foundations. Define the three bearing capacity factors and give their values for '$\varphi = 0$' case.	7 Marks
	b	Compute the safe bearing capacity of a continuous footing 1.5 m wide, at a depth of 1.5 m, in a soil with $\gamma = 18$ kN/m^3, $c = 18$ kN/m^2, and $\varphi = 25°$. Terzaghi's factors of $\varphi = 25°$ are $N_c = 25$, $N_q = 12.5$, and $N_\gamma = 10$. What is the safe load per metre run if the factor of safety is 3?	7 Marks
		Or	
6	a	What is the function of a 'foundation'?	5 Marks
	b	What are the general considerations in the choice of the foundation type?	9 Marks

Unit - 4

7 a What is the basis on which the dynamic formulae are derived? Mention two well known dynamic formulae and explain the symbols involved. 5 Marks

b A reinforced cement concrete pile weighing 30 kN (including helmet and dolly) is driven by a drop hammer weighing 30 kN with an effective fall of 0.9 m. The average penetration per blow is 15 mm. The total temporary elastic compression of the pile, pile cap and soil may be taken as 18 mm. Coefficient of restitution 0.36. What is the allowable load on the pile with a factor of safety of 2? Use Hiley's formula. 9 Marks

Or

8 Design of friction pile group to carry a load of 3000 kN including the weight of the pile cap at a site where the soil is uniform clay to a depth of 20m, underlain by rock. Average unconfined compressive strength of the clay is 70 kN/m^2. The clay may be assumed to be of normal sensitivity and normally loaded, with liquid limit 60%. A factor of safety of 3 is required against shear failure. Compute the settlement of the group assuming the load to be transferred at 2/3 length of the pile. 14 Marks

Unit – 5

9 a Write brief critical notes on 'Taylor's Stability Number'. 6 Marks

b An embankment 10 m high is inclined at an angle of 36° to the horizontal. A stability analysis by the method of slices gives the following forces per running meter: Σ Shearing forces = 450 kN, Σ Normal forces = 900 kN and Σ Neutral forces = 216 kN. The length of the failure arc is 27 m. Laboratory tests on the soil indicate the effective values c' and φ' as 20 kN/m^2 and 18° respectively. Determine the factor of safety of the slope with respect to (*a*) shearing strength and (*b*) cohesion. 8 Marks

Or

10 An embankment 6m high has a slope of 1V:2H. The material of slope has $\varphi = 30°$, $c = 5$ kN/m^2 and $\gamma = 19$ kN/m^3. A trail slip circle has a radius of 8.8 m and its centre is at the same level as the top of the embankment. The slip circle passes through the toe. By the method of slices, find the factor of safety of the slope with respect to the slip circle. 14 Marks

Subject Code: 1501503 R15

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B.Tech 5th Semester Regular Examinations, 2017 – Model Paper
Sub: HYDROLOGY
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any FIVE Questions choosing One Question from each Unit
All questions carry Equal Marks

Unit-I

1. (a) Describe the hydrologic cycle with a neat sketch. 7M
   (b) The isohyets for a storm which occurred over a drainage basin of area 950 km^2 yielded the following information. 7M

Isohyets (mm)	85-75	75-65	65-55	55-45	45-35
Area b/n Isohyets in km^2	125	236	264	175	150

(OR)

2. (a) Discuss different types of rain gauges and explain float type rain gauge with a neat diagram? 7M
   (b) During a month rain gauge went out of order while the other three gauges in basin reported rainfalls of 107,89,120 mm. If the normal annual rainfalls for these three gauges are 1120,935,1200 mm respectively and the normal annual rainfall of the broken gauge is 978 mm. estimate the missing monthlyrainfall at the broken gauge. 4M
   (c) Explain the forms of precipitation. 3M

Unit-II

3. (a) Define evaporation and discuss the factors affecting evaporation in detail? 7M
   (b) A reservoir has a spread of water to an area of 15 km^2. The data represents the average values for the day has
   Water temperature =24°C ;
   Air temperature = 26°C ;
   Atmospheric pressure = 752 mm of Hg; wind velocity at 0.5 meters above ground level = 25.3 kmph ; relative humidity = 46%.
   Estimate the average daily evaporation from reservoir and the evaporation Volume for a period of one week using *Filtzerald's equation, Meyer's equation, Horton's equation.* 7M

(OR)

4. (a) Define Ø-index and W-index and bring out the difference between them with aneat sketch? 7M
   (b) A storm with a precipitation of 10 cm provided 5.8 cm direct runoff. Duration of rainfall was 16 hours and its time distribution is given below. 7M
   Estimate Ø-index of the storm.

Time (hr)	0	2	4	6	8	10	12	14	16
Cumulative rainfall (cm)	0	0.4	1.3	2.8	5.1	6.9	8.5	9.5	10

Unit-III

5. (a) The following are the ordinates for a flood hydrograph resulting from an isolated storm of 6 hours duration. 7M

Time (hr)	0	12	24	36	48	60	72	84	96
Ordinates of flood hydrograph (cumec)	10	15	40	80	60	50	25	20	10

(b) Explain Area velocity method of stream discharge measurement? 7M

(OR)

6. (a) What are the components of runoff with sketch representation of runoff Process. 7M

(b) Given below are the ordinates of a 4 hour unit hydrograph. Using this derive the ordinates of a 2 hour unit hydrograph for same catchment. 7M

Col 1	0	4	8	12	16	20	24	28	32	36	40	44
Col 2	0	20	80	130	150	130	90	52	27	15	5	0

Col 1 indicates time in hrs

Col 2 indicates ordinates of a 4 hour unit hydrograph

Unit- IV

7. (a) Route the following glood through a river reach for which the muskingum coefficient K and x are 22 hours and 0.25 respectively. At the time t=0, outflow discharge is 40 cumec. 7M

Time (hr)	0	12	24	36	48	60	72
Inflow (cumec)	40	65	165	250	240	205	170

(b) What are the methods of flood control, explain any two methods? 7M

(OR)

8. (a) A coffer dam is designed for a 25 year flood constructed. If it takes 5 year to complete the construction of main dam, what is the risk that the coffer dam may fail before the end of construction period? What return period in the design of cofferdam would have reduced the risk is 10%. 4M

(b) Derive the Muskingum routing equation and expression for the routing coefficient C_0,C_1,C_2. 10M

Unit- V

9. (a) Differentiate between the following 7M
   i. Aquitard and Aquifuge
   ii. Effluent stream and Influent stream
   iii. Specific retention and specific yield
   iv. Aquitard

(b) A well with a radius of 0.5meters, completely penetrates an unconfined aquifer of thickness 50 meters and k=30meters/day. The well is pumped so that the water level in the well remains at 40 meters above the bottom. Assuming that pumping has essentially no effect on water table at r=500 m, what is steady stage discharge. 7M

(OR)

10. (a) An unconfined aquifer has a thickness of 30 meters. A fully penetrating 20 cm diameter well in this aquifer is pumped at a rate of 35 lit/sec.The drawdown measured in two observation wells located at a distance of 10 and 100 meters from the well are 7.5 and 0.5 meters respectively. Determine the average hydraulic conductivity of the aquifer. At what distance from the well the drawdown is insignificant. 7M

(b) Explain how to determine specific yield using Recuperation test with aneat sketch. 7M

Subject Code: 1501504 **R15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003

B.Tech 5th Semester Regular Examinations, 2017- Model Paper

Sub: CONCRETE TECHNOLOGY

(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any FIVE Questions choosing One Question from each Unit.

All Questions carries equal marks

UNIT - I

1. Write short notes on the following cements (14 M)

a. Portland slag cement

b. White Portland cement

c. Low heat cement

d. Portland pozzolana cement

(OR)

2. Write a short notes on

a. Mineral admixtures (7M)

b. Chemical admixtures (7M)

UNIT II

3. Bring out the detailed classification of aggregates and explain each one of them briefly. (14M)

(OR)

4. Define workability? What are the factors affecting the workability of concrete? (14M)

UNIT III

5. a. Define modulus of elasticity and explain about factors affecting modulus of elasticity of concrete. (7M)

b. Write short notes on chemical attack of concrete. (7M)

(OR)

6. a. Explain the term efflorescence. (7M)

b. Explain about factors affecting the shrinkage and creep. (7M)

UNIT IV

7. a. What are the various factors affecting compressive strength of concrete. (7M)

b. Explain in detail about the Rebound Hammer test. (7M)

(OR)

8. What is meant by curing of concrete? Explain about different types of curing and their advantages? (14M)

UNIT V

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

b. Briefly discuss various methods of the mix design available in literature? (7M)

(OR)

10. Design a concrete mix of M35 grade for a water tight slab. Take a standard deviation of 500mpa. The specific gravities of coarse aggregate and fine aggregate are 2.63 and 2.68 respectively. The bulk density of coarse aggregate is 1610kg/m^3 and fineness modulus of fine aggregate is 2.72. A slump of 60mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using ACI method. Assume any missing data suitably. (14M)

Subject Code: 1501505 R15

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B.Tech 5th Semester Regular Examinations, 2017 – Model Paper
Sub: WATER SUPPLY ENGINEERING
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Answer any FIVE Questions choosing One Question from each Unit
All questions carry Equal Marks

UNIT – 1

1.) a.)Define water demand and explain briefly about different types of water demand?

b.) A 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.

