

Subject Code: 1801501

R 18

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech V Semester - Regular Examinations, 2021 - Model Question Paper
Sub: SOLID MECHANICS – II
(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. The rectangular stress components of a point in three-dimensional stress system are defined as a $\sigma_x = 20\text{Mpa}$, $\sigma_y = -40\text{Mpa}$, $\sigma_z = 80\text{Mpa}$, $\tau_{xy} = 40\text{Mpa}$, $\tau_{yz} = -60\text{Mpa}$, $\tau_{xz} = 20\text{Mpa}$. Determine the principal stresses and principal planes.

OR

2. In a steel member, at a point the major principal stress is 200MN/m^2 and the minor principle stress is compressive. if the tensile yield point of the steel is 235MN/m^2 . Find the value of the minor principal stress at which yielding will commence, according to each of the following criteria of failure.
 1. Maximum shear stress
 2. Maximum total strain energy
 3. Maximum shear strain energy. Take passion ratio 0.26.

UNIT II

3. A cylindrical shell 100 cm long, and 25 cm in internal diameter having thickness of metal as 8 mm, is filled with a fluid at atmospheric pressure. If the additional fluid of 30 cm^3 is pumped in the shell. Take $E = 200\text{ GPa}$ and $\mu = 0.3$. Also find the hoop stress induced.

OR

4. A thick steel cylinder having an internal diameter of 100 mm an external diameter of 200 mm is subjected to an internal pressure of 55 M pa and an external pressure of 7 Mpa. Find the maximum hoop stress.

UNIT III

5. Derive the expression for buckling load (or) crippling load when both ends of the column are fixed.

OR

6. A built-up column consisting of rolled steel beam ISWB 300 with two plates 200 mm x 10 mm connected at the top and bottom flanges. Calculate the safe load the column carry, if the length is 3m and both ends are fixed. Take factor of safety 3 $f_c = 320$

N/mm^2 and $\alpha = \frac{1}{7500}$ Take properties of joist: $A = 6133 \text{ mm}^2$ $I_{XX} = 9821.6 \times 10^4 \text{ mm}^4$; $I_{yy} = 990.1 \times 10^4 \text{ mm}^4$

UNIT IV

7. Sketch the Core of symmetrical I-Section consisting a Web 400 mm x 30 mm and Flange 250 mm x 20 mm each in compression and tension region.

OR

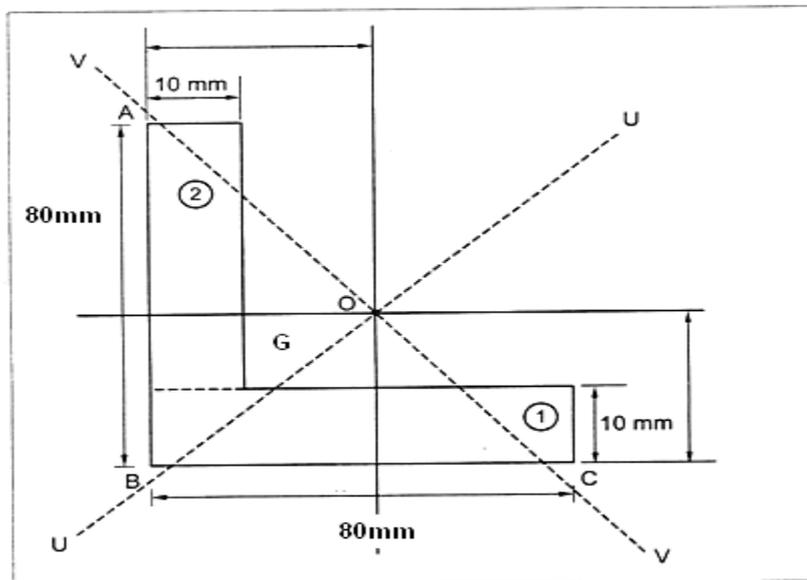
8. A short hollow cylindrical column carries a compressive force of 400 kN. The extremal diameter of the column is 200 mm and the internal diameter is 120 mm. Find the maximum permissible eccentricity of the load, if the allowable stresses are 60 N/mm^2 in compression and 25 N/mm^2 in tension.

UNIT V

9. Derive the formula for the deflection of beams due to unsymmetrical bending.

OR

10. A 80 mm x 80 mm x 10 mm angle section shown in fig. is used as a simply supported beam over a span of 2.4 m. It carries a load of 400 kN along the line YG, where G is the centroid of the section. Calculate (i) Stresses at the points A, B and C of the mid-section of the beam Take $E = 200 \text{ GN/m}^2$



Subject Code: 1801502

R18

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

V Sem (R18) – Model Question Paper - 2021

SUB: HYDRAULIC MACHINERY

(CE)

Time: 3 Hours

Max. Marks: 70

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

S.NO:	Questions	Marks		
UNIT-I				
1	A jet of water of diameter 100mm moving with a velocity of 30m/sec strikes a curved fixed symmetrical plate at the centre. Find the force exerted by the jet of water in the direction of the jet, if the jet is deflected through an angle of 120 degrees at the outlet of curved plate.	14		
OR				
2	Derive an expression for the calculation of critical depth in a triangular channel?	14		
UNIT – II				
3	A Pelton wheel has a mean bucket speed of 10 meters per second with a jet of water flowing at the rate of 700 liters/s under a head of 30 meters. The buckets deflect the jet through an angle of 160 degrees. Calculate the power given by the water to the runner and the hydraulic efficiency of the turbine. Assume Co-efficient of velocity as 0.98.	14		
OR				
4	Describe briefly the function of various main components of Pelton turbine with neat sketches?	14		
UNIT – III				
5	Explain the characteristics curves of Hydraulic turbines?	14		
OR				
6	Define the terms Unit speed of turbine, Unit power, Unit discharge, Unit quantities?	14		
UNIT – IV				
7	The internal and external diameter of the impeller of a centrifugal pump is 200 and 400mm respectively. The pump is running at 1200 r.p.m. The vane angles of the impeller at inlet and outlet are 20° and 30° respectively. The water enters the impeller radially and the velocity of flow is constant. Determine the work done by the impeller per unit weight of water.	14		
OR				

8	Define a centrifugal pump. Explain the working on a multi-stage centrifugal pump with sketches.	14		
UNIT – V				
9	What is reciprocating pump? Explain the principle and working of a reciprocating pump?	14		
OR				
10	A single-acting reciprocating pump, running at 50 R.P.M, delivers $0.01 \text{ m}^3/\text{s}$ of water. The diameter of the piston is 200 mm and strike length 400mm. Determine: i) The theoretical discharge of the pump, ii) Co-efficient discharge of the pump, iii) Slip and the percentage slip of the pump	14		

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech V Semester - Regular Examinations, 2021 - Model Question Paper
Sub: STRUCTURAL ANALYSIS – I
(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. A fixed beam AB of length 6m carries point load of 160 kN and 120 kN at a distance of 2m and 4m from the left end A. Find the fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams.

