Q.P. Code: 1801501 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Solid Mechanics - II (CE)

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

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

UNIT - I

1. A Rectangular block of material is subjected to a tensile stress of 110 N/mm^2 on one plane and a tensile stress of 47 N/mm^2 on a plane at right angle, together with shear stresses of 63 N/mm^2 on the same planes, find: **14M**
   (i) The direction of the principal planes.
   (ii) The magnitude of Principal stresses.
   (iii) The magnitude of greatest shear stress.

(OR)

2. Explain about any three theories of failures in Detail. **14M**

UNIT – II

3. Derive the expressions for Hoop stress and longitudinal stress with neat sketch. **14M**

(OR)

4. A Compound cylinder is made by shrinking a tube of 160 mm internal diameter and 20 mm thick over another tube of 160 mm external diameter and 20 mm thick. The radial pressure at the common surface, after shrinking, is 8 N/mm^2. Find the final stresses set up across the section, when the compound cylinder is subjected to an internal fluid pressure of 60 N/mm^2. **14M**

UNIT – III

5. Derive an expression for crippling load when one end of the column is fixed and the other end is hinged. **14M**

(OR)

6. Find the crushing load by Rankine's formula for a hollow C.I. column of 300mm external diameter, thickness of metal 40mm and 8 meters long, if both ends are fixed. Take f_c = 550 N/mm^2 and a = 1/1600. **14M**

UNIT – IV

7. Explain the following: **14M**
   (i) Core of a section.
   (ii) Combined stresses.
   (iii) Eccentric loading.
   (iv) Slenderness Ratio.

(OR)

8. A beam of rectangular cross section, 90 mm wide and 140 mm deep is subjected to a bending moment of 35 KN – m. The trace of the plane of loading is inclined at 45^0 to the YY – axis. Locate the neutral axis of the section and calculate the bending stresses induced at each corner of the beam. **14M**

UNIT-V

9. A Rectangular section of 90 mm wide and 130 mm deep is subjected to a bending moment of 15KNm. The trace of a plane of loading is inclined at 45^0 to YY axis of the section. Locate the neutral axis and find the maximum stress induced in the section. **14M**

(OR)

10. (a) What is Unsymmetrical bending? **7M**
    (b) Determine the principal moments of inertia for an unequal angle section 200 x 150 x 10 mm. **7M**

Q.P. Code: 1801502 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Hydraulics Machinery (CE)

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

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

1. Derive expression for the force exerted by a jet on stationary curved plate when the jet strikes the curved plate at one end tangentially under symmetrical condition of plate. 14M
2. A jet of water having a velocity of 30 m/s strikes a smooth curved vane which is moving with a velocity of 10 m/s. The jet makes an angle of 30^0 with the direction of motion of vane at the inlet and leaves at an angle of 90^0 to the direction of motion of vane at the outlet. Draw velocity triangles at the inlet and outlet. Also determine 14M
   (i) The vane angles at inlet and outlet so that water enters and leaves the vane without shock and
   (ii) Work done per second per unit weight of water striking the vane per second.
3. Give a general layout of a hydroelectric power plant. Also define the terms gross head, net head and other terms. 14M
4. Give comparisons between impulse turbine and reaction turbine. 14M
5. Define and derive an expression for specific speed of a turbine. What is the physical significance of it? 14M
6. A turbine is to operate under a head of 25 m at 200 rpm. The discharge is 9 m^3/s. If the efficiency is 90%, then determine the performance of turbine under a head of 20m. 14M
7. What is cavitation and its causes? How it can be prevented in centrifugal pumps? 14M
8. The following data are given for a centrifugal pump, such as outer diameter = 2 x internal diameter, speed = 3000 rpm, internal diameter = 0.1 m, impeller width at outlet = 0.02 m, vane angle at outlet = 30^0, constant flow velocity = 3 m/s, manometric efficiency = 0.8 and overall efficiency = 0.7. Calculate 14M
   (i) Vane angle at the inlet
   (ii) Rate of discharge
   (iii) Manometric head
   (iv) Shaft power and
   (v) Torque.
9. For a single acting reciprocating pump, the diameter and the length of the suction pipe are 5 cm and 6 m and that of delivery pipe is 4 cm and 18 m, respectively. The diameter of the piston and strike length is 0.124 m and 0.224m, respectively. The centre of the pump is 4 m above the water level in the sump and the delivery tank is 16 m above the centre line of the pump. The separation of water occurs at 7.8 m below the atmospheric pressure head. Determine maximum speed at which the pump can run without separation. 14M
10. Explain the constructional and working details of a hydraulic intensifier. Also mention some of the systems in which it is used. 14M

Q.P. Code: 1801503 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Structural Analysis – I (CE)

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

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

UNIT – I

1. A fixed beam AB of length 9m carries two point loads each of 200 kN at one-third and two-third of the span. Find the fixed end moments and the reactions at the supports. Draw bending moment diagram and shear force diagram. 14M

(OR)

2. A fixed beam AB of span 6 m carries uniformly varying load of intensity zero at A and 20 kN/m at B. Find the fixed end moments and draw the B.M. and S.F. diagrams for the beam. 14M

UNIT – II

3. A continuous beam of three equal spans is simply supported over two supports. It is loaded with a uniformly distributed load of w/unit length, over the two adjacent spans only. Using the theorem of three moments, find the support moments and sketch the bending moment diagram. Assume EI constant. 14M

(OR)

4. A continuous beam ABCD 20 m long is fixed at A, simply supported at D and carried on the supports B and C at 5 m and 12 m from the left end A. It carries two concentrated loads of 80 kN and 40 kN at 3 m and 8 m respectively from A and uniformly distributed load of 12 kN/m over the span CD. Analyse the beam by theorem of three moments and draw the shear force and bending moment diagrams. 14M

UNIT – III

5. Analyse the two span continuous beam loaded as shown in Fig. 1 by the slope deflection method and draw the bending moment and shear force diagrams. 14M

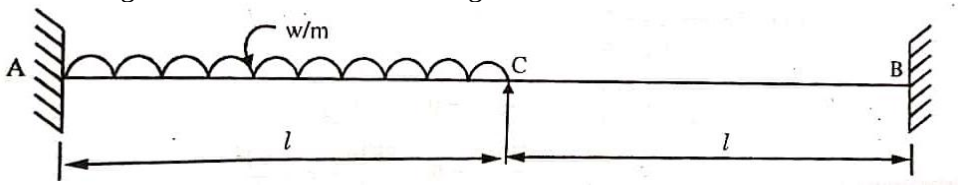


Fig. 1

(OR)

6. ABC is a continuous beam with constant EI throughout its length. The length of AB is 10m and BC is 12m. The end supports A and C are fixed and the beam is continuous over middle support B. Span BC is uniformly loaded with 9 kN per metre length while a concentrated vertical downward load of 120 kN acts at the mid-span of AB. Calculate the moments by slope deflection method. 14M

UNIT – IV

7. Analyse the continuous beam loaded as shown in Fig. 2 by the moment distribution method. Draw the bending moment and shear force diagrams. 14M

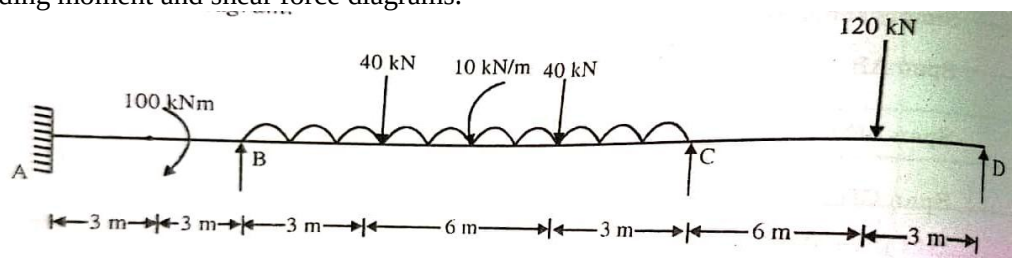


Fig. 2

(OR)

8. Draw the bending moment diagram for the beam loaded as shown in Fig. 3, when support B sinks by 10mm below the levels of A, C and D. Assume E = 200 GPa, I = 132 x 10^6 mm^4 for all the members. Use the moment distribution method. 14M

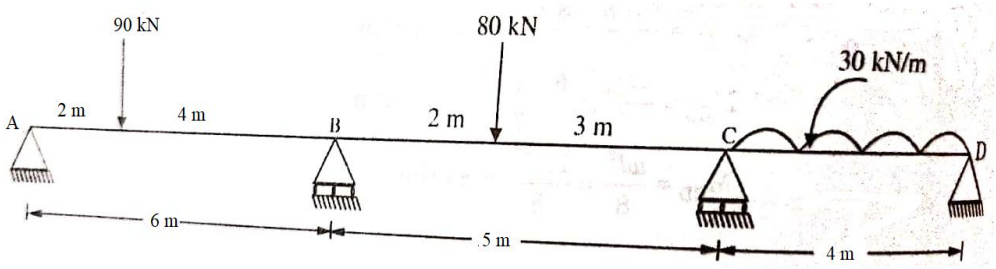


Fig. 3

UNIT-V

9. (a) Determine the expression for strain energy of the prismatic beam AB for the loading as shown in figure below. Take into account only the effect of normal stresses due to bending. 9M