(or)

2.) a.)Explain briefly about percapita demand and factors affecting percapita demand?

b.) The population of five decades from 1930 to 1970 are given below. Find out the population after one, two and three decades beyond the last known decade by using Geometrical increase method

Year	Population
1930	25000
1940	28000
1950	32000
1960	35000
1970	39000

UNIT – 2

3.) a.) Describe briefly about types of Intake towers?

b.) Explain briefly about characteristics of water?

(or)

4.) a.) Write short notes on waterborne diseases and its preventive measures?

b.) Describe briefly about water quality standards and impurities in water?

UNIT – 3

5.) a.) Explain briefly about the sedimentation tanks and design the continuous flow sedimentation tank?

b.) 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°c (Kinematic viscosity is $1.010*10^{-2}$ cm^{2}/sec)

(or)

6.) a.) The maximum daily demand at a water purification plant has been estimated as 12 million litres per day. Design the dimensions of a suitable sedimentation tank (fitted with mechanical sludge removal arrangements) for the raw supplies assuming a detention period of 8hours and the velocity of flow as 25cm/min

b.) Explain briefly about Deflouridation and Removal of Odours?

UNIT – 4

7.) a.) Describe briefly about principles and functions of Aeration?

b.) Explain briefly about water softening methods?

(or)

8.) a.) Write short notes on Rain water harvesting methods and its uses?

b.) Describe briefly about water pollution and its causes and effects?

UNIT – 5

9.) a.) Explain briefly about the design procedures for hardy cross and equivalent pipe methods?

b.) write short notes on principles of design of water supply in buildings?

(or)

10.) a.) Describe briefly about the house drainage and its different sanitary fittings?

b.) write a short notes in brief on scour valves, air valves, sluice valves and check valves?

Subject Code: 1501507 **R15**

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B.Tech 5th Semester Regular Examinations, 2017 – Model Paper
Sub: OPERATIONS RESEARCH
(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Note: Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks.

UNIT – I

1. Solve the following linear programming problem using graphical method

$$Maximize\ z = 5x_1 + 3x_2$$
$$Subject\ to \quad 3x_1 + 5x_2 \leq 15, \quad 5x_1 + 2x_2 \leq 10 \quad and \quad x_1, x_2 \geq 0$$

(OR)

2. Solve the following linear programming problem using Simplex method

$$Minimize\ z = x_1 - 3x_2 + 3x_3$$
$$Subject\ to \quad 3x_1 - 5x_2 + 2x_3 \leq 7, \quad 2x_1 + 4x_2 \geq -12$$
$$-4x_1 + 3x_2 + 8x_3 \leq 10 \quad and \quad x_1, x_2, x_3 \geq 0$$

UNIT – II

3. Solve the following linear programming problem using Dual Simplex method

$$Maximize\ z = -3x_1 - 2x_2$$
$$Subject\ to \quad x_1 + x_2 \geq 1, \quad x_1 + x_2 \leq 7, \quad x_1 + 2x_2 \geq 10 \quad x_2 \geq 3$$
$$and \quad x_1, x_2 \geq 0$$

(OR)

4. Consider the following linear programming problem.

$$Maximize\ z = 6x_1 + 8x_2$$
$$Subject\ to\ 5x_1 + 10x_2 \leq 60, \quad 4x_1 + 4x_2 \leq 40 \quad and \quad x_1, x_2 \geq 0$$

Solve the problem, if the R.H.S constants of constraint 1 and constraint 2 are changed from 60 and 40 to 40 and 20 respectively.

UNIT – III

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

	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. A department head has four subordinates and four tasks to be performed. The subordinates differ in efficiency and the tasks differ in their difficulty level. The estimation of time each man would take to perform each task in given in the matrix.

Tasks	*Man*			
	E	*F*	*G*	*H*
A	*20*	*28*	*19*	*13*
B	*15*	*30*	*16*	*28*
C	*40*	*21*	*20*	*17*
D	*21*	*28*	*26*	*12*

How should the task be allocated one to a man, so as to minimize the total man hours.

UNIT – IV

7. There are eight jobs, each of which has to go through the machines A and B in the order AB. Processing times in hours are given as follows:

Job	1	2	3	4	5	6	7	8
Machine A	8	10	10	06	12	1	5	9
Machine B	7	4	3	9	11	6	4	2

Determine a sequence of these jobs that will minimize the total elapsed time.

(OR)

8. Solve the following travelling sales man problem. The distance matrix is given in table below.

To / from	A_1	A_2	A_3	A_4	A_5
A_1	-	2	5	7	1
A_2	6	-	3	8	2
A_3	8	7	-	4	7
A_4	12	4	6	-	5
A_5	1	3	2	8	-

UNIT – V

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

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

(OR)

10. An organization is planning to diversify 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 subjects to the availability of the found. The different possible alternatives and their investment (in crores of rupees) and present worth of returns during the useful life (in crores of rupees) of each of these plants are summarized in table below. 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 will maximize the corresponding sum of the present worth of returns.

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	3
3	2	18	3	18	2	7
4	4	28	4	21	--	--

Model Question Paper

K S R M College of Engineering (Autonomous), KADAPA – 516 003

B.Tech (R 15) 5th Semester Regular Examinations, 2017 (RA)

GEO – TECHNICAL ENGINEERING – 1

(Civil Engineering)

Time: 03:00 Hrs. **Max. Marks: 70**

Note: 1. Answer FIVE questions, choosing ONE question from each UNIT
2. ALL questions carry EQUAL marks

Unit - 1

1 a Derive the relationship among dry density, bulk density and water content. 7 Marks

b Determine the IS classification of soil and percentage of materials present in. 7 Marks

IS Sieve	4.75 mm	2.00 mm	1.00 mm	600 μ	425 μ	300 μ	150 μ	75 μ
Wt. retaining in 'g'	10	50	340	250	150	80	70	50

Or

2 a Distinguish between 7 Marks
i. Flow index and toughness index
ii. Air content and percentage air voids

b A fully saturated clay sample has a mass of 130 g and has volume of 64 cm^3. The sample mass is 105 g after drying in oven. Assuming that volume does not change during drying. Determine specific gravity of soil solids, void ratio, porosity and dry density. 7 Marks

Unit - 2

3 a Describe the factors affecting permeability of soils. 7 Marks

b Explain about the pumping out test in unconfined and confined aquifers with a neat sketch. 7 Marks

Or

4 a Explain about quick sand condition with a neat sketch. 7 Marks

b Explain about the applications of flow nets. 7 Marks

Unit - 3

5 a Distinguish between Boussinesq and Westergaard theories of stress distribution in soils. 7 Marks

b A water tank has a circular foundation of 10 m diameter. If the total weight of tank with foundation is 2000 tons, calculate vertical stress at a depth of 2.5 m centrally below the foundation. 7 Marks

Or

6 a Describe the construction procedure of Newmark's influence chart. 7 Marks

b What is meant by pressure bulb? What is its significance? 7 Marks

Unit - 4

7 a Distinguish between standard and modified proctor compaction tests. 7 Marks

b The following data is obtained in IS light compaction test: 7 Marks

Water content (%)	2.0	4.2	5.5	6.6	7.5	10.0
Compacted density (g/cc)	2.02	2.08	2.17	2.20	2.21	2.20

Determine OMC and Maximum Dry Density. Also draw zero air voids line.

