

26.03.2022  
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Q.P. Code: 2001305

SET - 1

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
**Sub: Geomatics (CE)**

Time: 3 Hours

Max. Marks: 60

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

**UNIT - I**

- 1. (a) Explain the principles and classification of surveying 6M
- (b) In chaining past a pond, stations P and Q were selected on opposite sides of the pond. A line PA 200 m long was set out to the left of PQ, and line PB was set out on the right such that A, Q and B are collinear. The length PB was 250m. Also, AQ and QB were measured to be 125m and 150m respectively. Determine PQ. 6M

(OR)

- 2. (a) What is meant by chain surveying? Enumerate the factors to be considered in choosing the chain survey stations. 6M
  - (b) Calculate the included angles of the following traverse and apply geometric checks 6M
- |         |       |      |      |      |         |
|---------|-------|------|------|------|---------|
| Line    | : AB  | BC   | CD   | DE   | EA      |
| Bearing | : 75° | 137° | 194° | 245° | 336°30' |

**UNIT - II**

- 3. (a) Describe the procedure of setting up the plane table over a station. 6M
- (b) Explain the different types of leveling 6M

(OR)

- 4. (a) The following readings were taken with a 4 m leveling staff on a continuously sloping ground. Calculate the R.L. of last point if that of first point is 102.345 m 0.945, 1.470, 1.950, 2.780, 3.655, 1.750, 2.655, 3.440, 0.780, 1.345, 2.475. 6M
- (b) Explain different methods of contouring. 6M

**UNIT - III**

- 5. (a) What is temporary adjustment of theodolite? Describe the procedure of such adjustments 6M
- (b) The following angles were measured with a transit theodolite from stations A and B which are 420 m apart,  $\angle QAB = 63^\circ 00'$ ,  $\angle PBA = 40^\circ 00'$ ,  $\angle PAQ = 42^\circ 00'$ , and  $\angle QBP = 65^\circ 00'$ . Find the distance between P and Q, which are in accessible points 6M

(OR)

- 6. (a) Discuss the methods of tachometry. 6M
- (b) The following observations were taken with a tacheometer having constants  $k = 100$  and  $c = 0$  when the staff was held vertical 6M

Instrument station	Staff station	Reduced bearing	Vertical angle	Staff readings
O	P	N 45° W	+ 4° 15'	0.81, 5.25, 2.24
O	Q	S 20° W	- 3° 40'	1.84, 2.53, 3.22

Calculate the distance between P and Q and the gradient of line PQ

**UNIT - IV**

- 7. (a) The following perpendicular offsets were taken at 10 m intervals from a chain line to an irregular boundary line: 3.10, 4.20, 5.35, 6.45, 7.15, 8.25, 7.95 and 5.20 m Find the area by i) Trapezoidal rule, and ii) Simson's rule. 6M
- (b) Explain different methods of estimating volume of borrow pits by spot levels 6M

(OR)

- 8. (a) Work out the relationship between degree and radius of a curve 6M
- (b) A curve of 200 m radius connects two straights making a deflection angle of 70°. The chainage of the intersection point is 4.256 m. Make out the necessary calculations for setting out the curve and tabulate the results. The unit chord is 25m. 6M

**UNIT-V**

- 9. (a) Explain the types of EDM instruments. 6M
- (b) With neat sketch, explain the parts of total station. 6M

(OR)

- 10. (a) Explain the advantages and applications of total station 6M
- (b) Explain the importance of drone surveying 6M

Q.P. Code: 2002305

SET - 1

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

B. Tech. III Semester (R20) Regular Examinations of March – 2022

*Sub: DC Machines & Transformers (EEE)*

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. Explain constructional details of DC machine with the help of neat diagram 12M  
(OR)
2. (a) Derive the EMF Equation of DC Generator 6M  
(b) A 4-pole DC generator has a wave wound armature with 792 conductors. The flux per pole is 0.0121 wb. Determine the speed at which it should be run to generate 240V on no-load. 6M

UNIT - II

3. (a) Derive the torque equation of DC Motor 6M  
(b) A 4-pole, 220V Shunt motor has 540 lap-wound conductors. It takes 32A from the supply mains and develops output power of 5.595kW. The field winding takes 1A. The armature resistance is  $0.09\Omega$  and the flux per pole is 30mWb. Calculate (i) Speed (ii) Armature torque and (iii) Output torque. 6M  
(OR)
4. Explain the Speed control methods of DC shunt Motor 12M

UNIT - III

5. (a) Derive the condition for maximum efficiency of DC Machine 6M  
(b) Explain Swinburne's test on DC machines. Also state its advantages & disadvantages. 6M  
(OR)
6. Explain the method to obtain efficiency at full load by conducting Hopkinson's test on DC machines 12M

UNIT - IV

7. (a) Explain the working of single-phase transformer on no load with neat vector diagrams. 6M  
(b) Derive the emf equation of Transformer. 6M  
(OR)
8. (a) Explain sumpners method of testing of transformer. What are its advantages over OC and SC tests? 6M  
(b) A single phase, 25 KVA, 2000/200V transformer has iron loss is 350W and full load copper loss is 400W. Calculate the efficiency at unity power factor on full load and half load? 6M

UNIT-V

9. (a) Write short note on parallel Operation of transformer with equal voltage ratios. 6M  
(b) Two single phase transformers with equal turns have impedance of  $(0.5+j3)$  and  $(0.6+j10)$  ohm with respect to secondary. If they operate in parallel determine how they will share a total load of 100 Kw at power factor 0.8 lagging. 6M  
(OR)
10. Discuss various types of connections used for three phase transformers. 12M

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

B. Tech. III Semester (R20) Regular Examinations of March – 2022

Sub: Mechanics of Materials (ME)

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

## UNIT - I

1. (a) Define the terms Lateral strain, Poisson's ratio & volumetric strain. 6M  
 (b) Derive the expression for deformation of a body due to self-weight. 6M

(OR)

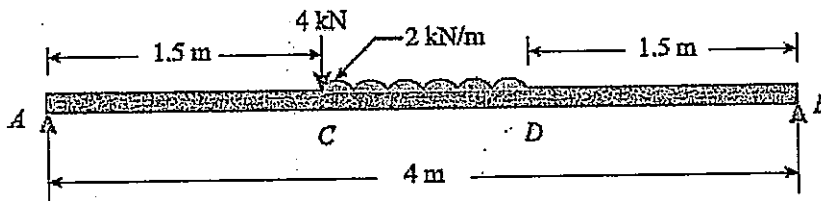
2. Derive the relationship between young's modulus, modulus of rigidity and poisson's ratio. 12M

## UNIT - II

3. A cantilever beam AB, 2 m long carries an U.D.L. of 1.5 KN/m over a length of 1.6 m from the free end. Draw shear force and bending moment diagrams from the beam. 12M

(OR)

4. A simply supported beam of 4 m span is carrying loads as shown in figure. Draw shear force and bending moment diagrams from the beam. 12M



## UNIT - III

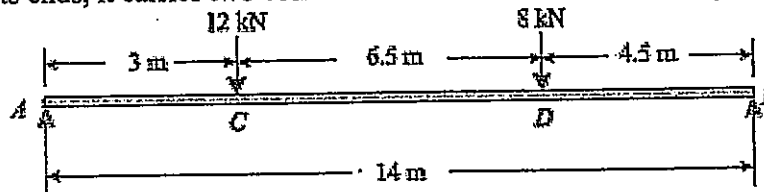
5. Write the assumptions for theory of simple bending and derive the bending equation 12M

(OR)

6. A beam is simply supported and carries an UDL of 40 KN/m run over the whole span. The section of the beam is rectangular having depth as 500 mm. If the maximum stress in the material of the beam is 120 N/mm<sup>2</sup> and moment of inertia of the section is  $7 \times 10^8$  mm<sup>4</sup>. Find the span of the beam. 12M

## UNIT - IV

7. A horizontal steel girder having uniform cross section is 14 m long and it is simply supported at its ends, it carries two concentrated loads as shown in the fig. 12M



Calculate the deflections of the beam under the loads C and D. take  $E = 200$  GPa and  $I = 160 \times 10^6$  mm<sup>4</sup>

(OR)

8. A cantilever AB of 2 m long is carrying a load of 20 KN at a free end and 30 KN at a distance of 1 m from free end. Find the slope and deflection at free end. Take  $E = 200$  GPa &  $I = 150 \times 10^6$  mm<sup>4</sup>. 12M

## UNIT-V

9. A cylindrical vessel 2 m long and 500 mm in diameter with 10 mm thick plates is subjected to an internal pressure of 3 MPa. Calculate the change in volume of the vessel by taking  $E = 200$  GPa and Poisson's ratio = 0.3 for the vessel material. 12M