   (b) Evaluate the strain energy for the following values of the beam P = 208 KN ; L = 3.6 m = 3600 mm A = 0.9 m = 90mm ; b = 2.7m = 2700 mm E = 200 GPa ; I = 104 x 10^8 mm^4 5M

(OR)

10. (a) Derive the expression for Strain energy due to bending moment. 7M

    (b) Derive the expression for Strain energy due to axial loading. 7M

Q.P. Code: 1801504 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Geotechnical Engineering (CE)

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

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

UNIT – I

1. (a) Derive relation expression eS=wG **7M**
   (b) The porosity of a soil sample is 35% and the specific gravity of its particles is 2.7. Calculate its void ratio, dry density, saturated density and submerged density. **7M**

(OR)

2. (a) Explain I.S. classification of coarse grained soils **7M**
   (b) The dry unit weight of a sand sample in the loosest state is 13.34 kN/m^3 and in the densest state, it is 21.19 kN/m^3. Determine the density index of this sand when it has a porosity of 33%. Assume the grain specific gravity as 2.68. **7M**

UNIT – II

3. (a) Describe the factors affecting permeability of soils. **7M**
   (b) Determine the neutral and effective stress at a depth of 16 m below the ground level for the following conditions: Water table is 3 m below ground level ; G = 2.68; e = 0.72; average water content of the soil above water table is 8%. **7M**

(OR)

4. (a) Explain the phenomenon of ''Piping'' **7M**
   (b) A deposit of cohesionless soil with a permeability of 3×10^{-2} cm/s has a depth of 10 m with an impervious ledge below. A sheet pile wall is driven into this deposit to a depth of 7.5 m. The wall extends above the surface of the soil and a 2.5 m depth of water acts on one side. Sketch the flow net and determine the seepage quantity per metre length of the wall. **7M**

UNIT – III

5. (a) Distinguish between Boussinesq and Westergaard theories of stress distribution in soils **7M**
   (b) Derive the principle of construction of Newmark's chart and explain its use. **7M**

(OR)

6. (a) What is meant by pressure bulb? What is its significance? **7M**
   (b) A concentrated load of 22.5 kN acts on the surface of a homogeneous soil mass of large extent. Find the stress intensity at a depth of 15 meters and (i) directly under the load, and (ii) at a horizontal distance of 7.5 metres. Use Boussinesq's equations. **7M**

UNIT – IV

7. (a) Derive an expression for 'zero air-void line' and draw the line for a specific gravity of 2.65. **7M**
   (b) An earth embankment is compacted at a water content of 18% to a bulk density of 19.2 kN/m^3. If the specific gravity of the sand is 2.7, find the void ratio and the degree of saturation of the compacted embankment. **7M**

(OR)

8. (a) State the assumptions made in Terzaghi's theory of one-dimensional consolidation **7M**
   (b) In a consolidation test the following results have been obtained. When the load was changed from 50 kN/m^2 to 100 kN/m^2, the void ratio changed from 0.70 to 0.65. Determine the coefficient of volume decrease, mv and the compression index, C_c. **7M**

UNIT-V

9. (a) Explain the principle of the direct shear test. What are the advantages of this test ? What are its limitations? **7M**
   (b) Sketch the stress-strain relationship for dense and loose and. **7M**

(OR)

10. The following observations were made a sample of soil in tri-axial testing. **14M**

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

Q.P. Code: 1801505 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Environmental Engineering (CE)

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

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

UNIT – I

1. (a) Explain the need for protected water supply system. 6M
   (b) Define the term "per capita demand". Write the factors affecting per capita demand 8M

(OR)

2. (a) Explain the fluctuations in water demand. 5M
   (b) Estimate the population of a city for the year 2031, based on the following data by using Geometric method and Incremental increase methods. 9M

Year	1961	1971	1981	1991	2001	2011
Population	70000	135000	210000	289000	391000	500000

UNIT – II

3. (a) Explain the various sources water for water supply system. 7M
   (b) Discuss in brief the physical characteristics of water 7M

(OR)

4. (a) Explain the significance of the following water quality parameters 8M
   i) Hardness ii) Chloride iii) Nitrate and iv) E-coli
   (b) Explain about water borne diseases. 6M

UNIT – III

5. (a) Design a circular sedimentation tank for a city having population 1 lakh. Assume suitable data if required. 7M
   (b) Explain the theory of sedimentation with coagulation. 7M

(OR)

6. (a) With neat sketch, explain working principle of rapid sand filter. 7M
   (b) What is disinfection? Explain the chlorination process 7M

UNIT – IV

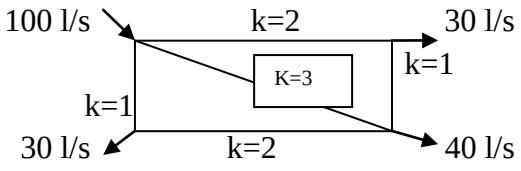
7. (a) Explain the methods of iron and manganese removal from water 7M
   (b) Discuss in brief about water softening processes. 7M

(OR)

8. (a) Explain the causes and effects of water pollution. 7M
   (b) Explain the importance of rain water harvesting. 7M

UNIT-V

9. (a) Explain the layouts of water distribution systems 7M
   (b) Estimate the flow in each of the pipes of distribution network given below using Hardy cross method with Hazen Williams formula. K value of each pipe is indicated 7M



(OR)

10. (a) Explain the various types of valves and their uses. 7M
    (b) Explain the principles of design of water supply in buildings. 7M

Q.P. Code: 1801506 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Transportation Engineering (CE)

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

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

UNIT – I

1. (a) Discuss the necessity of highway planning in India. 7M
   (b) Explain the factors affecting the highway alignment. 7M

(OR)

2. Explain the history of road development plans in India briefly bringing out their salient feature. 14M

UNIT – II

3. (a) Derive the expression for stopping sight distance at level and at gradients. 7M
   (b) Find the safe stopping sight distance for a design speed of 65 kmph. What will be the safe stopping sight distance, if 3% of up gradient is introduced on that location? Assume data suitably.

(OR)

4. (a) The speed and acceleration of overtaking vehicle are 60 kmph and 2.5 kmph per second respectively. Calculate the Overtaking sight distance for i) one way traffic ii) Two way traffic. Draw a neat sketch and show the features of overtaking sight distance. 7M
   (b) Define transition curve. What are its objects? Derive equation for the length of the transition curve. 7M

UNIT – III

5. (a) How the spot speed study conducted in the field and how the spot speed data is presented? 7M
   (b) Discuss the advantages and disadvantages of traffic signals. 7M

(OR)

6. (a) Explain the conditional and collision diagrams indetail in accident records. 7M
   (b) What are Road Markings? Explain the various types of marking with sketches 7M

UNIT – IV

7. (a) Differentiate between flexible and rigid pavements. 7M
   (b) Using the data below, calculate the stresses at interior, edge and corner regions of CC pavement by Westergaard's stress equations. 7M

   Modulus of elasticity of concrete = 3.1×10^5 kg/cm^2
   Poisson's ratio of concrete = 0.15
   Thickness of concrete slab = 25 cm
   Modulus of subgrade reaction = 12.0 kg/cm^2
   Wheel load = 5100 kg
   Radius of loaded area = 16 cm

(OR)

8. (a) Explain the design of flexible pavements as per IRC. 7M
   (b) Explain the construction of joints in Cement Concrete pavements. 7M

UNIT-V

9. (a) List out different tests on road aggregates. Explain any two test procedures. 7M
   (b) Explain the construction steps in bitumen concrete as per IRC recommendations.

(OR)

10. (a) List out different tests on bitumen. Explain any two test procedures. 7M
    (b) What are the requirements of a good highway drainage system? 7M

Q.P. Code: 1801510

SET - 2

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

B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021

SUB: Remote Sensing & GIS (CE)

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

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

UNIT – I

1.		Define Remote sensing. Write a short notes on (i) Snell's law (ii) Planck's law (iii)Stefan- Boltzmann's law	14M
		(OR)	
2.	(a)	Discuss classification of remote sensing.	6M
	(b)	Explain elements of remote sensing in detail	8M

UNIT – II

3.	(a)	Define a platform. Discuss classification of platforms in detail.	6M
	(b)	State the concept of resolution? Explain the spatial and radiometric resolutions in detail.	8M
		(OR)	
4.	(a)	Explain the satellite characteristics of IRS 1A and IRS 1B	6M
	(b)	Distinguish along track and across track sensors in detail	8M

UNIT – III

5.	(a)	Write a note on necessity of classification of images	6M
	(b)	Explain the techniques of image enhancement	8M
		(OR)	
6.	(a)	Write a note on visual interpretation techniques	6M
	(b)	Explain supervised classification in detail	8M

UNIT – IV

7.	(a)	Explain the components of GIS in detail	6M
	(b)	Explain GIS architecture in brief	8M
		(OR)	
8.	(a)	Differentiate CAM and VAM	6M
	(b)	Discuss vector data structures in detail	8M