Or

8 a Derive differential equation for one dimensional consolidation as per Terzaghi's theory. 7 Marks

b A 20 mm thick consolidated sample of clay reached 30 % consolidation in 20 minutes with double drainage. How long would it take for the clay layer from which sample is obtained, to reach 50 % consolidation? The clay layer is 5 m thick and has single drainage. 7 Marks

Unit – 5

9 a Explain Mohr-Coulomb theory of shear strength of soils 7 Marks

b A specimen of sandy clay failed at a stress of 250 kN/m^2 in unconfined compression test. The failure plane was observed to make an angle of 35° with longitudinal axis of specimen. Determine shear parameters of soil. 7 Marks

Or

10 a Discuss merits and demerits of tri-axial test over direct shear test. 7 Marks

b The following observations were made a sample of soil in tri-axial testing. 7 Marks

Test No.	Cell pressure (kN/m^2)	Axial stress at failure (kN/m^2)
1	300	875
2	400	1160
3	500	1460

Plot Mohr circles of stress and determine shear parameters.

Code:1502502

K.S.R.M COLLEGE OF ENGINEERING, KADAPA

(AUTONOMOUS)

MODEL QUESTION PAPER

FOUR YEAR B. TECH (R15) DEGREE EXAMINATIONS, JANUARY 2021

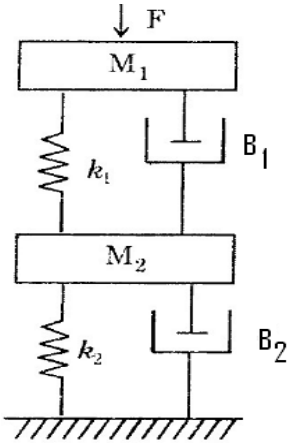
Fifth Semester Examination

Sub: Control Systems

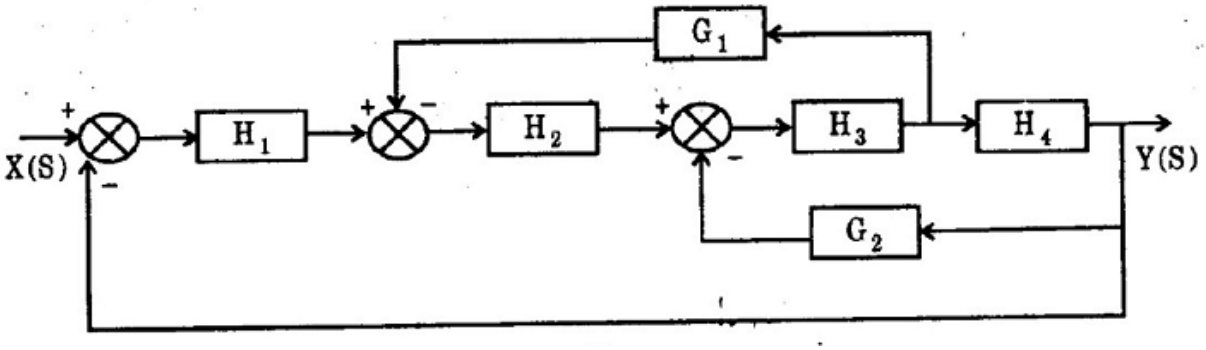
Time: 3 Hrs. **Max Marks : 70**

Note : Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks. UNIT - I

1.a) Explain the governing equations of the following mechanical systems used in vehicle suspension.



b)Using block diagram reduction technique finds the transfer function for the system shown in below Figure.



(OR)

2.a) State and explain the Mason's gain formula.

b) Derive the transfer function and develop the block diagram of Armature controlled DC servo motor

3. Derive the expressions for all the time domain specifications.

(OR)

4.a) Discuss the effect of PD and PI on performance o f a control system.

b) A unity feed back system is characterized by an open loop transfer function G(s)= K/S(S+5). Determine the gain K so that the system will have adamping factor of 0.7. For this value of K determine the natural frequency of the system. Itis subjected to a unity step input. Obtain the closed loop response of the system in time domain.

5. a) Explain stability of a system based on location of roots in S- plane.

b) Test the stability of the system with the following characteristic equation by Routh's test $s^6+ 2s^5+ 8s^4+ 20s^2+ 16s + 16 = 0$

(OR)

6. A unity feedback system has an open loop function G (s) =K/S(S^2+3S+10).make a rough 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. a) Derive the expressions for frequency domain specifications of a second order system.

b) Given the open loop transfer function of a unityfeedback system G(s) = 1/S(S+3)(1+2S). Draw the Bode plot and measure the frequency at which the magnitude is 0 dB.

(OR)

8. Draw the Nyquist plot for the system whose open loop transfer function is G(S)H(S) = K/S(S+2)(S+10). Determine the range of K for which closed loop system is stable.

9. Consider a unity feedback system with open loop transfer function G(s)= K/S(1+S)(2+S), design a suitable compensator so that the compensated system has,

Kv = 10 sec^{-1}

Phase margin = 40^0

Gain margin ≤12 db

(OR)

10. A unit feedback system has an open loop transfer function G(s) = K/S(S+1)(0.2S+1). Design a phase lag compensator to meet the following specifications.

Velocity error constant = 8

Phase margin ≥40^o

Code:1502503

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

MODEL QUESTION PAPER

FOUR YEAR B. TECH (R15) DEGREE EXAMINATIONS, JANUARY 2021

Fifth Semester Examination

Sub: Power Electronics

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

Note : Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks.

UNIT-I

1. a) Explain the static V-I characteristics of SCR. (8 marks)

b) An SCR has a $\frac{dv}{dt}$ rating of 250 V/μsec and $\frac{di}{dt}$ rating of 120 A/ μsec. If it operates on a 300V d.c source and load resistance of 10Ω, determine suitable value of the snubber circuit. (6 marks)

OR

2. a) Draw and explain the necessity of static equalizing circuit for series connected SCRs. Derive relations Used for determining the value of shunt resistor R. (8marks)

b) Sketch switching characteristics of a thyristor during its turn –on process. Explain briefly the nature of these curves . (6 marks)

UNIT-II

3. a) with the help of a circuit diagram and wave forms, explain the operation of a single – phase fully Controlled bridge rectifier feeding R-L load .Derive an expression for the D.C output voltage. (8mark)

b) A 1-Φ fully controlled rectifier is operated with a resistive load of 10Ω, the source voltage is 230V 50Hz.For the firing angle of $\mathbf{60^0}$ **,** determine i) Average load voltage ii) average and RMS load current iii) form factor and ripple factor. (6 marks)

OR

4. a) Explain the operation of a 3-Φ half controlled bridge converter with R-load. Derive an expression for its average output voltage. (10 marks)

b) Bring out the detailed comparison between circulating and non –circulating current mode of dual converter (4 marks)

UNIT – III

5. a) with the help of circuit diagram and wave forms , explain the operation of 1-Φ A.C voltage controller Feeding R-load. Derive the expression for the R.M.S value of output voltage. (8 marks)

b) What is an ac voltage controller? List some of its industrial applications. Enumerate its merits and demerits. (6 marks)

OR

6. a) Explain the operation of 1-Φ to 1-Φ step-down cyclo converter of bridge configuration with R-L load And draw relevant waveforms for $\mathbf{f_0 = f_s / 4}$. (7 marks)

b) Explain the operation of 1-Φ to 1-Φ step-up cyclo converter of Mid-Point configuration with R-Load And draw relevant waveforms for $\mathbf{f_0 = 4 * f_s}$ (7 marks)

UNIT-IV

7. a) Explain the operating principle of Basic chopper. Derive an expression for its average output voltage. (8 marks)

b) Explain the various control strategies employed for control of output voltage of chopper. (6 marks)

OR

8. a) Explain Two – quadrant operation of chopper. (8 marks)

b) A step-up chopper has input voltage of 220V and output voltage of 660V.If the conducting time of thyristor –chopper is 100μsec,compute the pulse width of output voltage . In case output – voltage pulse width is halved for constant frequency operation, find the average value of new output voltage. (6 marks)

UNIT-V

9. a) Draw and explain operation of a current source inverter. (7 marks)

b) Explain the operation of McMurray bridge inverter. (7marks)

OR

10. a)Discuss the principle of working of a single phase bridge inverter. (6marks)

b) Explain the space vector modulation technique. (8marks)

Code:1502504

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

MODEL QUESTION PAPER

FOUR YEAR B. TECH (R15) DEGREE EXAMINATIONS, JANUARY 2021

Fifth Semester Examination

Sub:POWER SYSTEMS – II

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

Note : Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks. UNIT - I

UNIT-I

1. Derive the expressions for sending end voltage and current relations in terms of receiving end voltage and current for a long transmission line using rigorous method and hence evaluate the ABCD constants
   10M

OR

2. A 132 kV overhead transmission line has the following line constants: A=D=0.99+j0.0052, B = 25.08+j65.35 Ω, C = $j4 \times 10^{-4}$. Calculate sending end voltage, current, percentage regulation, transmission efficiency of line if the load delivered at the receiving end is 45MVA at 0.8 p.f lagging.
   10M

UNIT-II

3. a) Develop the circuit model of a synchronous machine. 6M
   b) The per unit impedance of a 25MVA, 6.6kV generator is 1.5pu. Then determine the per unit impedance if the base values changed to 50MVA and 13.2kV.
   4M

OR

4. a) Explain impedance diagram and reactance diagrams 5M

   b) The ratings of a three phase power system shown in Fig.1. are given below

   G : 60 MVA 20kV X=9%

   T1: 50MVA 20/200kV X=10%

   T2: 50MVA 200/20kV X=10%

   M: 43.2 MVA 18kV X=8%

   Line: 200kV Z= 120+j200 Ω

   Draw the impedance diagram showing all impedances in per unit on a 100MVA base.