OR

2. Find the fixing moments and support reactions of a fixed beam AB of length 6m, carrying a uniformly distributed load of 4kN/m over the left half of the span.

UNIT-II

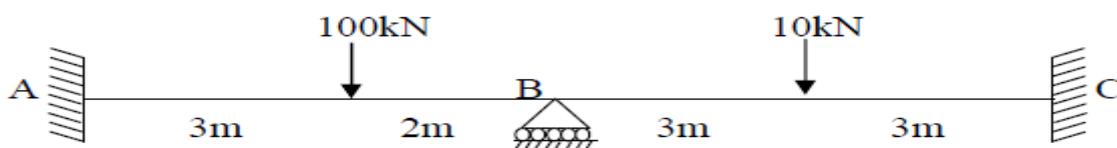
3. A continuous beam consists of three successive span of 6m and 12m and 4m and carries load of 2kN/m, 1kN/m and 3kN/M respectively on the spans . Draw BMD and SFD for the beam. Find the support moments and plot the shear force and bending moment diagram by **Clayperon's theorem**.

OR

4. A continuous beam ABC is built-in at A and C and is carried over simple roller support at B. Span AB = 8.5 m and span BC = 7.5 m. It carries a uniformly distributed load of 17 kN/m over the span AB and a point load of 26 kN is acting in the span BC, 3.5 m from the middle support B. The middle support B sinks by 8 mm with respect to supports A and C. Find the moments and reactions at all the supports and draw the bending moment and shear force diagrams using **Clapeyorn's theorem** of three moments. Assume $E = 2.1 \times 10^5$ MPa and $I = 2.3 \times 10^{-3}$ m⁴.

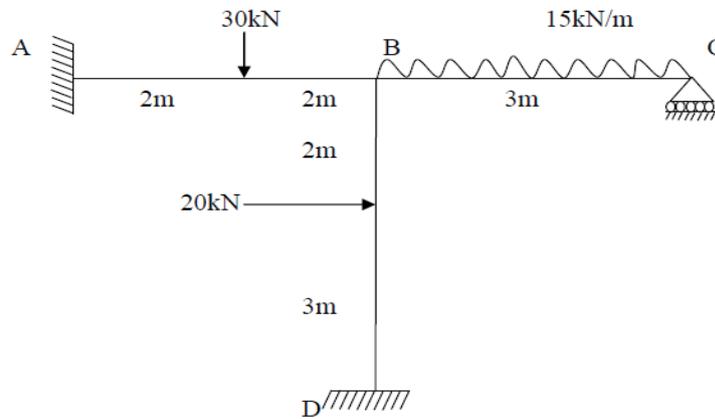
UNIT – III

5. Analyse the continuous beam shown in fig by **slope deflection method** and draw bending moment diagram.



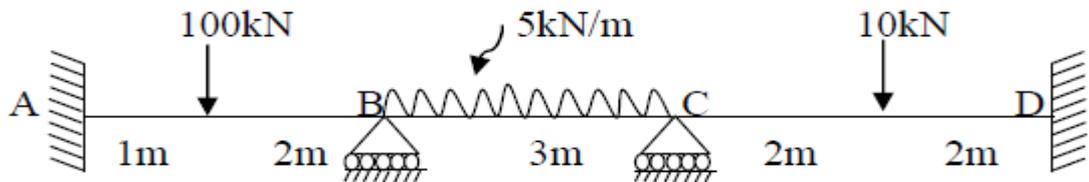
OR

6. Analyse the continuous beam shown in fig by **slope deflection method** and draw bending moment diagram.



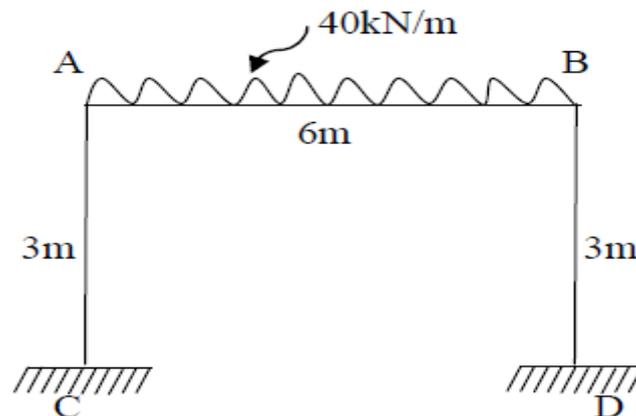
UNIT IV

7. Determine the support moments and draw the bending moment diagram for a loaded beam shown in fig. Use **moment distribution method**. Ends A and D are fixed.



OR

8. Using **moment distribution method**, analyse the portal frame shown in figure below

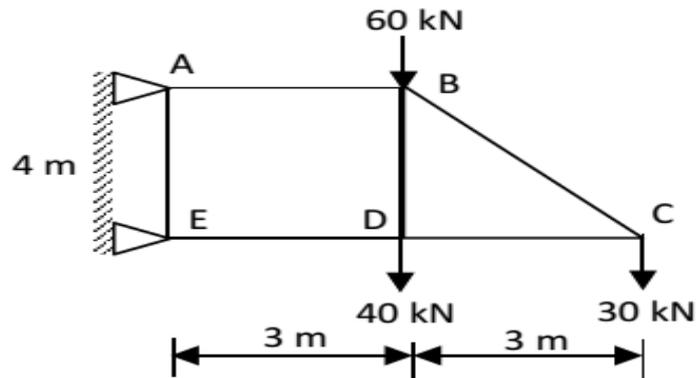


UNIT V

9. Derive the expression for:
- (a) Strain energy due to axial load.
 - (b) Strain energy due to flexural loading.

OR

10. Find the vertical deflection of the joint 'C' of the given truss. Take $E = 200 \text{ kN/mm}^2$. The cross-sectional areas of:
- (i) Horizontal members = 3000 mm^2 .
 - (ii) Vertical members = 4000 mm^2 .
 - (iii) Inclined members = 5000 mm^2 .



Code No: 1801504

Model Question Paper
K S R M College of Engineering (Autonomous), KADAPA – 516 003
B.Tech (R 18) 5th Semester Regular Examinations, 2021 – Model Paper
GEOTECHNICAL ENGINEERING
(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 cm³. 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/m² 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.