UNIT-V

9.	(a)	Describe land use, land cover applications of remote sensing in detail.	6M
	(b)	Write a step by step procedure to delineate watershed using GIS	8M
		(OR)	
10.		Write a detailed note on Environmental monitoring using remote sensing and GIS	14M

Q.P. Code: 1802503 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Power Electronics (EEE)

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

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

UNIT – I

1.	(a)	Explain the working principle of n-type Metal Oxide Field Effect Transister (MOSFET)	5M
	(b)	Analyze the drain current versus drain source voltage characteristics for various values of gate source voltages.	9M
		(OR)	
2.	(a)	Explain the turn ON and turn OFF methods of SCR in detail.	7M
	(b)	What is commutation? Explain any two forced commutation methods.	7M

UNIT – II

3.	(a)	Explain the working principle of single phase half controlled converter by considering R-L load. Derive the expression for average output voltage. Assume the current to be continuous.	7M
	(b)	The single phase half controlled converter is connected to 120volt, 50 Hz supply. The load current can be assumed continuous and ripple free. If delay angle is 90°, Calculate (i) Average DC voltage (ii) RMS output voltage (iii)input power factor.	7M
		(OR)	
4.		Explain the working principle of 3 phase dual converter for both circulating and non-circulating current mode of operation. Derive the expression for circulating current.	14M

UNIT – III

5.	(a)	Compare SCR with TRIAC for R and RL loads	4M
	(b)	Explain the working principle of single phase mid-point cyclo-converter with R & RL loads whose output frequency is half of the supply voltage.	10M
		(OR)	
6.	(a)	Classify AC Voltage controllers? Mention its applications.	4M
	(b)	Explain the working principle of single phase bridge cyclo-converter with R & RL loads whose output frequency is one thrid of the supply voltage.	10M

UNIT – IV

7.	(a)	Explain the various control strategies of a DC chopper.	7M
	(b)	Explain the working principle of multi-phase chopper with relevant output voltage waveforms.	7M
		(OR)	
8.	(a)	Classify different types of chopper with neat sketches	4M
	(b)	A step-up chopper has input voltage of 200V and output voltage of 600V. If the non-circulation time of thyristor is 100 micro seconds. Calculate the required pulse width.	10M

UNIT-V

9.	(a)	Explain the operation of basic series inverter with relevant waveforms.	7M
	(b)	Discuss about output voltage control techniques in single phase inverter	7M
		(OR)	
10.	(a)	Discuss about any two forced commutation techniques in single phase inverter	7M
	(b)	Discuss about any two pulse width modulation techniques.	7M

Q.P. Code: 1802504 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Power System Operation and Control (EEE)

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

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

UNIT – I

1. (a) Derive the condition for maximum power transfer when a short transmission line is connected between synchronous generator and infinite bus. 5M

   (b) A synchronous generator of reactance 1.20 p.u is connected to an infinite bus bar ($|V|$=1.0 p.u.) through transformers and a line of total reactance of 0.60 p.u. The generator no load voltage is 1.20 p.u and its inertia constant is H = 4 MW-s/MVA. The resistance and machine damping may be assumed negligible. The system frequency is 50 Hz. Calculate the frequency of natural oscillations if the generator is loaded to (i) 50% (ii) 80% of its maximum power limit. 9M

(OR)

2. (a) Discuss the application of equal area criterion for the system stability study when a sudden increase in load takes place. 7M

   (b) Find the steady state power limit of a system consisting of a generator equivalent reactance 0.50 p.u connected to an infinite bus through a series reactance of 1.0 p.u. The terminal voltage of the generator is held at 1.20p.u and the voltage of the infinite bus is 1.0 p.u. 7M

UNIT – II

3. (a) Derive the mathematical formulation for short term hydro thermal scheduling. 7M

   (b) A constant load of 400 MW is supplied by two generators1 and 2 of capacity each 210 MW, the fuel cost characteristics are given as below. 7M

   C_1=0.05 P_{G1}^2+20P_{G1}+30 Rs. /hr.

   C_2=0.06 P_{G2}^2+15P_{G2}+40 Rs. /hr.

   The real power generation of units P_{G1} and P_{G2} are in MW.

   Determine the most economical load sharing between the generators.

(OR)

4. (a) What is your analyzation by considering the optimization problem with transmission loss consideration? 7M

   (b) The fuel cost of two units are given by 7M

   C_1=0.1 P_{G1}^2+25P_{G1}+1.6 Rs. /hr.

   C_2=0.1 P_{G2}^2+32P_{G2}+2.1 Rs. /hr.

   If the total demand on the system is 250MW, find the economical load distribution of the two units.

UNIT – III

5. (a) What is the function of the fly ball speed governor? 4M

   (b) A load is feeded by two plants, one is thermal and other is a hydro plant. The load is located near the thermal plant. The characteristics of the units are 10M

   C_T = 20+30P_{GT} + 0.04 P_{GT}^2 Rs. /hr.

   W_H =7.5P_{GH}+0.0012P_{GH}^2 m^3/s

   Loss coefficient, B_{22}=0.0015 MW^{-1}

   γ_H=2.5X10^{-5} Rs./m^3.

   Draw the single diagram and determine the power generation of both thermal and hydro-plants, the load connected when λ=45Rs./MWh.

(OR)

6. A two plant system that has a hydro plant near the load center and a steam plant at a remote location is shown in Fig. The load is 400MW for 14hr a day and 200MW for 10hr a day. The characteristics of the units are 14M

$C_1 = 150+60P_{GT} + 0.1\ P_{GT}^2$ Rs./hr.

$w_2 = 0.8P_{GH}+0.000333P_{GH}^2$ m^3/s

Loss coefficient, $B_{22}=0.001MW^{-1}$

Find the generation schedule, daily water used by the hydro plant, and daily operating cost of the thermal plant for γ_j=77.5 Rs. /m^3hr.

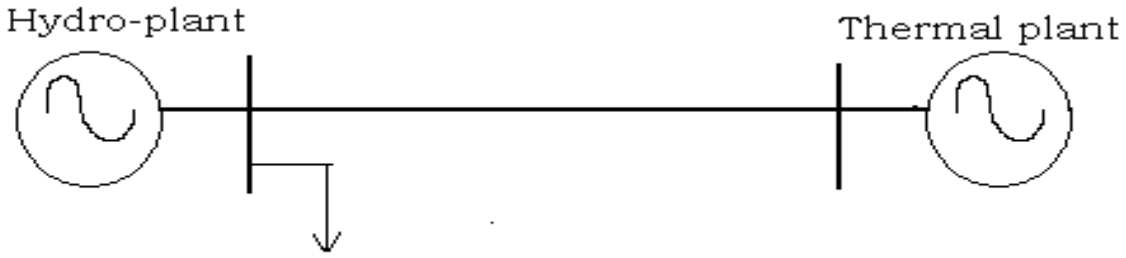


Fig: A typical two-plant hydro-thermal system

UNIT – IV

7. Two generators rated 200MW and 400MW are operating in parallel. The droop characteristics of their governors are 4% and 5% respectively from no load to full load. If the nominal frequency is 50 Hz at no load, assume free governor operation. 14M

(a) How a load of 600MW would is shared between them?

(b) What is system frequency?

(c) Repeat the problem if both governors have a droop of 4%.

(OR)

8. (a) Draw and explain the composite block diagram of a two area system for controlled case. 7M

(b) A 100 MVA synchronous generator operating on full load of frequency 50Hz. The load is suddenly reduced to 50 MW. Due to time lag in governor system, the steam valve being to close after 0.4s. Determine the change in frequency that occurs in this time. Assume H=5 kW-sec/kVA of generator capacity. 7M

UNIT-V

9. (a) What is the effect of PI controller in two-area LFC? 4M

(b) Two control areas of 1,000 and 2,000MW capacities are interconnected by a tie line. The speed regulations of the two areas, respectively, are 4 Hz/p.u. MW and 2.5 Hz/p.u. MW. Consider a 2% change in load occurs for 2% change in frequency in each area. Find steady-state change in frequency and tie-line power of 10MW change in load occurs in both areas. 10M

(OR)

10. Two control areas have the following characteristics: 14M

Area-1: Speed regulation = 0.02 p.u., Damping coefficient = 0.8 p.u.,

Rated MVA = 1,500.

Area-2: Speed regulation = 0.025 p.u., Damping coefficient = 0.9 p.u.

Rated MVA = 500.

Determine the steady-state frequency change and the changed frequency following a load change of 120 MW, which occurs in Area-1. Also find the tie-line power flow change.