   Choose 20 kV as the voltage base for generator 5M

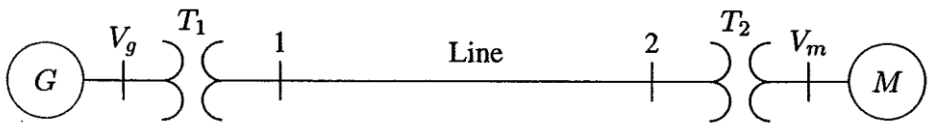


Fig.1

UNIT-III

5. A 3-phase 5 MVA, 6.6 kV generator with a reactance of 8% is connected to a feeder of series impedance (0.12+j0.48) Ω/ph/km. The transformer is rated at 3 MVA, 6.6 kV/33 kV and has a reactance of 5%. Determine the fault current supplied by the generator operating under no-load, with a voltage of 6.9 kV when a 3-Φ symmetrical fault occurs at a point 15 km along the feeder.

10M

OR

6. a) Explain bus bar reactors with a neat sketch 5M

   b) Explain the significance of Thevinin's theorem in fault calculations with an example. 5M

UNIT-IV

7. Show that the fully transposed mutually coupled transmission line can be observed in decoupled form in it's sequence circuit.

10M

OR

8. A synchronous generator is rated 25MVA, 11kV. It is star connected with the neutral point solidly grounded. The generator is operating at no-load at rated voltage. Its reactance's are $X''=X_2=0.20$ and $X_0=0.08$ pu. Calculate the symmetrical sub transient line currents for: (a) Single line to ground fault (b) Double line fault (c) Double line to ground fault and (d) Symmetrical 3 phase fault. Compare these currents and comment. 10M

UNIT-V

9. a) Derive expressions for earthing resistance of (i) hemispherical electrode (ii) driven rod. 5M

   b) A wire of length 3m and radius 0.25 cm is buried in a soil of resistivity 100 Ω-m. Find the earthing resistance if (i) wire is buried at surface of earth (ii) wire is buried at 0.5m depth (iii) wire is buried at infinite depth. 5M

OR

10. Explain resistance and reactance grounding. 10M

Code:1502505

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

MODEL QUESTION PAPER

FOUR YEAR B. TECH (R15) DEGREE EXAMINATIONS, NOVEMBER 2017

Fifth Semester Examination

ELECTRICAL MACHINES-III

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

Note : Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks. UNIT - I

UNIT-I

1. (a) Explain the differences between stationary armature and rotating armature? What are the advantages of rotating armature over stationary armature?

   (b) Derive the expression for pitch factor and breadth factor?

(OR)

2. A 6.6 KV, 3-Φ, 50 Hz, Y-connected alternator give the following data for open circuit, short circuit and full load zero power factor tests.

If in Amps	3.20	5.00	7.50	10.00	14.00
Ef in KV	3.10	4.90	6.60	7.50	8.24
Isc in Amps	500	778	1170	---	---
ZPF terminal Voltage in KV	---	1.85	4.24	5.78	7.00

Per phase armature resistance is 0.2 Ω. Calculate the voltage regulation at full load current of 500A, 0.8 p.f lagging by the following methods.

(i) emf method (ii) mmf method (iii) zpf method

UNIT-II

3. (a) Describe the determination of X_d & X_q from slip test of salient pole alternator?

   (b) Derive an expression for finding regulation of salient pole alternator using two reaction theory? Draw its phasor diagram?

(OR)

4. (a) Derive the expressions for power developed by salient pole synchronous machine and hence explain the power angle characteristics?

   (b) A 2 MVA, 3-Φ, Y-connected, 4-pole, 750 RPM alternator operating on 6000V bus bars. Xs is 6 Ω/phase. Find synchronizing power and corresponding torque for full load 0.8 p.f lagging.

UNIT-III

5. (a) What is infinite bus? What are the operating characteristics of an alternator connected to an infinite bus?

   (b) Two Y- connected alternators supply a load of 1500 KV at 0.8 p.f lagging and share the load equally. The excitation of second machine is adjusted so that it is supplying 60 A at a lagging power factor. The synchronous impedances are (0.4+j12) Ω/phase. Find current, p.f, induced emf and load angle of each machine. Terminal voltage is 6.6 KV.

(OR)

6. What are the various methods of synchronizing alternators? Explain any two methods?

UNIT-IV

7. (a) Explain the different methods of starting of synchronous motors?

   (b) What is hunting? Why it is essential to suppress the hunting?

(OR)

8. (a) Explain synchronous condenser?

   (b) A 220V, 3-Φ, Y-connected synchronous motor has a reactance of 0.22 Ω/phase and a synchronous reactance of 2.4 Ω/phase. The motor is operating at 0.6 p.f leading with a line current of 180 A. determine the value of generated emf?

UNIT-V

9. Explain briefly constructional features of 1-Φ motors and also explain principle of operation of 1-Φ induction motor based on cross field and double field revolving theory?

(OR)

10. With neat diagram explain the construction and working of variable reluctance motor. Also explain its static and dynamic characteristics?

Code: 1503501

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

III-I semester (R15) Regular Examinations - JAN-2021

HEAT TRANSFER

(Mechanical Engineering)

MODEL QUESTION PAPER

Time: 3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit

All Questions carry equal marks

Unit-I

1. a) Derive an expression for critical thickness of insulation for cylinder. (6marks)

b) The inside surface of a hollow sphere is electrically heated with a constant heat flux of 1.5 X 10^4 w/m^2. The outer surface is exposed to the ambient fluid at a temperature of 60^0C with a heat transfer coefficient of 50 w/m^2k. The thermal conductivity of the material is 20 w/mk. If the inner radius is 40 mm and the outer radius is 60 mm, determine the inner and outer surface temperatures of sphere. (8marks)

(OR)

2. a) Show that the temperature distribution in a solid cylinder of radius R with uniform heat generation of q_g W/m^3 is given by $\{(T - T_w) / (T_0 - T_w)\} = 1 - (r/R)^2$ where T_w is the surface temperature and T_0 is the centre temperature. (7marks)

b) The resistivity of a stainless steel wire of 3mm diameter is 70 micro ohm cm. The length of the wire is 150 cm. The outer surface temperature of the wire is maintained at 160^0C when a current of 250 A is passed through the wire. Calculate the centerline temperature of the wire. (7marks)

Unit-II

3. a) Derive equation for lumped heat capacity analysis? (7marks)

b) A stainless steel rod of outer diameter 1 cm originally at a temperature of 320^0C is suddenly immersed in a liquid at 120^0 C for which the convective heat transfer coefficient is 100 w/m^2k. Determine the time required for the rod to reach a temperature of 200^0C. ρ = 8238 kg/m^3, C = 468 j/kg, k = 13.4 w/mk

(7marks)

(OR)

4. a) Derive an expression for the temperature distribution in a straight rectangular fin of uniform cross-section for the case of a long fin. (7marks)

b) Circumferential aluminum fins (k = 200 w/mk) of rectangular profile 1.5 cm wide X 1.00 mm thick are fitted onto a 2.5 cm diameter tube. The fin base temperature is 170^0C and the ambient fluid temperature is 25^0C. Estimate the heat loss per fin. The heat transfer coefficient h may be taken as 130 w/m^2k. (7marks)