(OR)

10. A boiler shell of 2 m diameter is made up to mild steel plates of 20 mm thick. The efficiency of the longitudinal and circumferential joints is 70 & 60 % respectively. Determine safe pressure in boiler, if the permissible tensile stress in the plate section through the rivets is 100 MPa. Also determine the circumferential stress in the plate and longitudinal stress through the rivets. 12M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
 B. Tech. III Semester (R20) Regular Examinations of March - 2022  
 SUB: Network Theory (ECE)

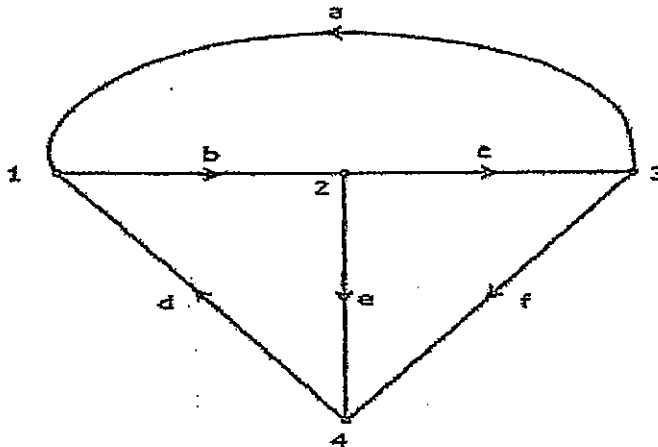
Time: 3 Hours

Max. Marks: 60

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

UNIT - I

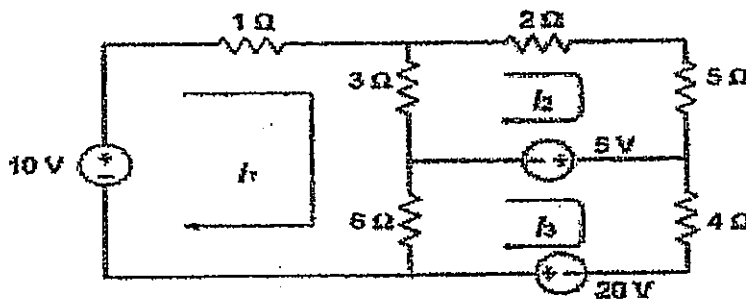
1. (a) Construct TIESET matrix for the given graph 6M



- (b) Explain the procedure to obtain Dual network 6M

(OR)

2. Determine the mesh currents for the given circuit 12M

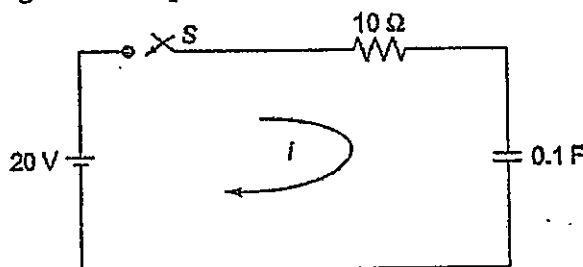


UNIT - II

3. Derive the transient response of series RL circuit excited by DC source and Plot the complete response for current. 12M

(OR)

4. A series RC circuit with  $R = 10 \Omega$  and  $C = 0.1 \text{ F}$  has a constant voltage  $V=20\text{V}$  applied at  $t=0$  as shown in below figure. Determine the current  $I$ , the voltage across resistor and the voltage across capacitor. 12M

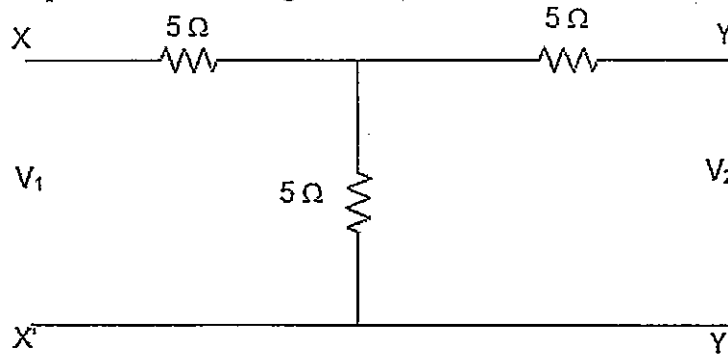


UNIT – III

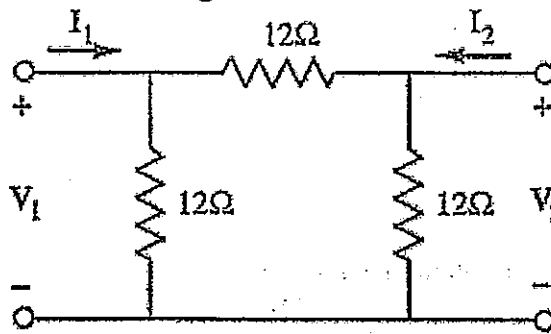
5. Derive the AC transient response of series RL circuit 12M  
 (OR)  
 6. (a) Define resonance and derive the formula for series resonant frequency 6M  
 (b) Derive quality factor for series resonance circuit 6M

UNIT – IV

7. (a) Determine the Z parameters for the given network 6M



- (b) Determine the Y parameters for the given network 6M



(OR)

8. (a) Derive the formulas for Transmission parameters of a Two Port network 6M  
 (b) Derive the conditions for symmetry and reciprocity 6M

UNIT-V

9. Explain the synthesis of R-L network by the Cauer method? 12M  
 (OR)  
 10. Explain the synthesis of R-C network by the Foster method? 12M

**Q.P. Code: 2005305**

**SET - 1**

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
**Sub: Database Management Systems (CSE)**

**Time: 3 Hours**

**Max. Marks: 60**

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

**UNIT - I**

1. (a) Explain Database Architecture with neat diagram 6M  
(b) Write about different views of data 6M

**(OR)**

2. (a) Write about different users and administrators in DB? 6M  
(b) What is mean by E-R Model? how constraints are implemented in E-R Model? 6M

**UNIT - II**

3. (a) Discuss in Detail about Keys in relational model? 6M  
(b) Write about fundamental Relational Algebra Operations? 6M

**(OR)**

4. (a) Write about query Languages in Relational Model? 6M  
(b) Explain the structure of relational databases? 6M

**UNIT - III**

5. (a) Discuss about basic structure of SQL Queries? 6M  
(b) Explain about Aggregate Functions with suitable examples? 6M

**(OR)**

6. Discuss in detail about tuple relational calculus and domain relational calculus with suitable example? 12M

**UNIT - IV**

7. (a) Write a short notes on 1 NF and 2 NF 6M  
(b) What is mean by lossless decomposition explain with example? 6M

**(OR)**

8. Explain about 3NF, BCNF and 4NF 12M

**UNIT-V**

9. How transaction concept work in DBMS, Explain Different States in transaction 12M

**(OR)**

10. (a) Explain about lock-based protocols? 6M  
(b) Explain about serializability ? 6M

Q.P. Code: 2001304

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
 B. Tech. III Semester (R20) Regular Examinations of March – 2022  
 SUB: Fluid Mechanics (CE)

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

## UNIT - I

1. (a) Explain the phenomenon of capillarity. Obtain an expression for capillary rise of a liquid. 6M  
 (b) The dynamic viscosity of an oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4m and rotates at 190 r.p.m. Calculate the power lost in the bearing for a sleeve length of 90mm. The thickness of the oil film is 1.5mm. 6M

(OR)

2. (a) Define the terms absolute, gauge, atmospheric and vacuum pressures. Show the relation among the above pressures with the help of line diagram. 6M  
 (b) A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of fluid in the left from the centre of pipe is 15 cm below. 6M

## UNIT - II

3. (a) Derive continuity equation in 3-Dimensional flow. 6M  
 (b) A stream function is given by ' $5x-6y$ '. Calculate the velocity components and magnitude and direction of the resultant velocity at any point. 6M

(OR)

4. (a) Derive the expression for Bernoulli's energy equation from Euler's equation 6M  
 (b) Water is flowing through a pipe of 5 cm diameter under a pressure of 29.43 N/cm<sup>2</sup> (gauge) and with mean velocity of 2 m/s. Find the total head or total energy per unit weight of the water at a cross-section, which is 5m above the datum line. 6M

## UNIT - III

5. (a) What is a Venturimeter? Derive an expression for the rate of flow through it. 6M  
 (b) An Orificemeter with orifice diameter 10 cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter given readings of 19.62 N/cm<sup>2</sup> and 9.81 N/cm<sup>2</sup> respectively. Co-efficient of discharge for the meter is 0.6. Find the discharge of water through pipe. 6M