K.S.R.M COLLEGE OF ENGINEERING (AUTONOMOUS) – KADAPA – 516003**DEPARTMENT OF CIVIL ENGINEERING****B. Tech V Sem- R 18 – Regular Examinations – Model Paper- 2021****Sub: Environmental Engineering****Civil Engineering****Time: 3 Hours****Maximum Marks: 70**

Answer any five questions, choosing one question from each unit.**All questions carry equal marks.****UNIT-I**

1. The census records of a city show population as follows:

Present	50,000
Before one decade	47,100
Before two decades	43,500
Before three decades	41,000

Workout the probable population after one, two and three decades by using Arithmetical, Geometrical and Incremental increase method. 14M.

(Or)

2. (a) Define the term “per capita demand”. Write the factors affecting per capita demand and state the reasons for variations in demand. 7M

(b) The population figures of a town during the four decades i.e. 1960, 1970, 1980 and 1990 are 25,000, 30,500, 35,500 and 42,000 respectively. Predict its population in the year 2000 through Geometrical Increase method. 7M

UNIT-II

3. Discuss the various Physical, Chemical and Biological characteristics of water. 14M

OR

4. (a) Explain about Waterborne diseases and its causes 7M

(b) Write the drinking water quality standards as per BIS. 7M

UNIT-III

5. (a) Water has to be purified for a town whose daily demand is 9×10^6 litres/day. Design a suitable sedimentation tank of the water works fitted with sludge remover. Assume the velocity of flow, in the sedimentation tank as 22cm/min and the detention period as 8 hrs. 7M
- (b) Discuss the Sedimentation by coagulation process using alum as coagulant. 7M

OR

6. Design a rapid sand filter to treat 10 million liters of raw water per day allowing 0.5% of filtered water for backwashing. Half hour per day is used for backwashing. Assume necessary data. 14M

UNIT –IV

7. (a) Write principles of functions of aeration process 07M
- (b) Write notes on : i) Membrane process ii) Desalination process 07M

OR

8. (a) Write a note on iron removal from water for small communities 07M
- (b) Write about Rain water Harvesting methods 07M

UNIT-V

- 9.(a) What are the different types of pipes in use for carrying water. Indicate approximately diameters and pressure ranges in which they are used. 07M
- (b) Explain and Sketch any two types of joints used for water mains. 07M

OR

10. (a) Briefly explain about the different distribution networks to supply the water? 7M
- (b) What are the different methods of analyzing a given distribution system? Explain Hardy Cross method of pipe network analysis. 7M

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech V Semester - Regular Examinations, 2021 - Model Question Paper
Sub: TRANSPORTATION ENGINEERING
(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. a.) Explain briefly about Engineering Surveys for Highway Alignment ? **7M**
 b.) Describe briefly about Road Network Patterns ? **7M**

(or)

2. The following data were collected for planning the road development programme of a backward district.
 Total area = 9600 km², Agricultural and developed area = 3200 km², Existing railway track length = 110 kms, Existing length of surfaced area = 322 kms, Existing length of surfaced area = 425 kms.
 Number of Towns/villages in different population ranges are as below :

Population	> 5000	2001 - 5000	1001 - 2000	501 - 1000	< 500
No of Towns & villages	8	42	140	290	540

Calculate the additional length of surfaced and unsurfaced roads for the road system based on Nagpur road plan formulae for this district. **14M**

UNIT – II

3. a.) Write a short notes on different types of Sight distance ? **7M**
 b.) Calculate the safe stopping sight distance on a level road stretch for a design speed of 50 kmph for a.) Two way traffic on a single lane road
 b.) Two way traffic on a Two lane road
 Assume coefficient of friction as 0.35 and total reaction time of driver is 2.5 secs **7M**

(or)

4. Explain briefly about the Transition curves ? **14M**

UNIT – III

5. a.) Write a short notes on Traffic speed studies ? **7M**

b.) Describe briefly about Traffic Road Signs ? **7M**

(or)

6. a.) Explain briefly about Accident Studies ? **7M**

b.) The 15 minute traffic counts on cross roads 1 and 2 during the peak hour are observed as 170 and 145 vehicles per lane respectively approaching the intersection in the direction of heavier traffic flow. If the amber times required as 3 and 2 secs for the two loads based on approach speeds, design the signal timings by trial cycle method. Assume average time headway as 2.5 secs during the green phase ? **7M**

UNIT – IV

7. a.) Explain briefly about the types of Grade separated intersections ? **7M**

b.) Write a short notes on the Advantages and Disadvantages of Rotary Intersections ? **7M**

(or)

8. Describe briefly about the Traffic Islands ? **14M**

UNIT – V

9. a.) Explain briefly about the Advantages and Limitations of the Flexible Pavements ? **7M**

b.) Describe briefly about the CBR test ? **7M**

(or)

10. a.) Write a short notes on the Types of joints in CC Pavements ? **7M**

b.) Explain briefly about the Factors affecting design and performance of CC pavements ?

7M

Subject Code: 1801510

R 18

K S R M College of Engineering (Autonomous), KADAPA – 516 003
B. Tech V Semester - Regular Examinations, 2021 - Model Question Paper
Sub: REMOTE SENSING & GIS
(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. a) Explain in detail the spectral signatures of vegetation and soil. 6 M
b) State the concept of resolution? Explain the spatial and radiometric resolutions in detail. 8 M

(Or)

2. a) Describe the interaction of EMR with atmosphere. 8 M
b) Describe the physics of Remote Sensing. 6 M

UNIT-II

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

(Or)

4. Explain various characteristics of sensors. 14 M

Unit- III

5. a) Explain the elements of visual interpretation techniques. 8M
b) Explain about Image enhancement 6M

(Or)

6. Explain about spatial filtering and edge enhancement 14M

Unit – IV

7. a) Define GIS. Describe the key components of GIS. 8M
b) Explain Computational Analysis Methods (CAM). 6M

(Or)

8. Explain in detail about functions of GIS. 14M

UNIT- V

9. Explain the applications of remote sensing in natural resource management 14M

(Or)

10. Explain the applications of remote sensing in water resources. 14M

KSRM College of Engineering (AUTONOMOUS), KADAPA

B. Tech., V Semester (R18) Regular Examinations of November 2020

Sub: Power Electronics

Time: 3 Hrs

Max. Marks: 70

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

All questions carry equal marks

UNIT-I

1. a) Explain the static V-I characteristics of SCR. (8M)
- b) An SCR has a $\frac{dv}{dt}$ rating of 250 V/ μ sec and $\frac{di}{dt}$ rating of 120 A/ μ sec. If it operates on a 300V d.c source and load resistance of 10 Ω , determine suitable value of the snubber circuit. (6M)

(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. (8M)
- b) Sketch switching characteristics of a thyristor during its turn –on process. Explain briefly the nature of these curves. (6M)

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. (8M)
- b) A 1- Φ fully controlled rectifier is operated with a resistive load of 10 Ω , the source voltage is 230V, 50Hz.For the firing angle of 60° , determine i) Average load voltage ii) average and RMS load current iii) form factor and ripple factor. (6M)