PTO

Unit-III

5. a) State and explain the reciprocity theorem. (4marks)

b) Two very large parallel planes with emissivity 0.3 and 0.8 exchange radiative energy transfer. To determine the percentage reduction in radiative energy transfer. When a polished aluminum radiation shield ($\epsilon = 0.04$) is placed between them. (10 marks)

(OR)

6. a) Define radiation intensity. Prove that the intensity of radiation is given by $I_b = E_b / \pi$ (7marks)

b) Derive Stefan Boltz man law $E = \sigma T^4$ (7marks)

Unit-IV

7. a) What is the physical significance of Groshoff number with reference to heat transfer by natural convections? What is Raleigh number? (4marks)

b) Calculate the convective heat loss from a radiator 0.5 m wide and 1 m high maintained at a temperature of 84^0C in a room at 20^0C. Treat the radiator as a vertical plate. (10marks)

(OR)

8. a) Distinguish between Bulk mean temperature and Film temperature. (4marks)

b) Air at 20^0C and 1 atmosphere flows over a flat plate at 35 m/sec. The plate is 75cm long and is maintained at 60^0C. Calculate the heat transfer from the plate per unit width of the plate. Also calculate the turbulent boundary layer thickness at the end of the plate assuming it to develop from the leading edge of the plate. (10marks)

Unit-V

9. a) Derive an expression for the mean temperature of a parallel flow heat exchanger. (7marks)

b) A heat exchanger is required to cool 55000 kg/hr of alcohol from 66^0C to44^0C using 40000 kg/hr of water entering at 5^0C. Calculate the surface area required for counter flow exchanger. Take U = 580 w/m^2k, C_p for water 4180 j/kgC, C_p for alcohol = 3760 j/kgC. (7marks)

(OR)

10. a) what is boiling and types of boiling. Explain clearly regimes of pooling boiling. (7marks)

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. (7marks)

Code: 1503502

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

B.Tech V semester (R15) Regular Examinations, JANUARY 2021

Design of machine elements-1

(Mechanical Engineering)

MODEL QUESTION PAPER

Time:3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit

All Questions carry equal marks

1. (a) Explain design process in design?
   (b) Calculate the diameter of the solid shaft to transmit 50 KW at 180 rpm, If the angle of twist in a length of 4 m is not to exceed 0.4^0 .the allowable stress in the material is 70 MPa and Modulus of rigidity is 84 GPa.

(OR)

2. A bolt is subjected to an axial force of 10000 N with a transverse shear force of 5000N. Find the diameter of the bolt required according to
   i) Max.Principal stress theory. ii) Max. Shear stress theory
   iii) Max. Principal strain theory. iv) Max. Strain energy theory.
   v) Max. Distortion energy theory.

3 (a) Explain Soderberg Method
   (b) A 20 KN tensile load acts on the following members. Considering stress concentration. Calculate the maximum stress induced in each member.
   i) A stepped shaft of diameter 50 mm & 25 mm with fillet radius 5mm
   ii) A rectangular plate 60 mm wide and 10 mm thick with a transverse hole of 12 mm diameter.

(OR)

4 A simply supported beam has a concentrated load at the center which fluctuates from a value of P to **4P**. The span of the beam is 500 mm and its cross section is circular with a 60 mm. Taking for the beam material an ultimate stress of 700 MPa, A yield stress 500 MPa. Endurance limit of 330 MPa for a reversed bending, and factor of safety of 1.3, Calculate the maximum value of P. Take a size factor of 0.85, fatigue stress concentration factor of 1.0 and a surface finish factor of 0.9.

5. (a) Explain types of welded joints
   (b) A plate 100 mm wide and 12.5 mm thick is to be welded to another plate by means of parallel fillet welds .The plates are subjected to welded load of 50 KN . Find the length of the weld so that maximum stress does not exceed 56 MPa consider the joint first under static loading and then under fatigue loading.

(OR)

6 (a) Explain About Bolts of Uniform Strength.
   (b) Determine the size of the bolts and the cross section of the arm of the bracket which is rectangular as shown in fig. if it carries of a load of 12 KN. The material of the bracket and the bolts is same for which the safe stresses can be assumed as 70, 50 and 105 MPa in tension, shear and compression respectively.

7 A shaft is supported by two bearings placed 1m apart .A 600 mm diameter pulley is mounted at a distance of 300 mm to the right of left hand bearing and this drives a pulley directly below it with the help of belt having maximum tension of 2.25 KN. Another pulley 400mm diameter is placed 200 mm to the left of right hand bearing and is driven with the help of electric motor and belt, which is placed horizontally to the right. The angle of contact for both the pulleys is 180^0 and $\mu=0.24$. Determine the suitable diameter for a solid shaft, allowing working stress of 63 MPa in tension and 42 MPa in shear for the material of shaft. Assume that the torque on one pulley is equal to that on the other pulley

OR

8 A solid circular shaft is subjected to a bending moment of 3000 N-m and a torque of 10000 N-m. The shaft is made of 45 C8 steel having ultimate tensile strss of 700 MPa and a ultimate shear stress of 500 MPa. Assuming a factor of safety as 6, determine the diameter of shaft

9 (a) Explain types of Keys?
(b) Design a clamp coupling to transmit 30 KW at 100 rpm, the allowable shear stress for the shaft and key is 40 MPa and the number of bolts connecting the two halves are 6.The permissible tensile stress for the bolts is 70 MPa. The coefficient of friction between the muff and shaft surface may be taken as 0.3.

OR

10 Sketch and explain design procedure for Sleeve and cotter joint

Code: 1503503

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

B.Tech V semester (R15) Regular Examinations, JAN 2021

MACHINE TOOLS

(Mechanical Engineering)

MODEL QUESTION PAPER

Time:3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit
All Questions carry equal marks

1. List out the operations performed on a Lathe and explain any four operations with a neat sketch

(OR)

2. Explain with Schematic diagram the principle of thread cutting on a lathe

3 (a) Define cutting speed, Feed, Depth of cut in a Shaper 6M
(b) Explain the various parts of a standard shaper with a neat sketch 8M

(OR)

4 (a) Explain the working principle of planer with a neat sketch 4M
(b) Explain the various parts of a Double housing planer with a neat sketch 10M

5. List out the operations performed on a drilling machine and explain any four operations with a neat sketch

(OR)

6 Explain Jig Boring machine with a neat sketch

7 Name and describe the principal parts of a horizontal milling machine with a neat sketch

(OR)

8 Explain the working mechanism of universal dividing head with a neat sketch

9(a) With a neat sketch explain the principal parts of a Tool and Cutter Grinder 8M
(b)Write a short note on wheel truing and wheel dressing 6M

(OR)

10 (a) How are broaches classified. With a neat sketch explain the working principle of Horizontal Continuous Broaching Machine 8M
(b) Describe the process of Honing with a neat sketch 6M

Code: 15033103

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

B.Tech Vsemester (R15) Regular Examinations, JAN-2021

Dynamics of Machinery-I

(Mechanical Engineering)

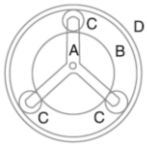
MODEL QUESTION PAPER

Time:3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit
All Questions carry equal marks

Unit-I

1. (a) What do you understand by 'gear train'? Discuss the various types of gear trains.
   (b) In an epicyclic gear of the 'sun and planet' type shown in Fig., the pitch circle diameter of the internally toothed ring is to be 224 mm and the module 4 mm. When the ring D is stationary, the spider A, which carries three planet wheels C of equal size, is to make one revolution in the same sense as the sun wheel B for every five revolutions of the driving spindle carrying the sun wheel B. Determine suitable numbers of teeth for all the wheels.



(OR)

2. (a) How the velocity ratio of epicyclic gear train is obtained by tabular method?
   (b) In a reverted epicyclic gear train, the arm A carries two gears B and C and a compound gear D - E. The gear B meshes with gear E and the gear C meshes with gear D. The number of teeth on gears B, C and D are 75, 30 and 90 respectively.Find the speed and direction of gear C when gear B is fixed and the arm A makes 100 r.p.m. clockwise.

Unit-II

3. (a) Obtain an expression for the length of a belt in an open belt drive.
   (b) Two parallel shafts whose centre lines are 4.8 m apart, are connected by open belt drive. The diameter of the larger pulley is 1.5 m and that of smaller pulley 1 m. The initial tension in the belt when stationary is 3 kN. The mass of the belt is 1.5 kg / m length. The coefficient of friction between the belt and the pulley is 0.3. Taking centrifugal tension into account, calculate the power transmitted, when the smaller pulley rotates at 400 r.p.m.