(OR)

6. (a) Outline the various ways of classifying notches and weirs. 6M  
 (b) Find the discharge of water flowing over rectangular notch of 3 m length when the constant head of water over the notch is 40 cm. Take  $C_d=0.6$ . 6M

## UNIT - IV

7. (a) Derive an expression for the loss of head due to friction in pipes. 6M  
 (b) Three pipes of lengths 800m, 500m and 400m and of diameters 500mm, 400 mm and 300 mm respectively are connected in series. These pipes are to be replaced by a single pipe of length 1700m. Find the diameter of the single pipe. 6M

(OR)

8. Explain the following A). Hardy cross method B). Water hammer. 12M

## UNIT-V

9. Obtain expression for the velocity distribution for turbulent flow in smooth pipes 12M

(OR)

10. (a) Describe the Buckingham's  $\pi$  theorem for dimensional analysis. 6M  
 (b) Give the dimensions of (i) Force, (ii) Viscosity and (iii) Kinematic Viscosity 6M

Q.P. Code: 2002304

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
B. Tech. III Semester (R20) Regular Examinations of March – 2022  
*SUB: Electrical Measurements & Measuring Instruments (EEE)*

Time: 3 Hours

Max. Marks: 60

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

UNIT – I

1. (a) Derive the expression for deflecting torque in Repulsion type Moving Iron Instrument. 6M  
(b) Explain the working of Dynamometer type Instrument with neat diagram. 6M

(OR)

2. (a) What are the shunts and multiplier? Derive the expression for both, with reference to meters used in electrical circuits. 6M  
(b) The coil of a measuring instrument has a resistance of  $1 \Omega$  and the instrument has a full scale deflection of 250 V when a resistance of  $4999 \Omega$  is connected with it. Find the current range of the instrument when used as an ammeter with the coil connected across a shunt of  $(1/499) \Omega$  and the value of the shunt resistance for the instrument to give a full scale deflection of 50 A. 6M

UNIT – II

3. (a) Describe the constructional details of an electro-dynamometer type wattmeter. 6M  
(b) A 3 $\phi$  500 V motor load has a pf of 0.4. Two watt meters connected to measure the input. They show the input to be 30 kW. Find the reading of each instrument 6M

(OR)

4. (a) Explain the working of single phase Induction type Energy Meter with neat diagram. 6M  
(b) Explain the errors in Induction type Energy Meter and their compensation. 6M

UNIT – III

5. (a) Explain the working of Kelvin's double bridge for measuring low resistance. 6M  
(b) Explain the working of Wheatstone bridge and Derive the unknown resistance equation. 6M

(OR)

6. Explain the working of Maxwell's bridge and derive the expression for unknown Inductance. Also draw the phasor diagram. 12M

UNIT – IV

7. (a) Derive the expression for ratio and phase angle error in CT 6M  
(b) Draw the equivalent circuit and phasor diagram of CT. 6M

(OR)

8. (a) Explain the principle and operation of DC Crompton's potentiometer. 6M  
(b) Explain the working of AC polar type potentiometer with neat sketch. 6M

UNIT-V

9. (a) Explain the working of CRO with neat diagram. 6M  
(b) Explain about Lissajous pattern. 6M

(OR)

10. Explain the working of ramp type digital voltmeter with neat diagram. 12M



Q.P. Code: 2003304

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
B. Tech. III Semester (R20) Regular Examinations of March – 2022  
SUB: Engineering Thermodynamics (ME)

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Differentiate the cyclic process and non-cyclic process. 4M  
(b) What do you understand by the term's macroscopic thermodynamics and microscopic thermodynamics? 8M

(OR)

2. (a) What is the difference between heat and work? 4M  
(b) A gas at a pressure of 138 KN/m<sup>2</sup> is having volume of 0.112 m<sup>3</sup>. It is compressed to 690 KN/m<sup>2</sup> according to the law  $pv^{1.4} = \text{constant}$ . Calculate the final volume of the gas. 8M

UNIT - II

3. (a) Make an analysis of the steam nozzle and heat exchanger. 6M  
(b) Derive the expression for the first law applied to i) A cycle ii) A process 6M

(OR)

4. The air speed of a turbo jet engine in flight is 270 m/s. Ambient air temperature is -15°C. Gas temperature at outlet of nozzle is 600°C. Corresponding enthalpy values for air and gas are respectively 260 and 912 kJ/kg. Fuel air ratio is 0.0190. Chemical energy of the fuel is 44.5 MJ/kg. Owing to incomplete combustion 5% of the chemical energy is not released in the reaction. Heat loss from the engine is 21 kJ/kg of air. Calculate the velocity of the exhaust jet. 12M

UNIT - III

5. (a) Why second law is called law of degradation of energy? 2M  
(b) Show that the violation of Kelvin-Planck statement leads to violation of Clausius statement 10M

(OR)

6. State and prove Clausius inequality and hence deduce that the property exists. 12M

UNIT - IV

7. (a) What do u understand by exergy and energy? 4M  
(b) Prove that the change in entropy during a polytropic process is given by,  $S_2 - S_1 = C_v(n-\gamma)/(n-1) \ln(T_2/T_1)$  where,  $\gamma$  is ratio of specific heats and n-index of compression or expansion 6M

(OR)

8. (a) A thermal energy source at 800 K loses 2000 kJ of heat to a sink at, 6M  
(i) 500 K and, (ii) 750K.  
Determine which heat transfer process is more irreversible.  
(b) Deduce an expression for the availability for flow process. 6M

UNIT-V

9. A mixture of ideal air and water vapour at a dbt of 22°C and a total pressure of 730 mm Hg abs. has a temperature of adiabatic saturation of 15°C. Calculate, 12M  
i) The specific humidity in gms per kg of dry air  
ii) The partial pressure of water vapour  
iii) The relative humidity (iv) Enthalpy of the mixture per kg of dry air.

(OR)

10. (a) Draw P-V and T-S diagram for water stating from its liquid phase to superheated steam. 6M  
(b) Define degree of saturation, specific humidity and relative humidity. 6M

**Q.P. Code: 2004303**

**SET - 1**

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
**SUB: Analog Circuits (ECE)**

**Time: 3 Hours**

**Max. Marks: 60**

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

**UNIT - I**

1. (a) With the help of equivalent circuit, derive the expression for overall voltage gain of cascade amplifier. **8M**  
(b) Explain the Hybrid parameters of transistor in common emitter configuration. **4M**

**(OR)**

2. (a) Briefly explain Small-Signal Operation of the MOS Differential Pair. **8M**  
(b) Explain the Non ideal Characteristics of the Differential Amplifier. **4M**

**UNIT - II**

3. (a) Short circuit CE current gain of a transistor is 25 at a frequency of 2MHz. If  $f_{\beta} = 200\text{KHz}$  Calculate (i)  $f_T$  (ii)  $h_{fe}$  (iii) Find  $|A_i|$  at frequency of 10MHz and 100MHz. **6M**  
(b) Derive the expression for cut off frequencies  $f_{\alpha}$ ,  $f_{\beta}$  and  $f_T$ . **6M**

**(OR)**

4. (a) Discuss in detail about the bandwidth of single stage amplifiers. **6M**  
(b) Describe in detail about gain bandwidth product for voltage and current of BJT. **6M**

**UNIT - III**

5. (a) Perform the generalized analysis of LC oscillators with suitable block diagram and obtain the condition for Hartley oscillator. **8M**  
(b) Calculate the value of 'C' in the frequency –determining network of a FET RC phase shift Oscillator circuit having  $R=2.5\text{K}\Omega$ , assuming frequency of oscillation  $f=1.625\text{KHz}$ . **4M**

**(OR)**

6. (a) An amplifier has a voltage gain of 400,  $f_1 = 50\text{Hz}$ ,  $f_2 = 200\text{kHz}$  and a distortion of 10% without feedback. Determine the amplifier voltage gain,  $f_{1f}$ ,  $f_{2f}$  and  $D_f$  when negative feedback is applied with feedback ratio of 0.01. **6M**  
(b) Discuss Feedback topologies. **6M**

**UNIT - IV**

7. (a) Derive the expression for efficiency of a direct coupled Class A power amplifier. **8M**  
(b) A single transistor operates as an ideal class B amplifier. If d.c current drawn from the supply is 25mA, calculate the a.c power delivered to load for load of  $2\text{K}\Omega$  **4M**

**(OR)**

8. (a) Derive the equation for the gain bandwidth product of a single tuned amplifier circuit. **10M**  
(b) What are advantages of stagger tuned amplifier. **2M**