(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. (10M)
- b) Bring out the detailed comparison between circulating and non –circulating current mode of dual converter (4M)

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. (8M)
- b) What is an ac voltage controller? List some of its industrial applications. Enumerate its merits and demerits. (6M)

(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 $f_0 = f_s / 4$. (7M)
- 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 $f_0 = 4 * f_s$ (7M)

UNIT - IV

7. a) Explain the operating principle of Basic chopper. Derive an expression for its average output voltage. (8M)
- b) Explain the various control strategies employed for control of output voltage of chopper. (6M)

(OR)

8. a) Explain Two – quadrant operation of chopper. (8M)
b) A step-up chopper has input voltage of 220V and output voltage of 660V. If the conducting time of thyristor –chopper is $100\mu\text{sec}$, 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. (6M)

UNIT - V

9. a) Draw and explain operation of a current source inverter. (7M)
b) Explain the harmonic reduction technique employed in inverter. (7M)

(OR)

10. a) Discuss the principle of working of a single phase bridge inverter. (6M)
b) Explain the space vector modulation technique. (8M)

KSRM College of Engineering (AUTONOMOUS), KADAPA

B. Tech., V Semester (R18) Regular Examinations of November 2020

Sub: Power Systems Operation & Control

Time: 3 Hrs

Max. Marks: 70

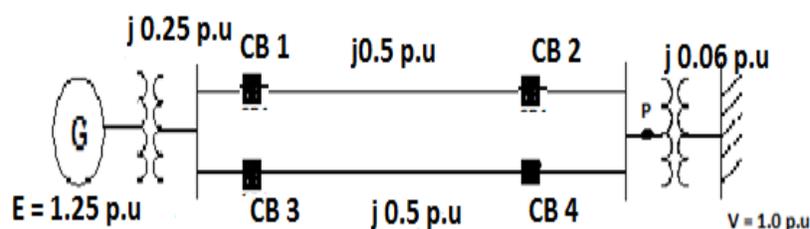
Answer any five questions, choosing one full question from each unit.
All questions carry equal marks

Unit-I

1. Obtain the power angle characteristics of a salient pole synchronous machine connected to infinite bus. 14 M

(OR)

2. (a) Derive the Swing equation for synchronous machine connected to an infinite bus. 8 M
(b) Find the CCA for clearing the fault with the simultaneous opening of CB3 and CB4. The generator delivers 1.0 p.u MW at the instant of preceding the fault. 6 M

**Unit-II**

3. (a) Explain the following terms with reference to thermal power plants.
(1) Heat Rate Curve (2) Cost Curve
(3) Incremental Fuel Cost (4) Input-Output Characteristics 8M
(b) The fuel costs of two units are given by 6M
 $C_1 = 0.1 P_{G1}^2 + 25 P_{G1} + 1.6$ Rs/hr
 $C_2 = 0.1 P_{G2}^2 + 32 P_{G2} + 2.1$ Rs/hr
If the total demand on the generating station is 300 MW, find the i) economic load distribution of the two units, ii) Savings in Rs/day if the load is shared equally between the generating stations.

(OR)

4. Derive the expression for economic operation of power system by considering the line losses also develop the algorithm for the solution of problem. 14 M

Unit-III

5. Obtain the condition for optimality of short term hydro thermal scheduling problem. 14 M

(OR)

6. Derive the transfer function of speed governor. 14 M

Unit-IV

7. (a) Write the necessity of keeping frequency constant in power system. 7M
(b) Develop the block diagram of the LFC of a single area system. 7M

(OR)

8. Show that the steady state change in load frequency control of an isolated power can be reduced to zero. 14 M

Unit-V

9. Obtain the mathematical modeling of tie line power in an interconnected power system and draw its block diagram. 14 M

(OR)

10. (a) What are the basic requirements needed for control strategy in LFC system. 7M
(b) Explain the combined operation of an LFC and Economic Dispatch control. 7M

KSRM College of Engineering (AUTONOMOUS), KADAPA

B. Tech., V Semester (R18) Regular Examinations of November 2020

Sub: Advanced Control Systems (PE- I)

Time: 3 Hrs

Max. Marks: 70

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

All questions carry equal marks

Q. No.	Questions	Marks	CO	BL
Unit I				
1.	Consider a unity feedback system with open loop transfer function, $G(S) = \frac{K}{s(s+8)}$ Design a suitable lead Compensator to meet the following specifications. (i) Percentage peak overshoot =9.5% (ii) Natural frequency of oscillation, $\omega_n = 12$ rad/sec (iii) Velocity error constant, $K_v \geq 10$.	14	CO5	L3
(OR)				
2.	Consider a unity feedback system with open loop transfer function, $G(S) = \frac{20}{s(s+2)(s+4)}$. Design a PD Controller so that the closed loop has a damping ratio of 0.8 and the natural frequency of oscillation as 2 rad/sec.	14	CO5	L3
Unit II				
3.	a) Determine the Canonical state model of the system. Whose Transfer function is $T(S) = \frac{2(S+5)}{[(S+2)(S+3)(S+4)]}$	7	CO3	L2
	b) Define state, state space and state model	7	CO1	L1
(OR)				
4.	a) Derive the solution of the state equation for the Homogeneous system.	10	CO1	L4
	b) Write down the properties of STM	4	CO1	L2
Unit III				
5.	What is Controllability? Determine whether the given system $\dot{X} = AX + BU$; $Y = CX$ is Controllable or not. Where $A = \begin{bmatrix} 0 & 0 & 1 \\ -2 & -3 & 0 \\ 0 & 2 & -3 \end{bmatrix}$; $B = \begin{bmatrix} 0 \\ 2 \\ 0 \end{bmatrix}$ and $C = [1 \ 0 \ 0]$	14	CO4	L1, L3
(OR)				
6.	Diagonalize the given system $\dot{X} = AX + BU$; $Y = CX$ Where $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix}$; $B = \begin{bmatrix} 0 \\ 0 \\ 2 \end{bmatrix}$ and $C = [1 \ 0 \ 0]$	14	CO4	L3
Unit IV				
7.	Consider a linear system described by the transfer function	14	CO5	L6