Q.P. Code: 1802507 | **SET - 2**

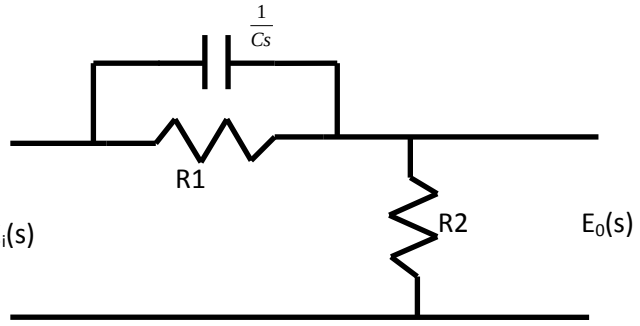
K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Advanced Control Systems (EEE)

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

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

UNIT – I

1. Obtain the frequency response of lead compensator electric circuit 14M



(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 natural frequency of oscillation as 2 rad/sec. 14M

UNIT – II

3. (a) Sketch and explain the basic elements used to construct the signal flow graph of state model. 6M
   (b) Obtain the state model of the system whose transfer function is given as $\frac{Y(s)}{U(s)}=\frac{10}{s^3+4s^2+2s+1}$ 8M

(OR)

4. (a) Write the properties of the state transition matrix. 5M
   (b) Derive the solution of the state equation for the Non-Homogeneous system. 9M

UNIT – III

5. (a) State the conditions for controllability by gilberts method 7M
   (b) Determine that the following system is observable or not. $\dot{X}=AX$, $Y=CX$, $A=\begin{bmatrix}-1 & 1\\ 2 & -2\end{bmatrix}C=\begin{bmatrix}1 & 0\end{bmatrix}$ 7M

(OR)

6. What are the advantages and disadvantages of state space analysis? and 14M
   Define(i) Eigen values (ii) Eigen vectors (iii) state of a system

UNIT – IV

7. Given the transfer function $\frac{10}{s^3+3s^2+2s}$ Design a feedback controller so that the closed loop system poles are placed at -2, -1±j1 14M

(OR)

8. Explain in detail about the design of state observer for continuous time systems 14M

UNIT-V

9. Consider a linear autonomous system described by the state equation $\dot{X}=AX$. Prove that the system has a unique solution $A^TP+PA=-Q$. Where P and Q are Positive Definite matrices. 14M

(OR)

10. (a) Consider a non-linear system governed by the equations $\dot{X}_1=-X_1-X_2^2$ and $\dot{X}_2=-X_2^2$ Determine the Stability 7M
    (b) Consider a non-linear system $\dot{X}_1=X_2$ and $\dot{X}_2=X_1-X_1^2X_2$ Determine the Stability 7M

Q.P. Code: 1803501 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Heat Transfer (ME)

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

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

UNIT – I

1. (a) What are boundary and initial conditions? To solve a second order differential equation, how many boundary conditions are required? 6M
   (b) A plane wall 10 cm thick generates heat at the rate of $4x10^4$ W/m^3 when an electric current is passed through it. The convective heat transfer coefficient between eacgh face of the wall and the ambient air is 50 W/m^{2}K. Determine: 8M
   (a) the surface temperature (b)the maximum temperature in the wall.
   Assume the ambient air temperature to be 20^0C and the thermal conductivity of the material to be 15 W/mK.

(OR)

2. (a) Derive the expression for critical radius of insulation for a cylinder 6M
   (b) A wall of 0.5 m thickness is to be constructed from a material which has an average thermal conductivity of 1.4 W/mK. The wall is to be insulated with a material having an average thermal conductivity of 0.35 W/mK so that the heat loss per square meter will not exceed 1450 W. Assuming that the inner and outer surface temperatures are 1200^0C and 15^0C respectively. Calculate the thickness of insulation required. 8M

UNIT – II

3. (a) Discuss the fin theory applied for the measurement of temperature error. 6M
   (b) A long carbon steel rod of length 40 cm and diameter 10 mm (K = 40 W/mK) is placed in such a way that one of its end is at 400^0C and the ambient temperature is 30^0C. The film coefficient is 10 W/m^{2}K. Determine: (i) Temperature at mid length of the fin. (ii) Fin efficiency (iii) Heat transfer rate from the fin. 8M

(OR)

4. (a) What is lumped mass model? Derive the equation for temperature distribution in transient condition of a material with negligible internal resistance. 6M
   (b) A slab of Aluminum 10 cm thick is originally at a temperature of 500^0C. It is suddenly immersed in a liquid at 100^0C resulting in a heat transfer coefficient of 1200 W/m^{2}K. Determine the temperature at the centerline and the surface 1 min after the immersion. The properties of aluminum for the given condition are $\alpha = 8.4 \times 10^{-5}$ m^2/s, K= 215 W/mK, ρ= 2700 kg/ m^3, Cp = 0.9 KJ/kg-K. 8M

UNIT – III

5. (a) write short notes on : (i) Gray body (ii) Emissivity (iii) Radiation shape factor 6M
   (b) Two concentric spheres of diameters d_1 = 0.8 m and d_2 = 1.2 m have surface temperatures T_1 = 450 K and T_2 = 300 K respectively. If the surface emissivities are 0.5 and 0.05 respectively, Determine the net radiation heat exchange between the two spheres 8M

(OR)

6. (a) State Kirchoff's and Wein's laws of thermal radiation. Derive the Wein's displacement law from basic Planck's distribution law. 7M
   (b) A gray surface is maintained at a temperature of 860^0C. If the maximum spectral emissive power at that temperature is 1.5×10^{10} W/m^3, determine the emissivity of the body and the wavelength corresponding to maximum spectral intensity of radiation. 7M

UNIT – IV

7. (a) Explain the concept of boundary layer theory for forced convection flow through a circular pipe. 6M
   (b) Water at 50^0C enters a 1.5 cm diameter and a 3 m long tube with a velocity of 1 m/s. The tube wall is maintained at a constant temperature 90^0C. Calculate the heat transfer coefficient and the total amount of heat transferred if the exit water temperature is 64^0C. 8M

(OR)

8. (a) (a)Explain the following Dimensionless numbers along with their physical significance. 6M
(i) Reynolds number (ii) Prandtl number (iii) Nusselt number

(b) Air at 20^0C flowing along a heated flat plate at 134^0C at a velocity of 3 m/s. The plate is 2 m long and 1.5 m wide. Calculate the thickness of the hydrodynamic boundary layer at 40 cm from the leading edge of the plate. Also calculate the rate of heat transferred from the first 40 cm of the plate. The kinematic viscosity of air at 20^0C may be taken at 15.06×10^{-6} m^2/s. 8M

UNIT-V

9. (a) Water enters a counter flow double-pipe heat exchanger at 15^0 C, flowing at the rate of 1300 kg/h. It is heated by oil (C_p = 2000 J/kg K), flowing at the rate of 550 kg/h from an inlet temperature of 94^0C. For an area of 1 m^2 and an overall heat transfer coefficient of 1075 W/m^2K, determine the heat transfer and the outlet temperatures of water and oil. 14M

(OR)

10. (a) Discuss the mechanism of Film wise and Drop wise condensation over a tube surface. 6M

(b) Water is boiled at the rate of 30 kg/h in a polished copper, 300 mm in diameter at atmospheric pressure. Assuming nucleate boiling conditions, calculate the temperature of the bottom surface of the pan. 8M

Q.P. Code: 1803502 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Design of Machine Elements – I (ME)

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

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

UNIT – I

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

(OR)

2. (a) State the design process of machine elements. — 7M
   (b) Discuss how materials selection is done while designing of mechanical components. — 7M

UNIT – II

3. (a) Write down Soderberg's equation and state its applications to different type of loadings. — 10M
   (b) What is the significance of theories of failure? — 4M

(OR)

4. (a) State the factors affecting endurance strength of the components. — 4M
   (b) A machine component is subjected to a fluctuating stress that varies from 40 N to 100 N/mm2. The corrected endurance limit of the machine component is 270 N/mm2. The ultimate stress and yield point stress of the material are 600 and 400 N/mm2 respectively. Find the factor of safety using: (i) Gerber formula. (ii) Solderberg line. — 10M

UNIT – III

5. (a) Write the failures of riveted joints and explain any two of them — 4M
   (b) Two plates of 10 mm thickness each are to be joined by means of a single riveted double strap butt joint. Determine the rivet diameter; rivet pitch, strap thickness and efficiency of the joint. Take the working stresses in tension and shearing as 80 MPa and 60 MPa respectively. — 10M

(OR)

6. (a) A 125 × 95 × 10 mm angle is joined to a frame by two parallel fillet welds along the edges of 150 mm leg. The angle is subjected to a tensile load of 180 kN. Find the lengths of weld if the permissible static load per mm weld length is 430 N. — 10M
   (b) Sketch and discuss the various types of welded joints used in pressure vessels. What are the considerations involved? — 4M

UNIT – IV

7. (a) Write detailed notes on the design of hollow shafts. — 7M
   (b) Find the diameter of a solid steel shaft to transmit 20 kW at 200 r.p.m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8.If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside to outside diameters is 0.5. — 7M

(OR)

8.		A steel solid shaft transmitting 15 kW at 200 r.p.m. is supported on two bearings 750 mm apart and has two gears keyed to it. The pinion having 30 teeth of 5 mm module is located 100 mm to the left of the right hand bearing and delivers power horizontally to the right. The gear having 100 teeth of 5 mm module is located 150 mm to the right of the left hand bearing and receives power in a vertical direction from below. Using an allowable stress of 54 MPa in shear, determine the diameter of the shaft.	14M

UNIT-V

9.	(a)	Discuss briefly about Flange coupling with neat sketches.	4M
	(b)	Design a cast iron protective type flange coupling to transmit 15 kW at 900 rpm from an electric motor to a compressor. The service factor may be assumed as 1.35. The following permissible stresses may be used: Shear stress for shaft, bolt and key material = 40 MPa; Crushing stress for bolt and key = 80 MPa; Shear stress for cast iron = 8 MPa.	10M