(OR)

4. **(a)** Describe with a neat sketch the working of a centrifugal clutch.
   (b) A single dry plate clutch transmits 7.5 kW at 900 r.p.m. The axial pressure is limited to 0.07 N/mm^2. If the coefficient of friction is 0.25, find **1.** Mean radius and face width of the friction lining assuming the ratio of the mean radius to the face width as 4, and **2.** Outer and inner radii of the clutch plate

.Unit-III

5. (a) Distinguish between brakes and dynamometers.
   (b) A band brake acts on the 3/4th of circumference of a drum of 450 mm diameter which is keyed to the shaft. The band brake provides a braking torque of 225 N-m. One end of the band is attached to a fulcrum pin of the lever and the other end to a pin 100 mm from the fulcrum.If the operating force is applied at 500 mm from the fulcrum and the coefficient of friction is 0.25,find the operating force when the drum rotates in the **(a)** anticlockwise direction, and **(b)** clockwise direction.

(OR)

6. (a) Explain with neat sketch the Torsion Dynamometer.

. (b) A car moving on a level road at a speed 50 km/h has a wheel base 2.8 meters, distance of C.G. from ground level 600 mm, and the distance of C.G. from rear wheels 1.2metres. Find the distance travelled by the car before coming to rest when brakes are applied,**1.** to the rear wheels, **2.** to the front wheels, and **3.** to all the four wheels. The coefficient of friction between the tyres and the road may be taken as 0.6

Unit-IV

7. (a) Explain the turning moment diagram of a four stroke cycle internal combustion engine.

(b) The turning moment diagram for a multi cylinder engine has been drawn to a scale 1 mm = 600 N-m vertically and 1 mm = 3° horizontally. The intercepted areas between the output torque curve and the mean resistance line, taken in order from one end, are as follows : + 52, – 124, + 92, – 140, + 85, – 72 and + 107 mm2, when the engine is running at a speed of 600 r.p.m. If the total fluctuation of speed is not to exceed ± 1.5% of the mean, find the necessary mass of the flywheel of radius 0.5 m.

(OR)

8. A punching press is driven by a constant torque electric motor. The press is provided with a flywheel that rotates at maximum speed of 225 r.p.m. The radius of gyration of the flywheel is 0.5 m. The press punches 720 holes per hour; each punching operation takes 2 second and requires 15 kN-m of energy. Find the power of the motor and the minimum mass of the flywheel if speed of the same is not to fall below 200 r. p. m.of the mean speed. Assume that the motor supplies energy to the machine at uniform rate.

Unit-V

9. (a) Explain the working principle of centrifugal governer ?

(b) The arms of a Porter governor are each 250 mm long and pivoted on the governor axis. The mass of each ball is 5 kg and the mass of the central sleeve is 30 kg. The radius of rotation of the balls is 150 mm when the sleeve begins to rise and reaches a value of 200 mm for maximum speed. Determine the speed range of the governor. If the friction at the sleeve is equivalent of 20 N of load at the sleeve, determine how the speed range is modified.

(OR)

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

(b) A Hartnell governor having a central sleeve spring and two right-angled bell crank levers moves between 290 r.p.m. and 310 r.p.m. for a sleeve lift of 15mm. The sleeve arms and the ball arms are 80 mm and 120 mm respectively. The levers are pivoted at 120 mm from the governor axis and mass of each ball is 2.5 kg. The ball arms are parallel to the governor axis at the lowest equilibrium speed.

Determine : **1.** loads on the spring at the lowest and the highest equilibrium speeds, and
2. stiffness of the spring.

Code: 1503505

K.S.R.M COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B.Tech. V semester (R15) Regular Examinations
Thermal Engineering II
(Mechanical Engineering)

MODEL QUESTION PAPER

Time: 3 hrs **Max Marks: 70**

Answer Five questions, selecting one Question from each Unit
All Questions carry equal marks

Unit-I

1. (a) What are the effects of operating conditions on the Rankine efficiency? (6M)

   (b) Saturated steam at 18 bar abs. enters the turbine of a steam power plant and expands to a condenser pressure of 0.8 bar. Determine the Rankine efficiency. (8M)

(OR)

2. (a) What are the advantages of a regenerative feed heating in steam power cycle? (4M)

   (b) A steam turbine receives super-heated steam at a pressure of 15 bar and 200^0C. The exhaust pressure is 0.07 bar and expansion of steam takes place isentropically. Calculate the (i) heat supplied (ii) heat rejected (iii) net work done (iv) Thermal Efficiency (v) Net Power, if mass flow rate of steam is 150 kg/sec. (10M)

Unit-II

3. (a) Explain the working of Babcock & Wilcox Boiler with neat sketch. (7M)

   (b) How much air is used/kg of coal burnt in a boiler having chimney of 35 m height to create a draught of 20 mm of water, when the temperature of flue gas in the chimney is 370^0C and the boiler house temperature is 34^0C. Does this chimney satisfy the condition of maximum discharge? (7M)

(OR)

4. (a) What do you understand by the term "Boiler Draught"? What are the various types of draughts used in usual practice? (4M)

   (b) The steam used by a turbine is 5.4 Kg/KW-hr at a pressure of 50 bar and at a temperature of 350^0C. The efficiency of boiler is 82% with feed water at 150^0C. If calorific value of coal is 28100 KJ/Kg, find the quantity of coal to be burnt to produce KW-hr energy. (10M)

Unit-III

5. (a) Discuss the process of super saturation in steam nozzles with the help of Enthalpy- Entropy diagram. (7M)

   (b) Steam at a pressure of 10 bar and 0.9 dry discharges through nozzle having throat area of 450 mm^2. If the back pressure is 1 bar, find (i) final velocity of the steam (ii) cross- sectional area of the nozzle at exit for maximum discharge. (7M)

(OR)

6.	(a)	Derive an expression for velocity of flow through a nozzle.	(4M)
	(b)	Steam at a pressure of 15 bar and 300^0C is expanded in a nozzle to 1 bar. If the frictional loss in the nozzle is 12% of the total heat drop, calculate the mass of steam discharged when the exit diameter of nozzle is 15 mm.	(10M)

Unit-IV

7.	(a)	Give comparison between impulse and reaction turbine.	(6M)
	(b)	The rotor of an impulse turbine is 60 cm in diameter runs at 9600 rpm. The nozzles are at 20^0 to the plane of the wheel and the steam leaves at 600 m/sec. The blade outlet angle is 30^0 and the friction factor is 0.8. Determine the power developed and diagram efficiency.	(8M)

(OR)

8.		The following particulars refer to a stage of a parson's reaction turbine, comprising one ring of fixed blades and one ring of moving blades. Mean diameter of blade ring=70 cm, RPM=3000, Steam velocity at exit of blades =160 m/s, Blade outlet angle=20^0, Steam flow through blades=7 kg/s. Draw a neat velocity diagram and find (i) Blade inlet angle (ii) Tangential force on the ring of moving blades and (iii) power developed in the stage.	(14M)

Unit-V

9.	(a)	What are the advantages and limitations of surface condensers over jet condensers?	(6M)
	(b)	In a surface condenser, the pressure of steam is 12 KPa and the cooling water flow rate is 40 kg/kg of steam condensed. The condensate leaves at 44^0C and the rise in temperature of circulating water is 14^0C. Determine the dryness fraction of steam entering into the condenser.	(8M)

(OR)

10.	(a)	Draw the schematic diagram of low level counter flow jet condenser and explain its working principle.	(6M)
	(b)	A steam turbine discharges 5000 kg/hr. of steam at 40^0C temperature and 0.85 dryness. The estimated air leakage is 15 Kg/Hr. The temperature at the suction of air pump is 32^0C and temperature of condensate is 30^0C. Find (i) Air pump capacity (ii) Loss of condensate in Kg/hr.	(8M)

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Code: 1503507

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

B.Tech V semester (R15) Regular Examinations, JAN-2021

Industrial Management(Mechanical Engineering)

MODEL QUESTION PAPER

Time:3 hrs **Max Marks: 70**

Answer five questions. Selecting one Question from each unit
All Questions carry equal marks

1. a) State the Advantages and Disadvantages of urban and rural locations.
   b) Explain the various principles of plant layout.