	$\frac{Y(s)}{U(s)} = \frac{10}{s(s+1)(s+2)}$ <p>Design a State Feedback controller with a state feedback so that the closed loop poles are placed at $s = -2$, $s = -1+j$, and $-1-j$ (use Ackermann's Formula)</p>			
	(OR)			
8.	<p>Consider a linear system described by the state model $\dot{X} = AX$; $Y = C$, where $A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix}$; $C = [1 \ 0 \ 0]$. Design a full-order state observer. The desired Eigen values for the observer matrix are -5,-5</p>	14	CO5	L6
	Unit V			
9.	a) Write down the Liapunov Stability and instability Theorems.	8	CO2	L2
	b) Consider a non-linear system governed by the equations $\dot{x}_1 = -x_1 + 2x_1^2x_2$ and $\dot{x}_2 = -x_2$. Determine the Stability	6	CO2	L4
	(OR)			
10.	a) Consider a linear autonomous system described by the state equation $\dot{X} = AX$. Prove that the system has a unique solution $A^T P + PA = -Q$. Where P and Q are Positive Definite matrices.	10	CO3	L4
	b) Consider the Second-order system described by $\begin{pmatrix} \dot{x}_1 \\ \dot{x}_2 \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ -1 & -1 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$ Determine the Stability of the system, whose equilibrium state is the origin.	4	CO2	L3

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

V semester (R18) 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) Define modes of heat transfer in detail

(6marks)

b) The inside surface of a hollow sphere is electrically heated with a constant heat flux of $1.5 \times 10^4 \text{ W/m}^2$. The outer surface is exposed to the ambient fluid at a temperature of 60°C with a heat transfer coefficient of $50 \text{ W/m}^2\text{K}$. 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 $q_g \text{ W/m}^3$ 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 3 mm 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°C 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°C is suddenly immersed in a liquid at 120°C for which the convective heat transfer coefficient is $100 \text{ W/m}^2\text{K}$. Determine the time required for the rod to reach a temperature of 200°C . $\rho = 8238 \text{ kg/m}^3$, $C = 468 \text{ J/kg}$, $k = 13.4 \text{ W/mK}$

(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 A very long 25 mm diameter copper rod $k=380 \text{ W/m}$ $^\circ\text{C}$ extends horizontally from a plane heated wall 120 C . The temperature of the surrounding air 25° C and convective heat transfer coefficient is $9 \text{ W/m}^2\text{C}^\circ$ determine the heat loss

(7marks)

PTO

Unit-III

5. a) State Planck's law, Kirchoff's law, Stefan Boltzmann law (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) explain about radiation properties (7marks)

Unit-IV

7. a) What is the physical significance of Grashoff 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°C in a room at 20°C . Treat the radiator as a vertical plate. (10marks)

(OR)

8. a) Distinguish between Bulk mean temperature and Film temperature. (4marks)
 b) Air at 20°C and 1 atmosphere flows over a flat plate at 35 m/sec. The plate is 75cm long and is maintained at 60°C . 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°C to 44°C using 40000 kg/hr of water entering at 5°C . Calculate the surface area required for counter flow exchanger. Take $U = 580 \text{ w/m}^2\text{k}$, C_p for water 4180 j/kgC, C_p for alcohol = 3760 j/kgC. (7marks)

(OR)

10. a) what is boiling ,explain types of boiling in detail. (8marks)
 b)explain about film wise and drop wise condensation in detail (6marks)

Code: 1803502

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

B.Tech V semester (R18) Regular Examinations, JAN-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° . 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 Rivited joints
(b) Design a double riveted butt joint with two cover plates for the longitudinal seam of a boiler shell 1.5 m in diameter subjected to a steam pressure of 0.95 N/mm². Assume joint efficiency as 75%, allowable tensile stress in the plate 90 MPa ; compressive stress 140 MPa ; and shear stress in the rivet 56 MPa.

Code: 1503502

- 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° 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 stress of 700 MPa and a ultimate shear stress of 500 MPa. Assuming a factor of safety as 6, determine the diameter of shaft
- 9 Sketch and explain design procedure for Sleeve and cotter joint

OR

- 10 (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.

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)**V semester (R18) Regular Examinations JAN-2021****METROLOGY****(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) Name and sketch three main types of fits. (7marks)
 b) A hole and mating shaft are to have a nominal assembly size of 40mm the assembly is to have maximum clearance of 0.15mm and minimum clearance of 0.05mm the hole tolerance is 1.5 times the shaft tolerance. Determine the limits for both hole and shaft. By using hole basis system and shaft basis system. (7marks)

(OR)

2. a) Difference between hole basis system and shaft basis system. (7marks)
 b) Explain terms interchangeability and selective assembly enumerates the differences between them. (7marks)

Unit-II

3. a) Differentiate between line standard and end standard. (7marks)
 b) Explain various methods of measuring angles and tapers. (7marks)

(OR)

4. a) Explain Taylor's Principle of gauge design. (7marks)
 b) Explain the phenomenon of Wringing? and the grades of slip gauge. (7marks)

Unit-III

5. a) Describe with a neat sketch working principle of a Autocollimator. (7marks)
 b) Describe with a neat sketch working principle of a NPL gauge interferometer. (7marks)

(OR)

6. a) Explain about Tomlinson surface meter. (7marks)
 b) Distinguish the difference between surface roughness and waviness? (7marks)

Unit-IV

7. a) Explain about two wire and three wire method. (7marks)
 b) Describe the pitch measurement of internal screw threads by various methods.(7marks)

(OR)

8. a) Enlist the instruments and equipment essential for performing alignment tests. (7marks)
 b) Explain in detail with suitable sketches about various alignment tests performed on a lathe. (7marks)

Unit-V

9. a) Define CMM write the application of CMM. (7marks)
- b) Explain the working principle of Parkinson gear tester. (7marks)

(OR)

10. a) write the advantages and dis advantages of mechanical comparator (7 marks)
- b) Explain the working principle of pneumatic comparators. (7 marks)

Model Paper

Code: 1803504

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

B.Tech V semester (R18) Regular Examinations, JAN-2021

**Dynamics of Machinery
(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. Four masses A,B,C and D revolve at equal radii and are equally spaced along a shaft. The mass B is 7Kg and the radii of C and D make angles of 90° and 240° respectively with the radius of B. Find the magnitude of the masses A,C, and D and the angular position of A so that the system may be completely balanced. (14M)

OR

2. (a) Explain the 'Direct and Reverse crank' method for determining unbalanced forces in radial engines. (7M)

(b) The pistons of a 60° twin V engine has strokes of 120 mm. The connecting rods driving a common crank has a length of 200 mm. The mass of the reciprocating parts per cylinder is 1 kg and the speed of the crank shaft is 2500 rpm. Determine the magnitude of the primary and secondary forces. (7M)

UNIT II

3. In a turning moment diagram, the areas above and below the mean torque line taken in order are 4400,1150, 1300 and 4550 mm² respectively. The scales of the turning moment diagram are:Turning moment, 1 mm = 100 N-m ; Crank angle, 1 mm = 1° Find the mass of the flywheel required to keep the speed between 297 and 303 r.p.m., if the radius of gyration is 0.525 m. (14M)