(OR)

10.	(a)	Design a knuckle joint to connect two circular rods subjected to an axial force of 50 kN. The rods are coaxial and small amount of angular movement between their axis is permissible. Design the knuckle joint and specify the dimensions of its components.	7M
	(b)	Explain cotter joint with a neat sketch.	7M

Q.P. Code: 1803503 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Metrology (ME)

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

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

UNIT – I

1. (a) Draw the conventional diagram of limits and fits and explain the following terms 10M
   (i) Basic size (ii) upper deviation (iii) Lower deviation
   (iv) Fundamental deviation (v) Zero line
   (b) Differentiate between tolerance and Allowance 4M

(OR)

2. (a) In a hole and shaft assembly of 30mm nominal size, the tolerance for hole and shaft are specified below:

   Hole: $30^{+0.02}_{+0.000}$ mm Shaft: $30^{-0.040}_{-0.070}$ mm

   Determine:
   (i) Maximum and minimum clearance obtainable
   (ii) Allowance
   (iii) Hole and shaft tolerance
   (iv) MML shaft and hole
   (v) The type of fit
   (b) Describe selective assembly with one practical example 7M

UNIT – II

3. (a) Explain the working principle of Bevel Protractor 8M
   (b) Distinguish between line standards and end standards. Give their examples 6M

(OR)

4. (a) Explain the construction and working of a Vernier Caliper. 6M
   (b) Explain briefly about Plug gauge and Ring gauge 8M

UNIT – III

5. (a) With a neat sketch explain the working principle of Auto Collimator 7M
   (b) Explain the construction and working principle of Tool Maker's Microscope 7M

(OR)

6. (a) List out assessment of average roughness for statistical criteria and explain surface waviness by CLA Method 7M
   (b) With a neat sketch explain about NPL gauge Interferometer 7M

UNIT – IV

7. (a) Explain the different pitch errors with neat sketches. State their causes 7M
   (b) Explain in detail with suitable sketches about various alignment tests performed on a lathe. 7M

(OR)

8. Explain how can you measure the effective diameter of the screw thread by three wire method 14M

UNIT-V

9. (a) Explain gear tooth vernier caliper with neat sketch 7M
   (b) Write advantages, disadvantage and applications of CMM 7M

(OR)

10. (a) Write working principle of optical comparators with sketch 7M
    (b) Explain the working principle of electrical comparators 7M

Q.P. Code: 1803504 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Dynamics of Machinery (ME)

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

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

UNIT – I

1. A Shaft carries four masses A,B,C and D placed in parallel planes perpendicular to the shaft axis and in this order along the shaft. The masses of B and C are 353 N and 245 N respectively and both are assumed to be concentrated at a radius of 15 cm, while the masses in planes A and D are both at a radius of 20 cm. The angle between the radii of B and C is 100^0 and that between B and A is 190^0, both angles being measured in the same sense. The planes containing A and B are 25 cm apart and those containing B and C are 50 cm apart. If the shaft is to be in complete dynamic balance, determine (i) Masses of A and D (ii) distance between the planes containing C and D (iii) angular position of the mass D. 14M

(OR)

2. A single cylinder horizontal engine runs at 120 r.p.m. The length of stroke is 400 mm. The mass of the revolving parts assumed concentrated at the crank pin is 100 kg and mass of reciprocating parts is 150 kg. Determine the magnitude of the balancing mass required to be placed opposite to the crank at a radius of 150mm which is equivalent to all the revolving and 2/3rd of the reciprocating masses. If the crank turns 300 from the inner dead centre, find the magnitude of the unbalanced force due to the balancing mass 14M

UNIT – II

3. A Punching machine makes 20 working strokes per minute, and is capable of punching 20 mm diameter hole in a 15 mm thick steel plate having an ultimate shear strength of 240 MPa. The punching operation takes place during 1/10 th of a revolution of the crankshaft. Estimate the power required for the driving motor, assuming a mechanical efficiency of 95 %. Also determine the size of the rim of the flywheel having width equal to twice the thickness. The flywheel is to revolve 10 times the speed of the crankshaft. The fluctuation of speed is 10 %. Assume the flywheel to be made of cast iron having working stress of 6 MPa and density 7300 kg/m^3. The diameter of the flywheel should not exceed 1.5 m. Neglect the effect of arms and hub. 14M

(OR)

4. (a) An engine flywheel has mass of 6.5 tonnes, and the radius of gyration is 2 m. If the maximum and minimum speeds are 120 rpm and 118 rpm respectively, find the maximum fluctuation of energy. 8M

(b) Derive a relation for the turning moment at the crankshaft in terms of the piston effort and the angle turned by the crank. 6M

UNIT – III

5. In a governor of the Hartnell type, the mass of each ball is 1.5 kg and the lengths of the vertical and horizontal arms of the bell crank lever are 100 mm and 50 mm respectively. The fulcrum of the bell crank lever is at a distance of 90 mm from the axis of rotation. The maximum and minimum radii of rotation of balls are 120 mm and 80 mm and the corresponding equilibrium speeds are 325 and 300 rpm. Find the Stiffness of the Spring and the equilibrium speed when the radius of rotation is 100 mm. 14M

(OR)

6. In a Spring loaded governor of the Hartnell type, the mass of each ball is 1 kg, length of vertical arm of the ball crank lever is 100 mm and that of the horizontal arm is 50 mm. The distance of fulcrum of each bell crank lever is 80 mm from the axis of rotation of the governor. The extreme radii of rotation of the balls are 75 mm and 112.5 mm. The maximum equilibrium speed is 5 percent greater than the minimum equilibrium speed which is 360 rpm. Find, neglecting obliquity of arms, initial compression of the spring and equilibrium speed corresponding to the radius of rotation of 100 mm? 14M

UNIT – IV

7.	(a)	Discuss the working of transmission type dynamometer with neat diagram?	7M
	(b)	An aeroplane makes a complete half circle radius towards left when flying at 210 km/h. The rotary engine and the plane is of 50 kg mass having a radius of gyration of 300 mm. The engine rotates at 2400 rpm clockwise as seen from the rear. Find the gyroscopic couple on the aircraft and its effect on the plane.	7M

(OR)

8.		A car weighs 20 kN. It has a wheel base of 2m, track width 1m and height of C.G. 300mm above the ground level and lies midway between the front and rear axle. The engine flywheel rotates at 3000 rpm clockwise when viewed from the front. The moment of inertia of the flywheel is 4kg-m^2 and moment of inertia of each wheel is 3kgm^2. Find the reactions between the wheels and the ground when the car takes a curve of 15 m radius towards right at 30 km/hr, taking into consideration the gyroscopic and the centrifugal effects. Each wheel radius is 400mm.	14M

UNIT-V

9.	(a)	A Shaft 40 mm diameter and 2.5m long has a mass of 15kg per meter length. It is simply supported at the ends and carries three masses 90 kg, 140 kg and 60 kg at 0.8 m, 1.5m and 2m respectively from the left support. Taking E= 200 Gpa, find the frequency of the transverse vibration.	8M
	(b)	Discuss vibration isolation and transmissibility?	6M

(OR)

10.	(a)	Illustrate torsional vibrations of two and three rotor system?	6M
	(b)	A machine part having a mass of 2.5 kg vibrates in a viscous medium. A harmonic exciting force of 30 N acts on the part and causes resonant amplitude of 14 mm with a period of 0.22 second. Find the damping coefficient. If the frequency of the exciting force is changed to 4 Hz, determine the increase in the amplitude of the forced vibrations upon the removal of the damper.	8M

Q.P. Code: 1803506 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Automobile Engineering (ME)

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

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

UNIT – I

1.	(a)	What is the necessity of a nozzle? On what basis they are classified?	7M
	(b)	What factors influence the selection of an automobile? How the automobiles are classified	7M
		(OR)	
2.	(a)	What is the necessity of filters in an automobile? Justify your answer	7M
	(b)	Explain the concept of the Hybridization factor?	7M
		UNIT – II	
3.	(a)	Describe the function of the fully floating type of a rear axle with the help of a sketch	7M
	(b)	State the need for a clutch in an automobile. Describe the diaphragm operated clutch system with a sketch.	7M
		(OR)	
4.	(a)	Explain the working principle of Torque Converter with a neat sketch	7M
	(b)	Sketch and explain in detail universal Joint.	7M
		UNIT – III	
5.	(a)	Differentiate the construction of a sliding mesh gear box and constant mesh gear box with a neat sketch.	7M
	(b)	What are the characteristics of a good braking fluid? Explain about Tandem master cylinder	7M
		(OR)	
6.	(a)	What are the classifications of brakes? And explain the operation of mechanical brake with a neat sketch	7M
	(b)	Explain the Ackerman steering gear mechanism	7M
		UNIT – IV	
7.	(a)	What are the advantages and disadvantages of Bio-diesel?	7M
	(b)	Explain how proper design of combustion chamber helps in reducing exhaust emission.	
		(OR)	
8.	(a)	Explain necessary engine modifications for a CI engine to be fuelled with natural gas. Support your answer with its significance and how it affects the functioning of the engine.	7M
	(b)	What are the merits and demerits of LPG of a motor fuel and list out the advantage of LPG.	7M
		UNIT-V	
9.	(a)	With the help of an illustration, explain the working of a port fuel injection system in a SI engine. Mention its merits and demerits with regard to throttle body injection.	7M
	(b)	Explain centrifugal advance method in automatic ignition advance method	7M
		(OR)	
10.	(a)	Describe battery ignition system with neat sketch	7M
	(b)	Compare the performance and emission characteristics of a vehicle fuelled with Bio-ethanol with that of a neat gasoline fuelled vehicle.	7M