**UNIT-V**

9. (a) Explain the operation of astable multivibrator with neat sketch **10M**  
(b) Define multivibrator. **2M**

**(OR)**

10. (a) Explain the basic principles of Miller and Bootstrap time-base generators **8M**  
(b) What are the advantages of miller over Bootstrap sweep circuits **4M**

**Q.P. Code: 2005304**

**SET - 1**

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
**Sub: Object Oriented Programming through Java (CSE)**

**Time: 3 Hours**

**Max. Marks: 60**

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

**UNIT - I**

1. (a) List and explain the Java buzzwords 6M  
(b) Discuss the Principles of OOPS. 6M

**(OR)**

2. Explain the overloading methods and constructors. 12M

**UNIT – II**

3. (a) What do you mean by inheritance? Explain how inheritance can be achieved in OOP 6M  
(b) Compare and contrast the interface vs. abstract classes. 6M

**(OR)**

4. (a) What is a package? Explain the process of creating and using a package in Java 6M  
(b) List and explain the benefits of Inheritance and Polymorphism 6M

**UNIT – III**

5. Differences between the multi threading and multitasking. 12M

**(OR)**

6. Explain the usage of two keywords in exception handling.. 12M

**UNIT – IV**

7. (a) Discuss the components of AWT. 6M  
(b) List and explain different types of layouts with examples. 6M

**(OR)**

8. Explain Scroll Pane, Menu Bar and Dialogs with examples. 12M

**UNIT-V**

9. (a) Make a comparison between the Swing & AWT. 6M  
(b) With a programming example, explain about passing parameters to applets. 6M

**(OR)**

10. What is an applet? Explain the lifecycle of applets 12M

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

B. Tech. III Semester (R20) Regular Examinations of March – 2022

SUB: Advanced Strength of Materials (CE)

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

## UNIT - I

1. (a) Determine the equation of deflection curve for a cantilever beam AB subjected to a uniform load of intensity  $q$  also determine deflection and slope at the free end. Consider the flexural rigidity of the beam as  $EI$  10M  
 (b) Write the differential equation for the elastic line of a beam. 2M

(OR)

2. A beam 6 m long, simply supported at its ends, is carrying a point load of 80 kN at its centre. The moment of inertia of the beam is  $84 \times 10^6 \text{ mm}^4$ . If  $E$  for the material of the beam =  $2.1 \times 10^5 \text{ N/mm}^2$ . Calculate deflection at the centre of the beam and slope at the supports. 12M

## UNIT - II

3. (a) Derive Torsional equation. 7M  
 (b) Explain the theory of pure torsion. 5M

(OR)

4. A close coiled helical spring is to carry a load of 5000N with a deflection of 50 mm and a maximum shearing stress of  $400 \text{ N/mm}^2$ , if the number of active turns or active coils is 8. Estimate the following: 12M  
 (i) wire diameter (ii) mean coil diameter (iii) Weight of the spring.  
 Assume  $G = 83000 \text{ N/mm}^2$ ; density =  $7700 \text{ kg/m}^3$

## UNIT - III

5. (a) A circular bar 50 mm diameter carries an axial tensile load of 125 kN. What is the value of shear stress on the planes on which the normal stress has a value of  $60 \text{ MN/m}^2$  tensile. 7M  
 (b) Write the various salient points of Mohr's stress circle 5M

(OR)

6. (a) Explain about the maximum principle stress theory. 6M  
 (b) Explain about the maximum strain energy theory. 6M

## UNIT - IV

7. (a) List out the limitations of Euler's theory 4M  
 (b) Differentiate between the column and strut. How is the effective length is related to actual length for the following end conditions (i) Both ends pinned (ii) One end fixed other free (iii) Both ends fixed 8M

(OR)

8. A hollow cylindrical cast iron column is 3.6 m long with one end fixed And other free. Determine the minimum diameter of the column if it has to carry a safe load of 400 kN with a factor of safety of 4. Take the internal diameter as 0.9 times the external diameter. Take  $\sigma_c = 500 \text{ MPa}$  and  $\alpha = 1/1600$  using Rankine's formula. 12M

## UNIT-V

9. A cylindrical thin drum 600 mm in diameter and 5m long is made of 16mm thick. If the drum is subjected to an internal pressure of 4.5 MPa, Solve change in diameter and length. Take  $E$  as 200 GPa and poisson's ratio as 0.25. 12M

(OR)

10. A thick spherical shell of 300mm internal diameter is subjected to an internal fluid pressure of  $10 \text{ N/mm}^2$ . If the permissible tensile stress in the shell material is  $11 \text{ N/mm}^2$ , find out the necessary thickness of shell. 12M

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
 B. Tech. III Semester (R20) Regular Examinations of March – 2022  
 SUB: Electrical Circuit Analysis – II (EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT - I

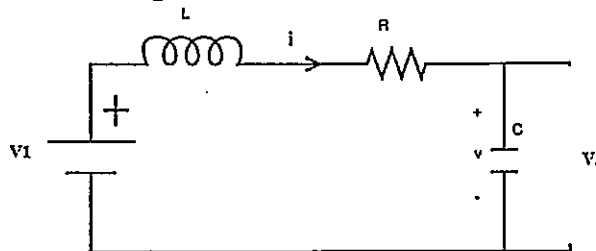
1. (a) Given a series RLC with  $R=100 \Omega$ ,  $L=0.5H$  &  $C=40\mu F$ , Calculate the resonant lower and upper half frequencies? 8M  
 (b) Write short notes on Series Resonance 4M

(OR)

2. (a) A Series RLC circuit with  $R=10 \Omega$ ,  $L=1 \text{ mH}$  &  $C=1.2\mu F$ . The circuit is connected to a sinusoidal voltage source of 20V magnitude and variable frequency. Find 8M  
 i) Resonant Frequency  
 ii) Quality factor  
 iii) Half Power frequencies  
 (b) Write a note on Parallel Resonance 4M

UNIT - II

3. (a) A transfer function is given by  $V(s) = \frac{3s(s+8)}{s(s+5)(s+6)}$  Plot the pole zero plot and obtain the time domain response. 6M  
 (b) Obtain Transfer function for the given Network: 6M

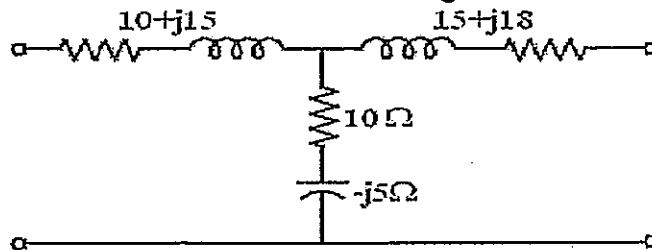


(OR)

4. (a) Brief about the Single port and Multi port Networks. 6M  
 (b) What is LC immittance function and Explain about Y and Z Parameters in brief 6M

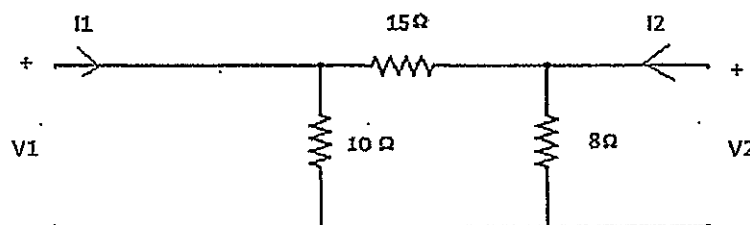
UNIT - III

5. Obtain the Transmission Parameters of the following network : 12M



(OR)

6. Derive the h-parameters for the network given below: 12M

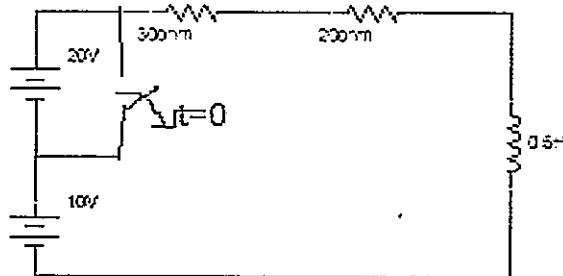


UNIT – IV

7. (a) A Constant voltage is applied to a RL circuit at  $t=0$ . The voltage across the inductor at  $t=3.46$  msec is 20V and 5V at  $t=25$  msec. Obtain R if  $L=2$ H 8M  
 (b) Write the expression for current transient for the series of RL and RC circuit for DC input? 4M

(OR)

8. The Network as shown below reaches a steady state with switch K closed. At  $t=0$ , the switch K is opened. Find  $i(t)$  for  $t > 0$ . 12M