OR

4. A. Explain the turning moment diagram of a four stroke cycle internal combustion engine. (4M)
- b. A single cylinder internal combustion engine working on the four stroke cycle develops 75 kW at 360 r.p.m. The fluctuation of energy can be assumed to be 0.9 times the energy developed per cycle. If the fluctuation of speed is not to exceed 1 per cent and the maximum centrifugal stress in the flywheel is to be 5.5 MPa, estimate the mean diameter and the cross-sectional area of the rim. The material of the rim has a density of 7.2 Mg/m³. (10M)

UNIT III

5. In a Porter governor, the upper and lower arms are each 250 mm long and are pivoted on the axis of rotation. The mass of each rotating ball is 3 kg and the mass of the sleeve is 20 kg. The sleeve is in its lowest position when the arms are inclined at 30° to the governor axis. The lift of the sleeve is 36 mm. Find the force of friction at the sleeve, if the speed at the moment it rises from the lowest position is equal to the speed at the moment it falls from the highest position. Also, find the range of speed of the governor. (14M)

OR

6. A. Explain the terms and derive expressions for 'effort' and 'power' of a Porter governor. (6M)

b. The spring controlled governor of the Hartung type has two rotating masses each of 2.5 kg and the limits of their radius of rotation are 100 mm and 125 mm. The each mass is directly controlled by a spring attached to it and to the inner casing of the governor as shown in Fig 18.26 (a). The stiffness of the spring is 8 kN/m and the force on each spring, when the masses are in their mid-position, is 320 N. In addition, there is an equivalent constant inward radial force of 80 N acting on each revolving mass in order to allow for the dead weight of the mechanism. Neglecting friction, find the range of speed of the governor. (9M)

UNIT IV

7. A. Describe with sketches one form of torsion dynamometer and explain with detail the calculations involved in finding the power transmitted. (14M)

b. A differential band brake acting on the $\frac{3}{4}$ th of the circumference of a drum of 450 mm diameter, is to provide a braking torque of 225 N-m. One end of the band is attached to a pin 100 mm from the fulcrum of the lever and the other end to another pin 25 mm from the fulcrum on the other side of it where the operating force is also acting. If the operating force is applied at 500 mm from the fulcrum and the coefficient of friction is 0.25, find the two values of the operating force corresponding to two directions of rotation of the drum. (14M)

OR

8. (a) Explain the terms Spin, Precession and gyroscopic acceleration. (4M)

(b) An aero plane makes a complete half circle of 50 m radius, towards left, when flying at 200 Kmph. The rotary engine and the propeller of the plane has a mass of 400 kg with a radius of gyration of 300 mm. The engine runs at 2400 rpm clockwise, when viewed from rear. Find the gyroscopic couple on the aircraft and state its effect. (10M)

Unit-V

9. (a) Discuss briefly with neat sketches the longitudinal, transverse and torsional vibrations. (4M)
- (b) A weight of 75 N hangs from a spring and makes damped oscillations. The time for 60 oscillations is 35 sec and the ratio of first to seventh displacement is found to be 2.5. Find (i) the stiffness of the spring (ii) the damping resistance in N/m/s (iii) if the oscillations were critically damped what is the damping resistance required in N/m/s. (10M)

(OR)

10. (a) Define critical speed and Logarithmic decrement. (4M)
- (b) The moments of inertia of 3- rotors A, B and C are respectively 250 kg-m^2 , 300 kg-m^2 and 550 kg-m^2 respectively. The distance between A and B is 3 m and between B and C is 8 m. The shaft is 20 cm diameter and the modulus of rigidity for the shaft material is $7 \times 10^{10} \text{ N/m}^2$. Find the frequencies of the free torsional vibrations of the system. (10M)

Code: (1803506)

K.S.R.M COLLEGE OF ENGINEERING, KADAPA (AUTONOMOUS)
B.Tech ME V Semester (R18) Regular Examinations, DEC-2020**AUTOMOBILE ENGINEERING***(Mechanical Engineering)*

Model Question Paper

Time:3 hours

Max Marks: 70

Answer any five questions. Selecting one question from each unit
All questions carry equal marks

UNIT I

1. (a) Draw the layout of an automobile and indicate its various components. (7 Marks)
(b) List out the functions of frame in an automobile and explain semi integral frame. (7 Marks)

OR

2. (a) Explain the Working of four stroke cycle (petrol) SI engine. (7 Marks)
(b) Write a short note on types of variable valve timing. (7 Marks)

UNIT II

3. (a) Discuss about working principle of single plate clutch . (7 Marks)
(b) Explain the sliding mesh gearbox with a suitable sketch. (7 Marks)

OR

4. (a) Explain the working principle of fluid flywheel with the help of a sketch. (7 Marks)
(b) Explain about Hotchkiss drive. (7 Marks)

UNIT III

5. (a) Explain Davis steering gear mechanism . (7 Marks)
(b) Write Functions of suspension system and what are the advantages of independent suspension system? (7 Marks)

OR

6. (a) Explain the working of disc brake system. (7 Marks)
(b) Discuss the need of ABS in automobiles. (7 Marks)

UNIT IV

7. (a) Explain electrolysis process in hydrogen production. (7 Marks)
(b) What are the advantages and limitations of Electric vehicle? (7 Marks)

OR

8. (a) How do alkaline fuel cells work? Explain with its sketch. (7 Marks)
(b) Describe the salient features of using LPG as an alternate fuel. (7 Marks)

UNIT V

- (9). (a) Explain the working of a zenith carburetor with a neat sketch. (7 Marks)
(b) Explain working principle of electronic fuel injection system. (7 Marks)

OR

- (10). (a) With a neat sketch, explain the working of a magneto coil ignition system (7 Marks)
(b) Explain a turbocharger with a neat sketch. (7 Marks)

Code No: 1804501
K.S.R.M. COLLEGE OF ENGINEERING (Autonomous), KADAPA.
V Sem B.Tech. (III Year I Semester) (R18)
Common to ECE & EEE
Subject: MICROPROCESSORS & MICROCONTROLLERS
Model Paper

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 various registers in 8085 microprocessor? Explain? [8 Marks]
(b) Explain different addressing modes supported by 8085 microprocessor. [6 Marks]
- (OR)**
2. (a) Explain the internal architecture of an 8086 microprocessor with a block diagram. [10 Marks]
(b) Is it possible for two segments to get overlap in 8086? How? [4 Marks]

UNIT-II

3. (a) Explain SEGMENT, END, EVEN, PROC assembler directives. [6 Marks]
(b) Write an alp to sort the given numbers in ascending order. [8 Marks]
- (OR)**
4. (a) Explain various Data transfer schemes. [8 Marks]
(a) Interface two 16KB ROMs and two 8KB SRAMs with 8086 microprocessor. [6 Marks]

UNIT-III

5. (a) Explain the CWR of programmable interval timer? [6 Marks]
(b) Explain internal block diagram of 8251 USART. [8 Marks]
- (OR)**
6. (a) 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? [8 Marks]
(b) Write an alp to generate triangular waveform using DAC? [6 Marks]