Q.P. Code: 1804501 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Microprocessors & Microcontrollers (EEE & ECE)

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

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

UNIT – I

1.		Explain the internal architecture of an 8085 microprocessor with a block diagram	14M
		(OR)	
2.	(a)	Explain in detail about various registers in 8085 Microprocessor	8M
	(b)	Explain different addressing modes supported by 8086 microprocessor	6M

UNIT – II

3.	(a)	Explain various Data transfer schemes.	8M
	(b)	Interface two 16KB ROMs and two 8KB SRAMs with 8086 microprocessor.	6M
		(OR)	
4.	(a)	Write an ALP to sort the given numbers in ascending order	8M
	(b)	Write an ALP of multiplication and division of any two given numbers	6M

UNIT – III

5.	(a)	Explain in detail about 8254 Programmable Interval Timer with neat block diagram	8M
	(b)	Write an ALP to generate Step waveform using DAC	6M
		(OR)	
6.	(a)	Explain in detail about 8259 Programmable Interrupt controller with neat block diagram	8M
	(b)	Write an ALP to generate triangular waveform using DAC	6M

UNIT – IV

7.	(a)	Explain in detail about the pin diagram of 8051 Microcontroller	7M
	(b)	Explain about 8051 Interrupt structure	7M
		(OR)	
8.		Describe in detail about the internal architecture of the 8051 microcontroller with a neat block diagram	14M

UNIT-V

9.		Explain in detail about single and multiple register load-store instructions of ARM	14M
		(OR)	
10.		Explain the thumb data processing and conditional instructions of ARM	14M

Q.P. Code: 1804502 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Digital Signal Processing (ECE)

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

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

UNIT – I

1. (a) State and prove the following properties of DFT: 12M
   (i) Circular Convolution (ii) Circular Shift (iii) Linearity (iv) Symmetry
   (b) Define DFT and IDFT. 2M

(OR)

2. (a) Find the 10-point DFT of each of the following sequences: 7M
   (i) x(n) = S(n) + 6(n - 5) (ii) x(n) = u(n) - u(n - 6)
   (b) Develop a radix-3 decimation-in-time FFT algorithm, and draw the corresponding flow graph for N =9. 7M

UNIT – II

3. (a) Obtain the direct form-II and cascade form realizations of the LTI system governed by the equation 7M

$$y(n) = -\frac{13}{12}y(n-1) - \frac{9}{24}y(n-2) - \frac{1}{24}y(n-3) + x(n) + 4x(n-1) + 3x(n-2)$$

   (b) Find the transposed direct form II realization of the system described by the difference equation 7M

$$y(n) = 0.5y(n-1) - 0.25y(n-2) + x(n) - 2x(n-1) + x(n-2)$$

(OR)

4. (a) Compare and contrast Direct form-I and Direct form-II structures of IIR filters. 3M
   (b) Draw the direct form I, cascade and parallel structures for the transfer function: 11M

$$H(z^{-1}) = \frac{z^{-1}}{(1+0.2z^{-1})(1+0.6z^{-1}+0.2z^{-2})}$$

UNIT – III

5. (a) The cutoff frequency of a Chebyshev highpass filter is ωp = 2500, which is the lowest frequency in the passband, and the maximum attenuation in the passband Ap = 0.5 dB. The maximum gain in the passband is 5 dB. At the stopband frequency ωs = 500, the minimum attenuation required is 30 dB. Design the highpass filter H(s). 7M
   (b) Design a lowpass Butterworth filter with a maximum magnitude of 5 dB, pass band of 1000 rad/s, maximum attenuation in the pass band A_p = 0.5 dB, and minimum attenuation A_s = 30 dB at the stop band frequency of 5000 rad/s. 7M

(OR)

6. (a) The specified magnitude response of a maximally flat bandpass digital filter has a maximum value of 1.0 in its passband, which lies between the cutoff frequencies $\theta_1 = 0.4\pi$ and $\theta_2 = 0.5\pi$. The magnitude at these cutoff frequencies is specified to be no less than 0.93, and at the frequency $\theta_3 = 0.7\pi$ in the stopband, the magnitude is specified to be no more than 0.004. Design the IIR digital filter that approximates these specifications, using the bilinear transformation. 12M

(b) Mention the important features of IIR filters. 2M

UNIT – IV

7. (a) What are the advantages of FIR filters over IIR filters? 5M

(b) Design a digital low-pass filter with a cutoff frequency of 1 rad/sec using rectangular window with $N = 7$. 9M

(OR)

8. (a) Discuss any two applications of DSP. 7M

(b) Design an FIR low-pass digital filter with $N = 7$, with a cutoff frequency of $\pi/3$ rad/sec. 7M

UNIT-V

9. (a) Describe the decimation process with a factor of D and then derive its expression. 7M

(b) Discuss the multistage implementation of sampling rate conversion. 7M

(OR)

10. (a) Consider a signal $x(n) = \sin \pi n u(n)$. 6M

(i) Obtain a signal with a decimation factor '4'

(ii) Obtain a signal with an interpolation factor '4'

(b) With the help of block diagram explain the sampling rate conversion by a rational factor I/D. Obtain necessary expression. 8M

Q.P. Code: 1804503 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Computer Organization (ECE)

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

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

UNIT – I

1.	(a)	What is system software? What are the various functions performed by system software?	7M
	(b)	Compare Multi Processors with Multi Computers.	7M
		(OR)	
2.	(a)	With the help of examples explain the micro arithmetic operations.	7M
	(b)	Illustrate the ALU units.	7M

UNIT – II

3.	(a)	Explain about instruction cycles.	7M
	(b)	Describe various computer registers and instructions.	7M
		(OR)	
4.	(a)	Elaborate on address sequencing.	7M
	(b)	Explain about control memory.	7M

UNIT – III

5.	(a)	Explain stack organization. What are the applications of stacks?	7M
	(b)	Explain different instruction formats with example.	7M
		(OR)	
6.	(a)	Describe the general classification of parallel processing systems.	7M
	(b)	What is an instruction pipeline? Explain the operation of instruction pipeline.	7M

UNIT – IV

7.	(a)	What is DMA? Explain the working of DMA with a neat sketch. What are its advantages?	7M
	(b)	What are various I/O modules and explain any one of them in detail.	7M
		(OR)	
8.	(a)	Explain different modes of I/O data transfer.	7M
	(b)	Define interrupt? Illustrate the transfer of control through the use of interrupts.	7M

UNIT-V

9.	(a)	Explain in detail about different types of Main memories.	7M
	(b)	What is cache coherence? Explain in detail.	7M
		(OR)	
10.	(a)	Explain the need for inter processor synchronization.	7M
	(b)	Differentiate between inter processor communication and Arbitration.	7M

Q.P. Code: 1804504 **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Analog Communications (ECE)

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

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

UNIT – I

1. (a) Briefly write about Hilbert Transform and its properties 7M
   (b) Describe in detail about Demodulation of SSB 7M

(OR)

2. (a) A modulating signal $m(t) = 20\cos(2\pi\times10^5 t)$ is amplitude modulated with a carrier signal $c(t)=70\cos(2\pi\times10^8 t)$. Find the modulation index, the carrier power, and the total power required for transmitting AM wave 7M
   (b) Explain in detail about Vestigial Sideband Modulation 7M

UNIT – II

3. (a) Compare Narrow Band FM with Wide Band FM 7M
   (b) Explain in detail about Indirect Method of FM generation 7M

(OR)

4. (a) Discriminate Amplitude modulation with Frequency Modulation 7M
   (b) An FM wave is given by $s(t)=20\cos(8\pi\times10^6 t+9\sin(2\pi\times10^3 t))$. Then Calculate the frequency deviation, bandwidth, and power of FM wave 7M

UNIT – III

5. (a) Describe Briefly about the following 7M
   i. selectivity
   ii.Fidelity
   iii. Double spotting
   (b) Illustrate in detail about the Super heterodyne FM receiver . 7M

(OR)

6. (a) Illustrate in detail about the Super heterodyne AM receiver 7M
   (b) Explain in detail about the FM Stereo 7M

UNIT – IV

7. (a) Four amplifiers A,B,C and D with gains 6dB,10dB,12dB,16dB and corresponding noise figures of 3dB, 5dB, 6dB, 8dB. Then find 7M
   i. Overall Noise Figure
   ii. Overall Gain
   (b) Discuss about the effect of noise in FM and find the SNR 7M

(OR)