OR

2. Explain about various types of material handling equipment in detail.

3. a) Explain the basic procedure of work study
   b) Explain about various types of symbols used in method study.

OR

4. a) State the various principles of motion economy.
   b) Explain about SIMO chart in detail

5. a) Discuss about various types of allowances used in time study.
   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%.

OR

6. a) Define work sampling? What are the applications of work sampling?
   b) Explain the procedure of work sampling.

7. a) What is Float? Discuss in brief different types of floats?
   b) For the information given below, draw the network and determine the floats.

Activity	A	B	V	D	E	F	G	H
Predecessor	-	-	A	A	C	D	B	E,F,G
Time(weeks)	3	4	5	6	7	8	9	3

OR

8. A small project consists of seven activities, the details of which are given below.

Activity	Duration (Days)			Immediate Predecessor
	Most likely	Optimistic	Pessimistic	
A	3	1	7	-
B	6	2	14	A
C	3	3	3	A
D	10	4	22	B,C
E	7	3	15	B
F	5	2	14	D,E
G	4	4	4	D

   i) Draw the network, number nodes, find the critical path, the expected project completion time and the next most critical path
   ii) What project duration will have 95 percent of confidence of completion?

9. a) Explain about various types of inspection in detail
   b) Explain about assignable and common causes in detail.

OR

10. a) Explain the procedure for construction of control charts for variables.
    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.

Subject Code: 1504501

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

B.Tech. V Semester (R15)

ECE

Model Paper

Subject: MICROPROCESSORS & INTERFACING

Time: 3 Hours Max. Marks: 70

Answer any **five** questions, choosing **ONE** question from each unit.

All questions carry equal marks.

1. (a) What are the various registers in 8085 microprocessor? Explain. [8Marks]
   (b) Explain different addressing modes supported by 8085 microprocessor. [6 Marks]

(OR)

2. (a) Explain the various arithmetic instructions available in 8085 microprocessor.
   (b) Explain the timing diagram for memory read cycle.

UNIT-II

3. (a) Explain the internal architecture of 8086 microprocessor with block diagram.[10 Marks]

   (b) Is it possible for two segments to get overlap in 8086? How? [4 Marks]

(OR)

4. (a) Explain Branch instructions available in 8086 microprocessor. [9 Marks]
   (b) Explain BHE*, INTR, CLK, DEN*, HLDA pins of 8086 microprocessor. [5 Marks]

UNIT-III

5. (a) Explain SEGMENT, END, EVEN, PROC assembler directives. [6Marks]
   (b) Write an alp to sort the given numbers in ascending order. [8Marks]

(OR)

6. (a) Write an alp to generate a delay of 10msec.
   (b) Write an alp to copy the string from 2000:3000 to 8000:9000 memory location.

UNIT-IV

7. (a) Explain various Data transfer schemes. [8Marks]
   (b) Explain Mode set register of programmable DMA controller 8257. [6Marks]

(OR)

8. (a) Explain the CWR of programmable interval timer. [6 Marks]
   (b) Explain internal block diagram of 8251 USART. [8Marks]

UNIT-V

9. (a) Interface two 16KB ROMs and two 8KB SRAMs with 8086 microprocessor.[6Marks]
   (b) Interface ADC0808 with 8086 microprocessor using 8255 ports. Use port A of 8255 for transferring digital data output of ADC to the Microprocessor. Use PB7, PB6, PB5 to connect A, B, C lines of ADC respectively and PC7 is connected to SOC, PC0 is connected to EOC. Assume the analog input is available at I/P5 of the ADC. Assume that suitable clock frequency is given to ADC. Draw the schematic and write required ALP? [8Marks]

(OR)

10. (a) Write an ALP to rotate the rotor of the stepper motor for 135^0 in clockwise direction.
    (b) Write an alp to generate Sawtooth waveform using DAC?

Subject Code: 1504502

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

III Semester (R15)

Model Paper

Subject: LINEAR IC APPLICATIONS

Time: 3 Hours Max. Marks: 70

Answer any five questions, choosing **ONE** question from each unit.

All questions carry equal marks.

UNIT-1

1. (a) What is a differential amplifier? Draw the balanced input and balanced output differential amplifier and explain its working. (7 M)

   (b) What is an Op-Amp? Draw its equivalent circuit and also explain the ideal characteristics. (7 M)

(OR)

2. (a) Explain the different blocks of commercial IC Op-Amp block diagram. (7 M)
   (b) Derive the voltage gain of an ideal op-amp in inverting configuration. (7 M)

UNIT-II

3. Explain an op-amp can be used as
   (a) Subtractor.
   (b) Integrator. (7 M)

(OR)

4. (a) Explain the working of instrumentation amplifier. (7 M)
   (b) Explain the operation of op-amp based V to I converter.

UNIT-III

5. (a) Explain the operation of Schmitt trigger using op-amp. (7 M)
   (b) Explain the operation of monostable multivibrator using op-amp. (7 M)

(OR)

6. (a) Derive the transfer function for second order HPF, and also plot its frequency response. (7 M)
   (b) Design second order LPF with following specifications, cut off frequency f_o=5 kHz, Gain A_o=5. (7 M)

UNIT-IV

7. (a) Explain the working of RC phase shift oscillator. (7 M)
   (b) Explain the working of Astable multivibrator using 555 timer. (7 M)

(OR)

8. (a) Explain the working principle of PLL, with neat diagram. (7 M)
   (b) Define 'Lock-in range' and 'capture range' of PLL. (7 M)

UNIT- V

9. (a) Explain the working of Weighted resistor DAC. (7 M)
   (b) List out specifications of DAC. (7 M)

(OR)

10. Explain the following:
    (a) Successive approximation ADC. (7 M)
    (b) Dual slope ADC. (7 M)

Code No: 1504503

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

B.Tech. V Semester (R15)

Model Paper

Subject: DIGITAL COMMUNICATIONS

Time: 3 Hours Max. Marks: 70

Answer any five questions, choosing **ONE** question from each unit.
All questions carry equal marks.

UNIT-I

1. (a) Write the advantage and disadvantage of digital communication system over the analog communication system.
   (b) With the help of neat block diagram, explain the pulse code modulation system.

(OR)

2 (a) Write a short note on the Non-uniform Quantizer in PCM systems.
   (b) Explain the working principle of Delta Modulation system.

UNIT-II

3 (a) Explain the operation of the Baseband digital transmission system.
   (b) Represent the binary sequence 100111010 using the following formats
   (i) Unipolar Return to Zero (ii) Bipolar (iii) Split Manchester code

(OR)

4 (a) Explain modified duobinary signaling scheme with the help of diagram.
   (b) Write about on eye diagram.

UNIT-III

5 (a) Define the following terms
   i) Information ii) Entropy iii) Rate of information
   (b) Show that mutual information I(X,Y) = H(X) - H(X/Y)

(OR)

6 (a) Find the channel capacity of a Binary symmetric channel.
   (b) A discrete memory less source has an alphabet of seven symbols whose probabilities occurrence are as under

Symbol	S0	S1	S2	S3	S4	S5	S6
Probability	0.25	0.25	0.125	0.125	0.125	0.0625	0.0625

Find codeword of each message using Shannon-Fano Coding technique. Also, find the coding efficiency.

UNIT-IV

7 (a) Explain Automatic Repeat Request (ARQ) systems.
   (b) Construct $(6,3)$ code for all possible data words taking the generator matrix as

$$G = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 & 1 & 0 \end{bmatrix}$$

(OR)

8 (a) The generator polynomial of a$(7,4)$ cyclic code is $g(x) = 1 + x^2 + x^3$. Find the codeword for the message $D = 1010$.
   (b) How is trellis diagram used to encoding and decoding of convolution codes?

UNIT-V

9 (a) Explain generation and detection of coherent BPSK.
(b) Derive an expression for P_e of a binary coherent BPSK.

(OR)

10 (a) With the help of block diagram, explain QPSK transmitter and receiver.
(b) Compare the performance of various digital modulation schemes.