UNIT-IV

7. (a) Compare the differences between RISC and CISC. [4 Marks]
(b) Describe the internal architecture of the 8051 microcontroller with a neat block diagram. [10 Marks]
- (OR)**
8. (a) Interface 16Kbytes of ROM and 8Kbytes of RAM to the 8051 microcontroller, such that the starting address of ROM is C000H and RAM is 8000H. [8 Marks]
(b) Write a program to generate a delay of 1 hour. Assume that the oscillator frequency is 12 MHZ.[6 Marks]

UNIT-V

9. (a) Explain the major design rules for implementing RISC and ARM philosophy. [6Marks]
(b) What are the various registers in ARM? Explain? [8Marks]
- (OR)**
10. (a) Explain the thumb data processing instructions of ARM? [8 Marks]
(b) Explain Single register load-store instructions of ARM? [6 Marks]

KSRM College of Engineering (AUTONOMOUS), KADAPA

B. Tech., V Semester (R18) Regular Examinations of November 2020

Sub: Microprocessor & Microcontrollers

Time: 3 Hrs

Max. Marks: 70

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

All questions carry equal marks

UNIT-I

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

(OR)

2. (a) Explain the internal architecture of an 8086 microprocessor with a block diagram. [10 M]
 (b) Is it possible for two segments to get overlap in 8086? How? [4 M]

UNIT-II

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

(OR)

4. (a) Explain various Data transfer schemes. [8 M]
 (b) Interface two 16KB ROMs and two 8KB SRAMs with 8086 microprocessor. [6 M]

UNIT-III

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 (b) Explain internal block diagram of 8251 USART. [8 M]

(OR)

6. (a) 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? [8 M]
 (b) Write an alp to generate triangular waveform using DAC? [6 M]

UNIT-IV

7. (a) Compare the differences between RISC and CISC. [4 M]
 (b) Describe the internal architecture of the 8051 microcontroller with a neat block diagram. [10 M]

(OR)

8. (a) Interface 16Kbytes of ROM and 8Kbytes of RAM to the 8051 microcontroller, such that the starting address of ROM is C000H and RAM is 8000H. [8 M]
 (b) Write a program to generate a delay of 1 hour. Assume that the oscillator frequency is 12 MHZ. [6 M]

UNIT-V

9. (a) Explain the major design rules for implementing RISC and ARM philosophy. [6M]
 (b) What are the various registers in ARM? Explain? [8M]

(OR)

10. (a) Explain the thumb data processing instructions of ARM? [8 M]
 (b) Explain Single register load-store instructions of ARM? [6 M]

Subject Code: **1804502**

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

V SEMESTER (R18)

Branch: ECE

Model Paper

Subject: **DIGITAL SIGNAL PROCESSING**

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) State and prove the following properties of DFS
 - i) Time shift of a sequence ii) Periodic convolution
- (b) Obtain the 4-point circular convolution of by using concentric method
$$h(n) = \{1, -1, 1, 0\}, \quad x(n) = \{1, 2, 3, 3\}$$

OR

2. (a) State and prove the following properties of DFT
 - i) Time reversal of a sequence ii) Circular time shift
- (b) Compute the 8-point DFT of the sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$ by using DIT FFT.

UNIT-II

3. (a) Obtain the Direct-form-I and the Direct-form II structures for the given system

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

- (b) Realize the linear phase filter with response

$$h(n) = \delta(n) + \frac{1}{2}\delta(n-1) - \frac{1}{4}\delta(n-2) + \frac{1}{2}\delta(n-3) + \delta(n-4)$$

OR

4. (a) Give direct-form-I and direct-form II structure of second order system realization.
- (b) Realize the linear phase filter with response

$$H(z) = (1/2) + (1/3)z^{-1} + z^{-2} + (1/4)z^{-3} + z^{-4} + (1/2)z^{-5}$$

UNIT-III

5. a) Derive the expression for the order of Chebyshev Type-1 filter.
- b) Design a Butterworth filter for the following specification using Impulse invariant technique.

$$0.8 \leq |H(e^{j\omega})| \leq 1, \quad 0 \leq \omega \leq 0.2\pi$$

$$|H(e^{j\omega})| \leq 0.2, \quad 0.6\pi \leq \omega \leq \pi$$

OR

6. a) Distinguish between Butterworth and Chebyshev type-1 filters.
 b) Design a Chebyshev filter for the following specification using Bilinear Transformation.

$$0.8 \leq |H(e^{j\omega})| \leq 1, \quad 0 \leq \omega \leq 0.2\pi$$

$$|H(e^{j\omega})| \leq 0.2, \quad 0.6\pi \leq \omega \leq \pi$$

UNIT-IV

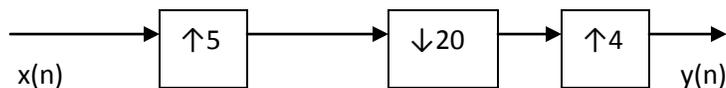
7. (a) Distinguish between FIR and IIR filters.
 b) Design an ideal differentiator with frequency response $H(e^{j\omega}) = j\omega$, $-\pi \leq \omega \leq \pi$ using rectangular window with $N=7$. Plot frequency response.

OR

8. (a) Explain the procedure for designing FIR filters using windows.
 (b) Explain the working principle of Dual Tone Multiple Frequency system.

UNIT-V

9. (a) Explain Decimation by a factor M.
 (b) Obtain the expression for the output $y(n)$ in terms of $x(n)$ for the multirate system given as follows



OR

10. (a) Explain Interpolation by a factor L.
 (b) Explain Multistage implementation of sampling rate conversion.

Code: 1804503

KSRM COLLEGE OF ENGINEERING, KADAPA(AUTONOMOUS)

B. Tech., V SEM. ECE MODEL PAPER

SUB: COMPUTER ORGANIZATION

Time: 3Hrs

Max. Marks: 70

Note: Answer *five* of the following
Choosing one from each unit

UNIT – I

- 1.(a) Classify the computer types available. 7M
(b) With the help of examples explain the micro shift operations. 7M

(OR)

- 2.(a) Illustrate the ALU units. 7M
(b) Illustrate the bus structures used in processor. 7M

UNIT – II

- 3.(a) Explain the memory reference instructions. 7M
(b) Explain about interrupts. 7M

(OR)

- 4.(a) Write a short note on address sequencing. 7M
(b) Explain about control memory. 7M

UNIT – III

- 5.(a) Illustrate the usage of stack memory. 7M
(b) Explain various addressing modes along with an example for each. 7M

(OR)

- 6.(a) Explain about arithmetic pipelining. 7M
(b) Explain about instruction pipelining. 7M

UNIT – IV

- 7.(a) Write short notes on asynchronous data transfer. 7M
(b) Explain about priority interrupt. 7M