8. (a) Explain about Threshold effect in FM 7M
   (b) Explain about the External and internal sources of noise and Noise calculations 7M

UNIT-V

9. (a) Define sampling theorem and Practical aspects of sampling 7M
   (b) Explain the generation and detection of PAM. 7M

(OR)

10. (a) Explain the detection of PDM and PPM 7M
    (b) Explain about Flat top sampling. 7M

Q.P. Code: 1804505 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Digital IC Applications (ECE)

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

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

UNIT – I

1.	(a)	Explain Gate delays and discuss min, max and typical delay assignment to gates.	7M
	(b)	Design CMOS transistor circuit for 3-input NAND gate. With the help of function Tables explain the operation of the circuit diagram.	7M
		(OR)	
2.	(a)	Compare the characteristics of the different types of MOS inverters in terms of noise margin and power dissipation.	7M
	(b)	Design CMOS transistor circuit for 3-input NOR gate. With the help of function Tables explain the operation of the circuit diagram.	7M

UNIT – II

3.	(a)	Explain the difference in program structure of VHDL and any other procedural language. Give an example.	7M
	(b)	Explain the behavioural desing model of VHDL.	7M
		(OR)	
4.	(a)	With an example, explain structural and data flow style of modeling.	7M
	(b)	Explain wait, if, case statements in VHDL.	7M

UNIT – III

5.	(a)	Write a VHDL program for 4x2 Encoder and 2x4 decoder.	7M
	(b)	Write the VHDL architecture for a dual priority encoder.	7M
		(OR)	
6.	(a)	Explain about three state devices.	7M
	(b)	Draw the logic symbol, truth table, logic diagram of a commercially available MSI 74x157 2-input, 4-bit multiplexer and model the same using behavioral-style VHDL program.	7M

UNIT – IV

7.	(a)	Design a full subtractor with logic gates.	7M
	(b)	Write VHDL data flow program for the implementation of the above subtractor.	7M
		(OR)	
8.	(a)	Design seven segment decoder using gates.	7M
	(b)	Write a Verilog code for the implementation of the above design.	7M

UNIT-V

9.	(a)	Explain Decade Binary Counter.	7M
	(b)	Write VHDL program for the implementation of the above counter.	7M
		(OR)	
10.	(a)	Draw the circuit of a bidirectional shift register with parallel loading using 2 to 4 line decoder and D-flip-flops.	7M
	(b)	Write VHDL structural program for the above shift-register.	7M

Q.P. Code: 1804506 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Antenna & Wave Propagation (ECE)

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

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

UNIT – I

1. (a) Derive the expression for the radiation pattern of a center-fed λ/2 dipole antenna. Sketch the radiation pattern. 7M
   (b) An antenna has a loss resistance 10Ω, power gain of 20 and directivity 22. Calculate its radiation resistance. 7M

(OR)

2. (a) Write a short note on "Effective length of antenna". 7M
   (b) Explain the terms directivity gain and radiation efficiency with reference to antennas. Are gain and bandwidth related? If so, explain how. 7M

UNIT – II

3. (a) What is a broadside array? Explain in detail the structure, radiation pattern and principle of operation of such an antenna. How does the radiation pattern get modified if spacing of the elements of array is changed? 7M
   (b) A broadside array operating at 100 cm wavelength consists of four half wave dipole spaced 50 cm. Each element carries radio frequency current in the same phase and of magnitude 0.5 Amp. Calculate 7M
   (i) Radiated power (ii) Half width of the major lobe

(OR)

4. (a) What is an antenna arrays? What are the reasons for using antenna arrays? Explain in detail the behavior of broadside and end-fire arrays? 7M
   (b) Calculate the directivity of a given linear, end-fire with improved directivity, Hansen-Woodyard uniform array of 10 elements with a separation of λ/4 between the elements? 7M

UNIT – III

5. (a) Describe the methods for measuring the gain and half power beamwidth of an antenna. 7M
   (b) Explain the working principle of a folded dipole antenna 7M

(OR)

6. (a) Describe how the radiation pattern, radiation resistance and gain of a given antenna can be measured experimentally. 7M
   (b) Describe the gain, beamwidth ana capture area for a parabolic antenna with 10m diameter dish and dipole feed at 10 GHz. 7M

UNIT – IV

7. (a) Discuss the effects of earth's properties on ground wave propagation. 7M
   (b) A 50-kW transmitter employs a vertical grounded half-wave antenna with a directivity of 1.41 as compared to a short dipole. If the transmitter frequency 1 MHz, find the field ε_r = 15 and $\sigma = 10^{-3}$ mhos/m. 7M

(OR)

8. (a) What are the factors that lead to fading in ionospheric propagation? 7M
   (b) Write short notes on fading of radio waves. 7M

UNIT-V

9. (a) Explain the terms MUF and skip distance. Show that on flat earth the skip distance for a given frequency is given by $D_{skip} = 2h\sqrt{\frac{f^2}{f_c^2} - 1}$ 7M
   (b) Two points on earth are 1500 km apart and are to communicate by means of HF. For a single hop transmission, the critical frequency at that time is 7MHz and conditions are idealized. Calculate the MUF for those two points if the height of the ionosphere layer is 300 km. 7M

(OR)

10. (a) With reference to sky waves, explain the following: 7M
    (i) Virtual Height (ii) Skip Frequency (iii) Maximum usable Frequency
    (b) Describe the effect of terrain and earth's curvature on ground propagation. 7M

Q.P. Code: 1805501 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Web Technologies (CSE)

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

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

UNIT – I

1.	(a)	Define XAMPP Server	2M
	(b)	Explain how to handle HTTP request and response in detail with example	12M
		(OR)	
2.	(a)	Write a short note on client / Server model	4M
	(b)	Explain Apache, WAMP, IIS web servers.	10 M

UNIT – II

3.	(a)	What is CSS? Explain in detail about various types of CSS.	7M
	(b)	How to create student bio-data form using HTML form elements?	7M
		(OR)	
4.	(a)	What is Java script? Explain dynamic HTML with java script	8M
	(b)	How to insert image in webpage and how to create frames in HTML?	6M

UNIT – III

5.	(a)	Explain different types of operators in PHP	6M
	(b)	Explain any five array functions with example in PHP.	8M
		(OR)	
6.	(a)	Explain any five string functions with example in PHP.	7M
	(b)	Explain oops concepts in PHP.	7M

UNIT – IV

7.	(a)	How to set & delete a cookie on user computer in PHP? Explain with an example.	8M
	(b)	Discuss in detail about session in PHP give suitable examples.	6M
		(OR)	
8.	(a)	Explain about date and time functions in PHP	8M
	(b)	Explain briefly how to use the header() function in different ways.	6M

UNIT-V

9.	(a)	Write a PHP program to validate a form with data valid conditions?	10M
	(b)	List out the differences between GET vs POST	4M
		(OR)	
10.	(a)	Explain the following functions with examples? (i) Mysql_connect() (ii) mysql_select_db () (iii) mysql_query() (iv) mysql_close()	12M
	(b)	List out the differences between truncate and delete	2M

Q.P. Code: 1805502 **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Database Management Systems (CSE)

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

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

UNIT – I

1. (a) Explain about various database users and user interfaces. 7M
   (b) Write various database-system applications. 7M

(OR)

2. (a) Explain about super key, candidate key, primary key, and foreign key. 7M
   (b) Discuss about the various components used in E-R diagram. 7M

UNIT – II

3. (a) Discuss about various Aggregate functions used in SQL. 7M
   (b) Explain about various built-in domain types supported by SQL. 7M

(OR)

4. (a) Explain about SQL functions and procedures. 7M
   (b) Discuss about Tuple-relational calculus by writing queries. 7M

UNIT – III

5. (a) Explain about 4NF and 5NF. 7M
   (b) Discuss the various problems caused by Redundancy. 7M

(OR)

6. (a) Explain how schema refinement can be done in Database design. 7M
   (b) Explain about the closure of a set of Functional Dependencies. 7M

UNIT – IV

7. (a) Explain about the ACID properties of Transactions. 7M
   (b) Explain about various selection operations for retrieving records in Query processing. 7M

(OR)

8. (a) With a diagram explain about various steps involved in query processing. 7M
   (b) Discuss about Shadow-copy technique for atomicity and durability. 7M

UNIT-V

9. (a) Explain about how the insert and delete operations affects concurrency control. 7M
   (b) Discuss about various storage types in Recovery system. 7M

(OR)

10. (a) Explain about Two-phase locking protocol. 7M
    (b) Explain about ARIES Recovery algorithm. 7M

Q.P. Code: 1805503 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Computer Networks (CSE)

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

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

UNIT – I

1.	(a)	Define Topology and discuss in detail about different Network topologies with the help of neat diagram.	**7M**
	(b)	Explain in detail about Transmission Impairments in data communications.	**7M**
		(OR)	
2.	(a)	Describe the TCP/IP Reference model in detail.	**7M**
	(b)	What is the significance of Switching? What are different switching techniques used in computer networks? Discuss.	**7M**