UNIT-V

9. (a) Determine the solution for the current when switch is closed at  $t=0$  for a series RL circuit. Applied voltage is  $V= 50\sin 25t$  volts. Resistance  $R=10\Omega$  and inductance  $L=5$ H. 8M

- (b) What is the behavior of inductor and capacitor under steady state conditions for DC input. 4M

(OR)

10. (a) Determine the solution for the current when switch is closed at  $\Phi=0$  for a series RC circuit. Voltage  $V=100\sin (500t+\Phi)$  volts is applied at  $\Phi=45$ . Resistance  $R=15\Omega$  and  $C=100\mu\text{F}$ . 8M  
 (b) How many types of responses may be obtained in a DC series RLC transient Circuit depending upon their numerical values? 4M

Q.P. Code: 2003303

SET - 1

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
***SUB: Manufacturing Processes (ME)***

Time: 3 Hours

Max. Marks: 60

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

**UNIT - I**

1. With the help of schematic sketch, describe the step by step procedure of making a mould with a two piece split pattern. 12M

(OR)

2. What is a pattern? Name the various allowances associated with patterns and why are they provided? 12M

**UNIT – II**

3. Enumerate some common casting defects and explain the reasons which cause these defects. 12M

(OR)

4. Describe the process of centrifugal casting with neat sketch. What are the advantages? 12M

**UNIT – III**

5. Explain the process of thermit welding with neat sketch. Write its applications. 12M

(OR)

6. Describe the principle of oxyacetylene gas welding. How many types of flames are used for welding? 12M

**UNIT – IV**

7. Explain the various forging operations and list the forging defects. 12M

(OR)

8. Distinguish between  
(i) Hot working and cold working.  
(ii) Wire drawing and tube drawing. 12M

**UNIT-V**

9. Describe the deep-drawing process. What defects can occur in an improperly deep drawn product? 12M

(OR)

10. Differentiate between  
(i) Hot spinning and cold spinning processes.  
(ii) Punching and blanking processes. 12M

Q.P. Code: 2004302

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
B. Tech. III Semester (R20) Regular Examinations of March – 2022  
SUB: Digital System Design (ECE)

Time: 3 Hours

Max. Marks: 60

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

UNIT – I

1. (a) What is hamming code? How is the hamming code word tested and corrected? 6M  
(b) Subtract 798.46 from 435.12 using 10's complement method. 6M  
(OR)  
2. (a) What are error detecting codes? Explain in detail. 6M  
(b) Convert  $105.15_{10}$  to binary, octal & hexadecimal. 6M

UNIT – II

3. Obtain the minimal SOP expression for the switching function using k-map 12M  
 $Y = \sum m(1,5,7,13,14,15,17,18,21,22,25,29) + \sum d(6,9,19,23,30)$ . Draw and explain the logic diagram.  
(OR)  
4. Draw the basic circuit for the TTL NAND gate with totem pole output and open collector. Explain the operation 12M

UNIT – III

5. (a) Implement the following function with 4X1 MUX.  $F(A, B, C) = \sum(1,2,4,7)$  6M  
(b) Design the 4-input priority encoder using logic gates 6M  
(OR)  
6. (a) Explain how a decoder can be converted into a de-multiplexer with relevant block diagrams and truth tables. 5M  
(b) Using 8 to 1 multiplexer, realize the Boolean function: 7M  
 $T = f(w,x,y,z) = m(0,1,2,4,5,7,8,9,12,13)$

UNIT – IV

7. (a) With the help of circuit diagram and functional table, explain the working of D Flip-Flop. 6M  
(b) Convert JK Flip-Flop to SR Flip-flop. 6M  
(OR)  
8. (a) With the help of circuit diagram, graphic symbol and characteristic table, explain the JK flip-flop. 5M  
(b) Design a four-bit binary Ripple Counter using D flip-flops and then explain the same. 7M

UNIT-V

9. (a) Give the logic implementation of a 32 X 4 bit ROM using decoder of suitable size. 6M  
(b) Implement the following Boolean function with PLA  $F(A,B,C) = \sum(1,5,6,7)$  6M  
(OR)  
10. (a) Implement the following Boolean function using PROM:  $F(A,B,C) = \sum(1,3,4,5,6)$ . 7M  
(b) Compare PLA and PAL. 5M



**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
**SUB: Formal Languages and Automata Theory (CSE)**

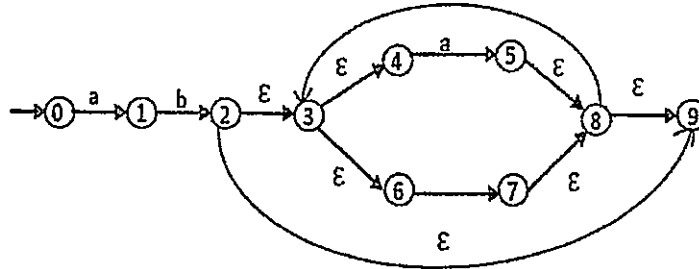
Time: 3 Hours

Max. Marks: 60

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

**UNIT - I**

1. (a) Discuss the method for converting the Moore machine to Mealy machine. 6M  
 (b) Convert the following NFA with  $\epsilon$  to NFA without  $\epsilon$ . 6M



(OR)

2. (a) What is the finite state machine? Define finite automata and discuss the representation of finite automata. 6M  
 (b) Explain the procedure of minimization of Finite state machine with example. 6M

**UNIT - II**

3. (a) Summarize the closure properties of regular language. 6M  
 (b) Explain the procedure of Pumping lemma of regular sets with Example. 6M

(OR)

4. (a) Give the properties of regular expressions 6M  
 (b) Explain the procedure for converting Regular Expression to Finite Automata with suitable example. 6M

**UNIT - III**

5. (a) Explain the procedure of converting the given CFG to Greibach Normal Form(GNF) with suitable example. 6M  
 (b) Explain in detail about Chomsky normal form with suitable Example 6M

(OR)

6. (a) Define the following i) Left most derivation ii) Right most derivation 6M  
 iii) Derivation tree iv) Ambiguous grammar  
 (b) Write the procedure for Eliminating Unit productions in the given grammar. 6M

**UNIT - IV**

7. (a) Define PDA. Design a PDA for equal number of a's and b's. 6M  
 (b) Explain in detail about Two Stack PDA. 6M

(OR)

8. (a) When do you say that a language is a DCFL? Design a DPDA for the language of strings over the alphabet {a, b} containing more number of a's than number of b's. Process the string 'ababbaa'. 6M  
 (b) Explain the abstract model of a PDA with a neat sketch. 6M

**UNIT-V**

9. (a) Explain Chomsky Hierarchy of languages. 6M  
 (b) Explain any four variations of Turing machines. 6M

(OR)

10. (a) Write short notes on NP Hard and NP complete complexities of problems. 6M  
 (b) Show that it is undecidable whether an arbitrary CFG is ambiguous. (Assume that PCP is undecidable). 6M

Q.P. Code: 2001302

SET - 1

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
***SUB: Geology and Building Materials (CE)***

Time: 3 Hours

Max. Marks: 60

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

**UNIT - I**

- 1. (a) Describe the branches of geology along with their usefulness in Civil Engineering. 8M
- (b) What is meant by strike and dip? 4M

(OR)

- 2. (a) Explain the importance of weathering of rocks with reference to Civil Engineering. 6M
- (b) What are the parts of faults? Give their types of faults with sketches. 6M

**UNIT – II**

- 3. (a) Describe the six physical properties of minerals which are used in identification of minerals. 6M
- (b) Describe the structure and texture of igneous rocks. 6M

(OR)

- 4. (a) Describe the physical properties of minerals (i) Magnetite and (ii) Hematite. 6M
- (b) What is metamorphism? Explain the structure of metamorphic rock. 6M

**UNIT – III**

- 5. (a) Explain about the various field tests for cement. 6M
- (b) Explain the requirements of good brick. 6M

(OR)

- 6. (a) Explain with a neat sketch of any five defects in timber. 6M
- (b) Explain about the manufacture of hydraulic lime. 6M

**UNIT – IV**

- 7. (a) State the requirement and uses of G.I. sheet as roofing material. 6M
- (b) Explain the following: 6M
- (i) Cement concrete flooring, (ii) Terrazzo flooring

(OR)

- 8. (a) Write the features of mosaic and ceramic flooring. 6M
- (b) Describe various factors affecting the selection of floor finishes. 6M

**UNIT-V**

- 9. (a) Explain about fiber glass reinforced plastic. 6M
- (b) What are the materials used for manufacturing of geotextiles? And explain its types. 6M

(OR)

- 10. (a) What are the general requirements of all composite materials? 6M
- (b) Write the civil engineering applications of geomembranes. 6M