Subject Code: 1504504

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

B.Tech. III Semester (R15)

Branch: ECE

Model Paper

Subject: ANTENNA AND WAVE PROPAGATION

Time: 3 Hours Max. Marks: 70

UNIT-I

1. a) Explain the antenna parameters 8 M
   i) Radiation pattern ii) beam area iii) directivity iv) FBR

   b) Calculate the beam widths in the x-y and y-z planes of an antenna, the power pattern of which is given by

   $U(\theta, \varphi) = \{\sin^2\theta \sin\varphi \quad 0 \le \theta \le \pi; \quad 0 \le \varphi \le \pi$

   $0 \quad 0 \le \theta \le \pi; \quad \pi \le \varphi \le 2\pi \ \}$ 6 M

(OR)

2. Explain briefly about a half wave dipole and determine its radiation resistance. 14 M

UNIT-II

3. (a) Discuss about linear broadside array with non uniform amplitude distributions. 7 M

   (b) Explain pattern multiplication with an example. 7 M

(OR)

4. Explain the array of N- point sources of equal amplitude and spacing- End fire case 14 M
   (i) Direction of pattern maxima (ii) Direction of pattern minima
   (iii) FNBW (iv) Directivity

UNIT-III

5. (a) Explain in detail about a folded dipole antenna. 8 M

   (b) Design a Yagi-Uda array having three elements to operate at 500 MHz with a folded dipole feed. 6 M

(OR)

6. (a) Write brief notes on parabolic reflector antenna. 8 M
   (b) Explain measurement of gain by direct comparison method. 6 M

UNIT-IV

7. (a) Describe different modes of wave propagation. 6 M
   (b) Derive the expression of field strength in the case of space wave propagation and explain how it varies with respect to distance and height. 8 M

(OR)

8. (a) Explain about tropospheric propagation.
   (b) Explain the effect of earth's curvature on wave propagation.

UNIT-V

9. Discuss briefly about sky wave propagation and explain the terms 14 M
   (i) Maximum usable frequency (ii) virtual height
   (iii) Multi-Hop propagation

(OR)

10. (a) Write short notes on structure of ionosphere. 7 M
    (b) Communication is to be established between two stations that are 1500 km apart. Derive the necessary formulae and calculate the MUF you may choose for communication using the ionosphere as a reflector if the height and critical frequency are respectively 250 km and 12MHz.Assume the ionosphere to be thin and earth to be flat. 7 M

Code No: 1504506

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

B.Tech. III Semester (R15)

Branch: ECE

Model Paper

Subject: DIGITAL IC APPLICATIONS

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 basic TTL NAND gate and explain the functional operation? (7 M)

(b) Explain the operation of 2-input ECL OR/NOR gate with its functional table. (7 M)

OR

2 (a) Draw and explain the structure of an 8x4 Static RAM. (7 M)

(b) Design an 8x4 diode ROM using 74x138 for the following data starting from the first location 1,4,9,B,0,F,C,7. (7 M)

UNIT-II

3 (a) Define VHDL? Explain about Design Flow of VHDL? (7 M)

(b) Briefly explain about data-flow design elements. (7 M)

OR

4 (a) Design a logic circuit to detect a prime number of a 4-bit input .Write a VHDL Program for the above design. (7 M)

(b) Explain the use of packages. Give the syntax and structure of a package in VHDL. (7 M)

UNIT-III

5 (a) Design a 5-to-32 Decoder using 74x138s and 74x139. (7 M)

(b) Write a VHDL code in data flow model for 74x138 3-to-8 Decoder. (7 M)

OR

6. Draw and explain the operation for the following ICs: (7 M)

(i) 74x541 Octal tri state buffer (ii) 74x545 Octal tri state Transceiver.

UNIT-IV

7 (a) Design a 16-bit comparator using 74x85 ICs. (7 M)

(b) Write a VHDL program for an 8-bit comparator. (7 M)

OR

8. Explain the operation of barrel shifter and write a VHDL program for the above. (14 M)

UNIT-V

9 (a) Explain the operation of SR-Latch with enable input and draw relevant wave forms. (7 M)

(b) Write a VHDL code for SR flip-flop in behavioral model. (7 M)

OR

10 (a) Explain about 74x163 4-bit binary counter. (7 M)

(b) Design a modulo-193 counter with counting sequence 63, 64, …, 255, 63, 64,…. by using two 74x163 ICs. (7 M)

Code:1514507

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

MODEL QUESTION PAPER

FOUR YEAR B. TECH (R15) DEGREE EXAMINATIONS, NOVEMBER 2017

Fifth Semester Examination

Signals and Systems **(Common to EEE & ECE Branches)**

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

Note : Answer any **FIVE** questions by choosing one from each unit.
All questions carry equal marks.

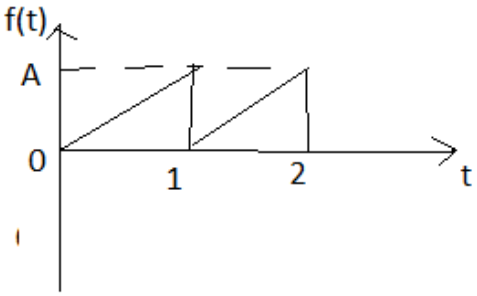
UNIT - I

1.a) Classify the signals based on continuous and discrete terminology. (7M)

b) Enumerate the basic operations on signals with examples. (7M)

Or

2. Obtain the exponential Fourier series representation of the periodic waveform shown below (14M)



UNIT - II

3. State and prove any four properties of Fourier transforms. (14M)

Or

4. Determine the Fourier transforms of two sided exponential signal. (14M)

UNIT-III

5. Describe the classification of systems with examples. (14M)

Or

6. Test the stability of the LTI systems given below

(i) $h(t) = e^{-5t}$ (ii) $h(t) = e^{-4t}u(t)$ (iii) $h(t) = t\cos t$ (iv) $h(t) = t\,e^{-3t}u(t)$ (14M)

UNIT –IV

7.State and prove Sampling theorem. (14M)

Or

8. State and prove the following properties of DTFT. (14M)

(i) Time shifting
(ii) Convolution in time
(iii) Linearity
(iv) Differentiation in frequency

UNIT –V

9. Evaluate the Laplace transforms for the given signals (14M)

(i) $x(t) = \sin(w_0 t)\,u(t)$ (ii) $x(t) = e^{-3t}u(t)$

Or

10. Define Z-Transforms and state the properties of ROC of Z-Transforms. (14M)

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
Model Question Paper
(1514508) MICROPROCESSORS & INTERFACING
B.Tech. V Semester (CSE) (R15) Degree Examinations

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

Note: Answer any **FIVE** questions choosing **ONE** question from each unit.
All questions carry **Equal** marks.

UNIT-I

1.a) What are the various data related addressing modes used in 8086 micro processor and how the data is retrieved from the memory in each case? (7M)

(b) With neat diagram explain the architecture of 8086 micro processor? (7M)

(OR)

2. With neat diagram explain the 40 pins of 8086 microprocessor? (14M)

UNIT-II

3.a) Describe the assembler directives? (7M)

b) Write an ALP to find out a biggest number from an array? (7M)

(OR)

4.a) Write an ALP to find out the data is a palindrome or not? (7M)

b) Write an ALP to find average value from the given array of a data? (7M)

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.a) list the salient features of 80486? (4M)

b) List the general purpose registers in 80486? (5M)

c) Explain the memory management of 80486? (5M)

Subject Code: 1515505

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

B.Tech. V Semester (R15)

Model Paper

Subject: COMPUTER ORGANIZATION

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 functional units computer with a neat sketch 7 M
   (b) Discussabout Basic operational concepts of computer. 7 M

(OR)

2. (a) Explain register and bus transfers 7 M
   (b) Explain about arithmetic and logic microoperations. 7 M

UNIT II

3. (a) Write short notes on computer instructions. 7 M
   (b) Design a microprogram sequencer for a control memory. 7 M

(OR)

4. (a) Explain the instruction cycle with a flowchart. 10 M
   (b) Explain about Address sequencing. 4 M

UNIT III

5. (a) Mention different types of instruction formats. 7 M
   (b) What is an addressing mode? Explain different types of addressing modes. 7 M

(OR)

6. (a) Explain in detail about arithmetic pipeline with example 7 M
   (b) Discuss about parallel processor system. 7 M

UNIT IV

7. (a) Explain about Asynchronous data transfer. 10 M
   (b) Mention different modes of transfer. 4 M

(OR)

8. (a) Explain DMA transfer in a computer system with the help of a diagram. 10 M
   (b) Explain about Daisy-chain priority interrupt. 4 M

UNIT V

9. Explain the following memory types. 3.5*4=14 M
   (a) Auxiliary memory (b) Associative memory
   (c) Cache memory (d) Virtual memory.

(OR)

10. (a) Explain interprocessor communication and synchronization. 4 M
    (b) Explain about characteristics of multiprocessors. 10 M