UNIT – II

3.	(a)	What are the design issues of Data Link Layer? Explain.	**7M**
	(b)	What is pure ALOHA and slotted ALOHA? Mention the advantages of slotted ALOHA.	**7M**
		(OR)	
4.	(a)	With an example explain the sliding window Flow control mechanism.	**7M**
	(b)	Describe the working principle of Carrier sense multiple access with collision Detection (CSMA/CD).	**7M**

UNIT – III

5.	(a)	Describe Dijkstra shortest path algorithm. Also show working of Dijkstra algorithm with the help of an example.	**7M**
	(b)	Give features of IPv6 in the context of advanced communication networks.	**7M**
		(OR)	
6.	(a)	Write an example, demonstrate how to make routing table using distance vector routing.	**7M**
	(b)	Explain leaky bucket algorithms in detail.	**7M**

UNIT – IV

7.	(a)	Describe in brief about TCP segment Header	**7M**
	(b)	Explain the general principles of congestion control	**7M**
		(OR)	
8.	(a)	What are the services provided by transport layer to the upper layers?	**7M**
	(b)	Explain in detail three way handshaking for connection establishment in TCP.	**7M**

UNIT-V

9.	(a)	Describe importance of DNS in application layer.	**7M**
	(b)	What is World Wide Web? Explain details about HTTP.	**7M**
		(OR)	
10.		What is electronic E-mail? Describe in brief about the two architectures of E-Mail.	**14M**

Q.P. Code: 1805504 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Software Engineering (CSE)

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

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

UNIT – I

1.	(a)	Define Software Engineering. Explain the characteristics of Software Engineering?	8M
	(b)	Write about Management Myths?	6M
		(OR)	
2.	(a)	Explain the differences between Iterative Process flow and Parallel Process flow?	7M
	(b)	Discuss about the Incremental Model.	7M

UNIT – II

3.	(a)	Why Analysis model act as a bridge between System Description and Design model?	7M
	(b)	Explain the process of Eliciting the requirements?	7M
		(OR)	
4.		Discuss in detail about Scenario-Based Modeling.	14M

UNIT – III

5.		Discuss about various Architectural Styles in detail.	14M
		(OR)	
6.		Write about various Design Concepts that helps in Designing.	14M

UNIT – IV

7.	(a)	List out the various Golden rules for user interface design?	8M
	(b)	Write short notes on Black Box testing?	6M
		(OR)	
8.	(a)	Explain about User Interface Design Process?	8M
	(b)	Explain about Testing and Debugging in detail?	6M

UNIT-V

9.	(a)	Write about Risk Management.	7M
	(b)	Write about Metrics for Project estimation	7M
		(OR)	
10.		Why Software Project Management Plays a Vital role in developing and managing the software?	14M

Q.P. Code: 1805507 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Distributed Systems (CSE)

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

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

UNIT – I

1.	(a)	Explain in detail the distributed information systems	8M
	(b)	Define transparency and describe different forms of transparency in a distributed system.	6M
		(OR)	
2.	(a)	Explain with neat diagram the basic client server model.	9M
	(b)	Write about edge server systems.	5M
		UNIT – II	
3.	(a)	Explain role of virtualization in distributed systems.	6M
	(b)	Discuss about general organization of a three- tiered server cluster.	8M
		(OR)	
4.	(a)	Explain the basic RPC Operation and explain the issues.	7M
	(b)	Explain general architecture of message queuing system.	7M
		UNIT – III	
5.	(a)	Discuss about vector clocks	7M
	(b)	Explain Lamport's logical clock with neat diagram	7M
		(OR)	
6.	(a)	Write about bully algorithm and summarize how it is different from other election algorithms	9M
	(b)	Write about Reference Broadcast Synchronization (RBS).	5M
		UNIT – IV	
7.	(a)	Explain cache-coherence protocols.	7M
	(b)	Write short notes on Monotonic Reads and Monotonic Writes in Client-Centric Consistency model.	7M
		(OR)	
8.	(a)	Explain the Primary-based Consistency protocol.	9M
	(b)	Compare unicasting and multicasting.	5M
		UNIT-V	
9.	(a)	Explain the two forms of error recovery and also explain why receiver based message logging is generally considered better than sender based logging.	8M
	(b)	Explain briefly four different orderings of multicast.	6M
		(OR)	
10.	(a)	Explain the Two-Phase Commit protocol in Distributed Commit .	9M
	(b)	Explain byzantine agreement problem briefly.	5M

Q.P. Code: 1805508 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Compiler Design (CSE)

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

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

UNIT – I

1.	(a)	Explain about analysis and synthesis part	6M
	(b)	Explain about Lex Tool	8M
		(OR)	
2.	(a)	Write a short notes on Token Lexeme and pattern	8M
	(b)	Write about lexical errors	6M
		UNIT – II	
3.	(a)	Discuss in detail about shift reduce parsing.	8M
	(b)	Write an algorithm for construction of predictive parsing table.	6M
		(OR)	
4.	(a)	Discuss in detail about different orders of derivation in parsing.	7M
	(b)	Discuss different error recovery strategies that a parser can employ to recovery from syntactic error.	7M
		UNIT – III	
5.	(a)	Define S-attributed and L-attributed grammars.	8M
	(b)	List out some typical semantic errors. Explain how they can be rectified	6M
		(OR)	
6.	(a)	What is a three address code? What are its types? How it is implemented?	8M
	(b)	Explain how declarations are done in a procedure using syntax directed translation.	6M
		UNIT – IV	
7.	(a)	What is the importance of evaluation order? Explain how to get optimal evaluation order of instructions?	6M
	(b)	Generate assembly code for the following assignment statement: Amount = principle + rate * 40	8M
		(OR)	
8.	(a)	Explain the issues in the design of code generator.	7M
	(b)	Explain in detail about global register allocation	7M
		UNIT-V	
9.	(a)	Define code optimization. What are the principle sources of optimization? Explain in detail.	8M
	(b)	Explain with example local optimization technique.	6M
		(OR)	
10.	(a)	What is a symbol table? What are the contents of a symbol table? Explain briefly the data structures for symbol table	10M
	(b)	How flow graph and DAG are related with each other? Explain.	4M

Q.P. Code: 1814502 | **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Linear Digital IC Applications (EEE)

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

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

UNIT – I

1.	(a)	Organize the Op-amp with block diagram representation and explain the functionality of each block.	8M
	(b)	Design an amplifier with a gain of -10 and input resistance equal to 10 kΩ.	6M
		(OR)	
2.	(a)	Define an op-amp. Explain the ideal characteristics of an op-amp.	6M
	(b)	Explain in detail about external frequency compensation techniques with neat sketches.	8M

UNIT – II

3.	(a)	Draw and explain the ideal differentiator circuit using an Op-Amp. Mention its drawbacks and how these can be eliminated by using a practical differentiator.	8M
	(b)	Explain the operation of an AC amplifier and derive an expression for bandwidth.	6M
		(OR)	
4.	(a)	Draw the circuit of Astable multi-vibrator using OP-Amp and explain its operation.	7M
	(b)	Explain the circuit diagram of an integrator and derive its output equation.	7M

UNIT – III

5.	(a)	Draw the internal schematic of IC 555. Configure it for astable operation and explain the working.	8M
	(b)	Design an Astable multivibrator using IC555 timer to obtain a square wave with frequency of 5 kHz at 50% duty cycle.	6M
		(OR)	
6.	(a)	What is a Schmitt trigger? Draw the circuit of Schmitt trigger using 555 timer and explain its operation briefly.	7M
	(b)	Summarize the terms frequency multiplication, frequency translation of PLL.	7M

UNIT – IV

7.	(a)	Explain the operation of open collector and tri-state outputs of Standard TTL NAND gate.	8M
	(b)	Explain the concept interfacing between CMOS and TTL logic.	6M
		(OR)	
8.	(a)	Explain bipolar logic families?	7M
	(b)	Explain the CMOS dynamic state electrical behavior?	7M

UNIT-V

9.	(a)	Explain multiplexer and demultiplexer code converters?	7M
	(b)	Write a verilog program for 8 to 1 multiplexer using case statement.	7M
		(OR)	
10.	(a)	Difference between dataflow design and structural design with examples?	7M
	(b)	Write a verilog dataflow description for 4-bit full adder with carry lookahead.	7M

Q.P. Code: 1825505 **SET - 2**

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA
B. Tech. V Sem. (R18) Supplementary Examinations of September – 2021
SUB: Managerial Economics (ME)

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

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

1.	' Economics is the study of how individuals and societies make choices Subject to constraints'. Discuss	14M
2.	'Macroeconomics is concerned with certain issues to study the aggregate economic behavior of a nation'. Elucidate	14M
3.	Discuss the factors that determine the elasticity of Demand	14M
4.	'There are factors on which the demand for a commodity depends'. Explain	14M
5.	Describe production function with one and two variables.	14M
6.	What is Break-Even Analysis? Explain the Break Even Chart with an example	14M
7.	Discuss the Price and output determination under perfect competition.	14M
8.	How Skimming price strategy is different from penetration pricing strategy?	14M
9.	Discuss the various sources of short term finance to meet the working capital requirements of a company.	14M
10.	Calculate IRR of the project .The Investment is Rs 45,000 and the cash inflows are Rs 30,000; Rs 23,000; Rs 17,000; and Rs 12,000 respectively.	14M