Q.P. Code: 2002302

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
B. Tech. III Semester (R20) Regular Examinations of March – 2022  
SUB: Electromagnetic Field Theory (EEE)

Time: 3 Hours

Max. Marks : 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) State and Explain Coulomb's law for electrostatic fields in vector form. 6M  
(b) Determine the field at a distance 'r' from an infinite line charge of strength of  $+p_L$  c/m using Gauss's law. 6M

(OR)

2. (a) Describe electric potential and derive electric potential with necessary equations. 6M  
(b) Obtain the expression for Electric field intensity due to an electric Dipole. 6M

UNIT - II

3. (a) Derive the point form of Ohm's law. 6M  
(b) Calculate the emerging angle by which the vector E changes its direction as it passes from a medium with  $\epsilon_r = 100$  in to air making an angle of  $45^\circ$  with the interface as it enters. 6M

(OR)

4. (a) Illustrate the effect of "Polarization in Dielectrics" with neat diagrams. 6M  
(b) If 'a' and 'b' are the inner and outer radius of sphere, then show that capacitance of spherical capacitor is  $\frac{4\pi\epsilon}{\left(\frac{1}{a} - \frac{1}{b}\right)}$ . 6M

UNIT - III

5. (a) State and explain Biot-Savart's law. Show that the divergence of magnetic induction is always zero. 6M  
(b) Find an expression for H at the centre of circular wire carrying a current I in the anticlockwise direction. The radius of the circle is 'a' and the wire is in XY plane. 6M

(OR)

6. (a) Determine the field intensity H due to infinite line current using Ampere's Circuit law. 6M  
(b) A Circular loop located on  $x^2 + y^2 = 9$ ,  $z = 0$  carries a direct current of 10 A along  $a_\phi$ . Determine magnetic field intensity H at (0,0,4) and (0,0,-4). 6M

UNIT - IV

7. (a) Illustrate about the force due to moving charged particle in electric field  $\vec{E}$  and magnetic field  $\vec{B}$ . 6M  
(b) Two long parallel wires separated 5m apart carry currents of 80A and 120 A respectively in the same direction. Determine the magnitude and direction of the force per unit length between them. 6M

(OR)

8. (a) Determine the torque on a rectangular current loop in a uniform magnetic field 6M  
(b) Derive an expression for self-inductance of a solenoid with a neat sketch. 6M

UNIT-V

9. (a) Make clear about Faraday's laws of electromagnetic induction in both integral and differential forms with help of necessary expressions. 6M  
(b) Deduce the detailed mathematical modelling of displacement current and justify the following equation: 6M

$$\nabla \times H = \frac{\partial D}{\partial t} + J$$

(OR)

10. (a) Describe the maxwell's equations for moving loop for time-varying fields. 6M  
(b) Length of bar is 4cm and placed along x-axis and it can slide freely over two conducting rails along y-axis. Calculate the induced emf if the bar is stationed at  $y=6\text{cm}$  and  $B = 2 \cos 10^5 t a_z \text{ wb/m}^2$ . 6M

**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA**  
**B. Tech. III Semester (R20) Regular Examinations of March – 2022**  
**SUB: Fluid Mechanics & Hydraulic Machinery (ME)**

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

**UNIT – I**

1. (a) Differentiate between: (i) Liquids and gases, (ii) Real fluid and ideal fluids, (iii) Specific weight and specific volume of a fluid. 6M  
 (b) Calculate the specific weight, density, and specific gravity of one litre of liquid which weighs 7 N 6M

(OR)

2. (a) Define atmospheric, absolute, gauge and vacuum pressures with diagram. 6M  
 (b) A pipe containing water at 172 kN/m<sup>2</sup> pressure is connected by a differential gage to another pipe 1.5 m lower than the first pipe and containing water at high pressure. If the difference in heights of the two mercury columns of the gage is equal to 75 mm, what is the pressure in the lower pipe? G of mercury = 13.6 6M

**UNIT – II**

3. (a) Distinguish between (i) Steady flow and un-steady flow, (ii) Uniform and Non-uniform flow and (iii) Rotational and irrotational flows. Give two examples of each flow. 8M  
 (b) State and explain continuity equation of motion? 4M

(OR)

4. (a) What is a venturimeter? Derive an expression for the discharge through a venturimeter. 6M  
 (b) A bend in pipe line conveying water gradually reduces from 0.6 m to 0.3 m diameter and deflects flow through angle of 60°. At the larger end the gage pressure is 171.65 kN/m<sup>2</sup>. Determine the magnitude and direction of the force exerted on the bend, When there is no flow. 8M

**UNIT – III**

5. (a) Explain Reynolds experiments and the significance of Reynolds's number. 6M  
 (b) Derive the relationship between the friction factor and the Reynolds number of viscos flow in a circular pipeline. 6M

(OR)

6. (a) Derive an expression for the loss of head due to: (i) Sudden enlargement and (ii) Sudden contraction of a pipe. 6M  
 (b) The rate of flow of water through a horizontal pipe is 0.25 m<sup>3</sup>/s. The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller pipe is 11.772 N/cm<sup>2</sup>. Determine: (i) Loss of head due to sudden enlargement. (ii) Pressure intensity in the large pipe. (iii) Power lost due to enlargement. 6M

**UNIT – IV**

7. (a) The velocity profile in a laminar boundary layer is approximated by a parabolic profile 6M

$$\frac{u}{U} = 2 \left( \frac{y}{\delta} \right) - \left( \frac{y}{\delta} \right)^2$$

Where 'u' is the velocity at 'y'. Calculate the displacement thickness and the momentum thickness.

- (b) Derive an expression for the momentum thickness of boundary layer. 6M

(OR)

8. (a) What do you understand by Boundary Layer? Explain the development of Boundary layer over a flat plate. 6M
- (b) A thin plate is moving in still atmospheric air at a velocity of 5 m/s. The length of the plate is 0.6 m and width 0.5 m. Calculate the thickness of the boundary layer at the end of the plate, and drag force on one side of the plate. Take density of air as  $1.24 \text{ kg/m}^3$  and kinematic viscosity 0.15 stokes. 6M

**UNIT-V**

9. (a) How do you estimate the impact of a jet striking a moving normal plate in the direction of the jet. 6M
- (b) A jet of water of diameter 40 mm moving with a velocity of 30m/sec strikes a Curved fixed symmetrical plate at the center. Find the force exerted by the water on the plate, if the jet is deflected through an angle of  $120^\circ$  at the outlet of the curved plate. 6M

**(OR)**

10. (a) What type of turbine is Kaplan turbine? Explain how it works with a neat diagram. Discuss the importance of draft tube in reaction turbines. 6M
- (b) Define centrifugal pump. With neat sketch explain the working of a single stage centrifugal pump? 6M

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

**B. Tech. III Semester (R20) Regular Examinations of March – 2022**

**SUB: Signals and Systems (ECE)**

**Time: 3 Hours**

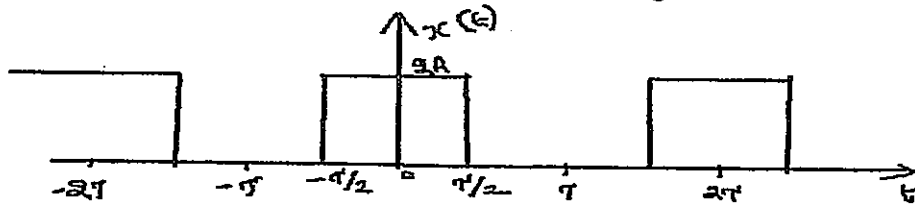
**Max. Marks: 60**

**Answer any FIVE Questions choosing one question from each unit.**

**All questions carry Equal Marks.**

**UNIT - I**

1. (a) Define and sketch the following continuous signals. 6M  
 i) Unit Step signal    ii) Unit impulse signal    iii) Signum function
  - (b) Draw the following signals, if unit step signal is represented by  $u(t)$  6M  
 (i)  $2u(t - 4)$     (ii)  $4u(t + 4)$     (iii)  $u(t) - u(t - 1)$
- (OR)
2. (a) What is the importance of Fourier Series? Write short notes on Dirichlet's conditions for Fourier series. 6M
  - (b) Find the Exponential Fourier series for the following waveform. 6M