(OR)

- 8.(a) What is DMA? Explain in detail. 7M
(b) Explain about serial communication. 7M

UNIT – V

- 9.(a) Write the difference between main memory and auxiliary memory. 7M
(b) Write about cache memory. 7M

(OR)

- 10.(a) Explain about interprocessor communication. 7M
(b) What is cache coherence? Explain. 7M

Code: 1804504

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

V SEMESTER (R18) Branch: ECE

Model Paper

Subject: **ANALOG COMMUNICATIONS**

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). Define the following terms of a signal (i) Frequency (ii) Phase (iii) Time period and (iv) Wave length? (7M)

1. b). Derive expression for Full AM modulation and draw the frequency plot of Full AM signal with its frequencies. (7M)

OR

2. a) Obtain the expression for the relationship between the Total side band power and Total power of amplitude modulated signal. (7M)

2. b) Explain the generation of AM signal using Square law modulator. (7M)

UNIT-II

3. a) Obtain the expression for (i) Frequency modulation (ii) Phase modulation from angle modulation and draw the respective plots. (7M)

3. b) Explain (i) Narrow band frequency modulation (ii) Wide Band frequency modulation using Bessel's function. (7M)

OR

4. Discuss about the direct and indirect methods of generating FM signals. (14 M)

UNIT-III

5. Explain the functioning of super heterodyne AM and FM receivers. (14 M)

OR

6. Explain the Measurement of sensitivity, selectivity, and choice of Intermediate frequency in Radio transmitter and receiver. (14 M)

UNIT-IV

7. a) Explain about the External and internal sources of noise and Noise calculations. (7M)

7. b) Explain about Noise figure and Noise temperature. (7M)

OR

8. a) Discuss about the effect of noise in AM and FM modulation system. (7 M)

8. b) Explain about Pre-emphasis and de-emphasis. (7 M)

UNIT-V

9. a) Define sampling theorem and Practical aspects of sampling; (7 M)

9. b) Explain about Flat top sampling. (7 M)

OR

10. Explain the generation and detection of PAM, PDM and PPM. (14M)

Code: 1804505

KSRM COLLEGE OF ENGINEERING(AUTONOMOUS), KADAPA
B. TECH. V SEM (R18) ECE
SUB: DIGITAL IC APPLICATIONS (DICA)
MODEL PAPER

TIME: 3HRS

Max. Marks: 70

Note: Answer any *five* of the following
Choosing *one* from each unit

<u>UNIT-I</u>		
1.(a)	Draw the circuit diagram of basic CMOS inverter gate and explain its operation.	7M
(b)	Design a 4-input CMOS AND-OR-INVERT gate. Draw the logic diagram and function table.	7M
(OR)		
2.(a)	Explain about BiCMOS with BiCMOS inverter circuit	7M
(b)	Comparison of TTL,ECL,CMOS	7M
<u>UNIT-II</u>		
3.(a)	Describe a HDL design flow with neat block diagram	7M
(b)	Explain the Verilog behavioral (procedural) model in detail with an example.	7M
(OR)		
4.(a)	Write syntax for a. Declaration of Verilog net types,vector, constants, reg type and always block. b. Case statement, if-else statement, for statement and initial block	7M
(b)	Design a 4 bit prime number detector circuit and write a Verilog dataflow module	7M
<u>UNIT-III</u>		
5.(a)	Design a 4-to-16 Decoder using 74x138s.	7M
(b)	Write a Verilog module for 74x138 3-to-8 Decoder.	7M
(OR)		
6.(a)	Design a 4 bit binary to gray code converter	7M
(b)	Write a Verilog code for the above design	7M
<u>UNIT-IV</u>		
7.(a)	Illustrate a 16-bit comparator using 74x85 ICs.	7M
(b)	Write a Verilog module for an 8-bit comparator.	7M
(OR)		
8.(a)	Design a full adder using two half adders	7M
(b)	Write a Structural verilog module for full adder	7M
<u>UNIT-V</u>		
9.(a)	Draw the logic symbol for 74x163 synchronous 4 bit binary counter and explain Its Operation in free running mode with state table and suitable wave forms.	7M
(b)	Write the Verilog code for the above IC.	7M
(OR)		
10.(a)	Explain the operation of JK Flip Flop with preset and clear and draw relevant wave forms.	7M
(b)	Write a behavioral Verilog module for DFF with preset and clear	7M

Code: 1804506
MODEL QUESTION PAPER (R18)
BTECH V SEM - ECE (2020-21)
SUB: ANTENNAS AND WAVE PROPAGATION

MARKS: - 70

UNIT-1

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 6 M
- $$U(\theta, \varphi) = \begin{cases} \sin^2 \theta \sin \varphi & 0 \leq \theta \leq \pi; \quad 0 \leq \varphi \leq \pi \\ 0 & 0 \leq \theta \leq \pi; \quad \pi \leq \varphi \leq 2\pi \end{cases}$$

(OR)

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

UNIT-2

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-3

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-4

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-5

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

KSRM College of Engineering (AUTONOMOUS), KADAPA

B. Tech., V Semester (R18) Regular Examinations of November 2020

Sub: Linear Digital & IC Applications

Time: 3 Hrs

Max. Marks: 70

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

All questions carry equal marks

Unit I

1. (a). Explain about block diagram of IC741? [7M]
(b). Explain about inverting and non inverting amplifier? [7M]

(OR)

2. (a). Explain about DC characteristics of op-amp? [7M]
(b). Explain about ideal and practical op-amp? [7M]

Unit II

3. (a). Explain about converters (I to V) and (V to I)? [7M]
(b). Explain about the Precision Rectifier? [7M]

(OR)

4. (a). Explain about inverting integrator of op-amp with output waveforms? [7M]
(b). Explain Schmitt trigger and regenerative comparator? [7M]

Unit III

5. (a) Explain Mono stable Multi vibrator using IC 555 with necessary equations? [7M]
(b) Explain about IC 565 PLL and its basic principles? [7M]

(OR)

6. (a). Explain Astable Multi vibrator using IC 555 with necessary equations? [7M]
(b) Explain about Schmitt Trigger using IC 555 with neat sketch? [7M]

Unit IV

7. (a) Explain the CMOS study state electrical behavior? [7M]
(b) Explain the process of TTL logic families? [7M]

(OR)

8. (a) Explain the concept of CMOS/TTL interfacing? [7M]
(b) Explain bipolar logic families? [7M]

Unit V

9. (a) Write a Verilog program on 3 to 8 Decoder using Behavioral design? [10M]
(b) Difference between dataflow design and structural design with example? [4M]

(OR)

10. (a) Explain multiplexer and de multiplexer code converters ? [7M]
(b) Write a Verilog program on full adder? [7M]