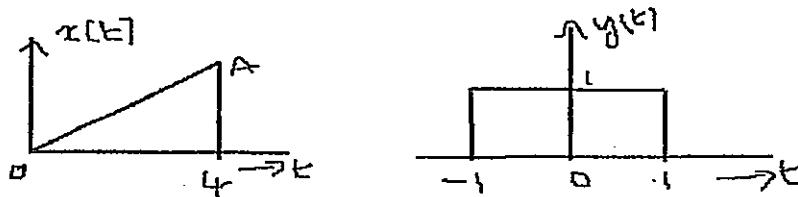


**UNIT - II**

3. (a) Define Fourier Transform. What is the advantage of Fourier Transform? 2M
  - (b) Determine the Fourier transform of the following signals. 10M  
 i) Signum function    ii) Unit Step  
 iii) Constant 'A'    iv) Delta Function
- (OR)
4. (a) Prove the following properties of Fourier Transform. 8M  
 i) Linearity    ii) Frequency Shifting  
 iii) Time Shifting    iv) Differentiation in time
  - (b) Find the Fourier transform of the signal. 4M  
 $x(t) = e^{-at} \cos wt$

**UNIT - III**

5. (a) State Sampling Theorem. Prove how signal is reconstructed from its samples. 6M
  - (b) Explain the following operations on Discrete Time signals with an example. 6M  
 i) Time Shifting    ii) Time reversal    iii) Time scaling
- (OR)
6. (a) Define autocorrelation and cross correlation functions. 4M
  - (b) Find the Graphical convolution of the functions  $x(t)$  and  $y(t)$  as shown below. 8M



UNIT - IV

7. (a) Explain the following systems with an example. 6M  
i) Static and dynamic systems ii) Stable and Unstable system  
iii) Causal and non-causal systems 6M  
(b) Derive the relation between bandwidth and rise time for LPF.

(OR)

8. (a) Find the impulse response of the system described by the difference equation using DTFT. 6M  
$$y(n) - \left(\frac{3}{4}\right)y(n-1) + \left(\frac{1}{8}\right)y(n-2) = 2x(n)$$
  
(b) Find the DTFT of  $x(n) = (1/3)^n u(n)$  and sketch its spectrum. 6M

UNIT-V

9. (a) Explain the use of S-plane in Laplace Transform and discuss the concept of BIBO stability. 6M  
(b) Determine Laplace transform & ROC of the signal. 6M  
$$x(t) = e^{-t}u(t) + e^{-bt}u(-t)$$

(OR)

10. (a) Explain the properties of ROC for Z Transforms. 6M  
(b) Determine the Z-Transform of the following 6M  
(i)  $x(n) = r^n (\sin w_0 n) u(n)$  (ii)  $x(n) = n a^n u(n)$



Q.P. Code: 2005302

SET - 1

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

B. Tech. III Semester (R20) Regular Examinations of March - 2022

*SUB: Advanced Data Structures (CSE)*

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. (a) Define data structure. Explain classification of data structures. 4M  
(b) Write an algorithm to delete element from double linked list. 8M

(OR)

2. (a) Write a non recursive algorithm for converting infix notation to postfix notation and evaluate the same with an example 12M

UNIT - II

3. (a) What is circular queue? Write an algorithm for inserting data item into circular and deleting data item from circular queue 8M  
(b) List out applications of queues 4M

(OR)

4. (a) Write an algorithm to add an element anywhere in double linked list 8M  
(b) What are the advantages and disadvantages of linked list. 4M

UNIT - III

5. (a) What is AVL Tree? Construct AVL tree for the following sequence 8M  
16,279,11,36,54,8163,72.  
(b) What is a leftist tree? Explain with an example. 4M

(OR)

6. (a) Explain tree traversal techniques 6M  
(b) Explain different types of rotations in splay trees with example 6M

UNIT - IV

7. (a) Demonstrate Prim's algorithm with an example 6M  
(b) Explain Graph traversal techniques 6M

(OR)

8. (a) What is spanning tree? Explain applications of spanning trees 5M  
(b) Trace quick sort algorithm for the following list of elements 7M  
12,25,5,9,1,84,63,7,15,4,3

UNIT-V

9. (a) Explain Merge sort Technique to sort list of elements with an example and derive time complexity for the same. 8M  
(b) Write short notes B+ trees 4M

(OR)

10. (a) Explain skip list representation with an example 6M  
(b) Define hashing and discuss the different hashing functions with an example 6M

**Q.P. Code: 2021302**

**SET - 1**

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

**B. Tech. III Semester (R20) Regular Examinations of March – 2022**

**SUB: Probability, Statistics & Numerical Methods (CE)**

**Time: 3 Hours**

**Max. Marks: 60**

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

**UNIT - I**

1. If  $X$  is a Poisson variate such that  $P(X=0) = P(X=1)$ , find  $P(X=0)$  and using recurrence formula find the probabilities at  $x=1, 2, 3, 4$  and  $5$ . 12M

(OR)

2. Construct a normal curve to the following distribution: 12M

$x$	0	1	2	3	4	5
$f(x)$	13	23	34	15	11	4

**UNIT - II**

3. (a) A sample of 100 students is taken from a large population. The mean height of the students in this sample is 160 cm. Can it be reasonably regarded that, in the population, the mean height is 165cm, and the standard deviation is 10cm? 6M

- (b) In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of the men in this city are smokers? 6M

(OR)

4. (a) The means of two samples of 1000 and 2000 items are 67.5 and 68.0 respectively. Can the samples be regarded as 5% LOS, has drawn from the same population with standard deviation 2.5? 6M

- (b) A salesman in a departmental store claim that at most 60 percent of the shoppers entering the store leave without making a purchase. A random sample of 50 shoppers showed that 35 of them left without making a purchase. Are these sample results consistent with the claim of the salesman? Use on LOS of 0.05. 6M

**UNIT - III**

5. (a) The mean life time of a sample of 25 light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the bulbs produced by the company is 1600 hours using the LOS of 0.05. Is the claim acceptable? 6M

- (b) Two independent samples of 8 and 7 items respectively had the following values of the variable: 6M

Sample 1	9	11	13	11	15	9	12	14
Sample 2	10	12	10	14	9	8	10	

Do the two estimates of population variance differ significantly at 5% LOS?

(OR)

6. The following table gives for a sample of married women, the level of education and the marriage adjustment score: 12M

Level of education	Marriage adjustment				Total
	Very low	Low	High	Very high	
College	24	97	62	58	241
High school	22	28	30	41	121
Middle school	32	10	11	20	73
Total	78	135	103	119	435

Can you conclude from this data that the higher the level of education, the greater is the degree of adjustment in marriage?

UNIT - IV

7. (a) Find a root of the equation  $x^3 - x - 11 = 0$ , using the bisection method correct to three decimal places. 6M
- (b) Find a real root of the equation  $2x - \log x = 7$  by regula-falsi method correct to four decimal places. 6M

(OR)

8. Solve the system of equations  $5x + 2y + z = 12$ ;  $x + 4y + 2z = 15$ ;  $x + 2y + 5z = 20$  by Gauss-Seidal iteration method. 12M

UNIT-V

9. The population of a town in the decimal census was given below. Estimate the population for the years 1895 and 1925. 12M

year $x$	1891	1901	1911	1921	1931
population $y$ (thousands)	46	66	81	93	101

(OR)

10. Using Lagrange's formula, express the function  $\frac{3x^2 + x + 1}{(x-1)(x-2)(x-3)}$  as a sum of partial fractions. 12M

Q.P. Code: 2002301

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
B. Tech. III Semester (R20) Regular Examinations of March – 2022  
SUB: Switching Theory & Logic Design (EEE)

Time: 3 Hours

Max. Marks: 60

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

UNIT – I

1. (a) Convert the number  $(17.125)_{16}$  to base 10, base 8 and base 2. 6 M  
(b) Perform the binary arithmetic operations on  $(-14)$ - $(-2)$  using signed 2's complement representation. 6 M

(OR)

2. (a) Subtract the following numbers using the 9's complement method. 6 M  
(i)  $745.81 - 436.62$  (ii)  $436.62 - 745.81$   
(b) A 7 bit Hamming code is received as 1110101. Is there any error? If yes, locate position of the error bit. Parity checks are created by odd parity. 6 M

UNIT – II

3. (a) Reduce the following boolean expressions using theorems and identities. 6 M  
i)  $F = C + AB + AD(B + C) + CD$   
ii)  $F = AB + CDB + ACD$   
(b) Prove that NAND and NOR gates are Universal gates. 6 M

(OR)

4. (a) Simplify the following expression using the K-map: 6 M  
 $Y = A'B'C' + AC'D' + AB' + ABCD' + A'B'C$   
(b) Write the expression for Boolean function  $F(A, B, C) = \sum m(1, 4, 5, 6, 7)$  in standard POS form. 6 M

UNIT – III

5. (a) What is full adder? Derive the necessary equations from the truth table and realize using the logic gates. 6 M  
(b) Realize look ahead carry adder. 6 M

(OR)

6. (a) Implement the following function with 4:1 multiplexer.  $F(A,B,C) = \sum m(1,3,5,6)$  6 M  
(b) Realize 3-line to 8-line decoder. 6 M

UNIT – IV

7. (a) Convert S-R flip flop into JK-flip flop. Draw and explain the logic diagram. 6 M  
(b) Using D-Flip flops and waveforms, explain the working of a 4-bit SISO shift register. 6 M

(OR)

8. Explain 4-bit Johnson's counter with suitable circuit, state and timing diagrams 12M

UNIT-V

9. (a) Write the differences between PAL and PLA. 6 M  
(b) Minimize and implement the Boolean function  $F = \sum(0,1,2,3,13,14,15)$  using PROM. 6 M

(OR)

10. Design and implement the following Boolean functions in PAL. 12M  
(i)  $A(w,x,y,z) = \sum m(0,2,6,7,8,9,12,13)$   
(ii)  $B(w,x,y,z) = \sum m(0,2,6,7,8,9,12,13,14)$   
(iii)  $C(w,x,y,z) = \sum m(1,3,4,6,10,12,13)$   
(iv)  $D(w,x,y,z) = \sum m(1,3,4,6,9,12,14)$

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

B. Tech. III Semester (R20) Regular Examinations of March - 2022

*SUB: Fundamentals of Statistics and Dynamics (ME)*

Time: 3 Hours

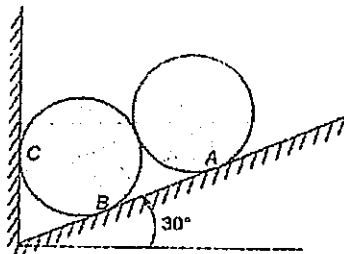
Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

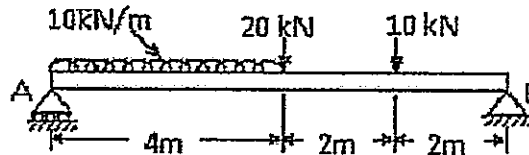
## UNIT - I

1. (a) State and explain the concept of free body diagram with suitable example. 4M  
 (b) Two identical rollers, each of weight 80 N are supported by an inclined plane and a vertical wall as shown in figure. Determine the reactions at points of supports A, B and C, assuming all the surfaces is smooth. Also find the reaction force between rollers. 8M



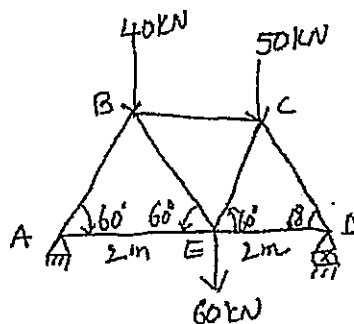
(OR)

2. (a) Classify the different types of beams and supports. 4M  
 (b) A beam AB is located supported and loaded as shown in figure. Find the reactions at supports. 8M



## UNIT - II

3. (a) Classify the types of frames? 2M  
 (b) Determine the forces in all the members for the truss show in figure. Tabulate the results? 10M

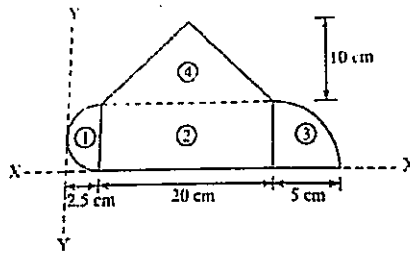


(OR)

4. (a) Classify and explain the different types of friction. 6M  
 (b) A pull of 180N applied upward at  $30^\circ$  to a rough horizontal plane was required to just move a body resting on the horizontal plane while push of 220N applied along the same line of action was required to just move the same body downwards. Determine the weight of the body and the coefficient of friction. 6M

UNIT – III

5. (a) Differentiate between centroid and centre of gravity. 2M  
 (b) Find the centroid of the following figure. 10M



(OR)

6. (a) What is stress? Classify the different types of stresses. 4M  
 (b) Discuss the terms, modulus of elasticity, modulus of rigidity, bulk modulus and Poisson's ratio. Give the relations between them. 8M

UNIT – IV

7. (a) What is second moment of area? 2M  
 (b) State and prove the parallel axis theorem on moment of inertia for a plane area. 10M

(OR)

8. (a) A homogeneous circular disc of diameter 4m and its mass is 1.5kg. Determine the mass moment of inertia of the disc with respect to its geometric axis. 2M  
 (b) Derive the expression for the moment of inertia of a homogeneous right circular cone of mass 'm', base radius 'r', and altitude 'h' with respect to geometric axis. 10M

UNIT-V

9. (a) Write down the equations of motion with uniform acceleration. 2M  
 (b) Derive the expression for torsional equation. 10M

(OR)

10. (a) What are the stresses developed in helical springs? 2M  
 (b) Derive the expression for deflection of helical spring. 10M

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

B. Tech. III Semester (R20) Regular Examinations of March - 2022

SUB: Special Functions and Complex Analysis (ECE)

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

## UNIT - I

1. (a) Prove that  $J_{n+1}(x) = \frac{2n}{x} J_n(x) - J_{n-1}(x)$ . 6M

(b) Prove that  $\frac{d}{dx}[J_0(x)] = -J_1(x)$ . 6M

(OR)

2. (a) Prove that  $(1 - 2xt + t^2)^{-1/2} = \sum_{n=0}^{\infty} t^n P_n(x)$ . 6M

(b) Express  $f(x) = x^4 + 3x^3 - x^2 + 5x - 2$  in terms of Legendre's polynomials. 6M

## UNIT - II

3. Show that the function  $f(z) = \begin{cases} xy^2(x+iy) & , z \neq 0 \\ 0 & , z = 0 \end{cases}$  the C-R equations are satisfied at the

origin but the derivative of  $f(z)$  at origin does not exist.

(OR)

4. (a) Determine the analytic function whose real part is  $e^{2x}(x \cos 2y - y \sin 2y)$ . 6M

(b) If  $f(z)$  is an analytic function with constant modulus, show that  $f(z)$  is constant. 6M

## UNIT - III

5. Find the bilinear transformation that maps the points  $z = -1, 0, 1$  on to the points  $w = -1, -i, 1$  respectively. Hence find the invariant points of this transformation. 12M

(OR)

6. Discuss the transformation  $w = \sin z$ . 12M

## UNIT - IV

7. (a) Evaluate  $\int_0^{2+i} (x^2 - iy) dz$  along the line  $y = x$ . 6M

(b) Evaluate, using Cauchy's Integral formula  $\oint_c \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$  where  $c$  is the circle

$$|z| = 3.$$

(OR)

8. (a) State and prove Cauchy's Integral theorem. 6M

(b) Evaluate  $\oint_c \frac{\log z}{(z-1)^3} dz$  where  $c$  is the circle  $|z-1| = 1/2$ , using Cauchy's Integral formula. 6M

## UNIT-V

9. (a) Determine the poles and their residue at  $\frac{\sin z}{(2z - \pi)^2}$ . 6M

(b) Evaluate  $\int_c \frac{z-1}{(z+1)^2(z-2)} dz$  where  $C$  is the circle  $|z-1| = 2$  using Residue theorem. 6M

(OR)

10. Prove that  $\int_0^{\infty} \frac{x^2}{(x^2+1)(x^2+4)} dx = \frac{\pi}{3}$  by using calculus of residues. 12M

Q.P. Code: 2024301

SET - 1

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA  
B. Tech. III Semester (R20) Regular Examinations of March – 2022  
SUB: Business Economics and Accounting for Engineers (CSE)

Time: 3 Hours

Max. Marks: 60

Answer any FIVE Questions choosing one question from each unit.

All questions carry Equal Marks.

UNIT - I

1. What is meant by demand forecasting? Explain in brief the various methods of forecasting demand for (a) established products and (b) New products 12M

(OR)

2. (a) Define Managerial Economics and specify its scope 6M  
(b) State and explain the law of Demand and also write about its exceptions 6M

UNIT – II

3. Distinguish the three stages of short period production function when only two factors are being employed 12M

(OR)

4. What is meant by break even analysis? How is it helpful to the manager in decision making? And specify its limitations 12M

UNIT – III

5. What is meant by monopolistic competition? How does a firm take its pricing and output decisions under it? 12M

(OR)

6. What is pricing? Explain various pricing methods adopted by MNC's in the market 12M

UNIT – IV

7. (a) Explain accounting concepts 6M  
(b) Explain accounting conventions 6M

(OR)

8. From the following Trial Balance of Tadipathril Granite, prepare the Final Accounts for the year ended 31<sup>st</sup> December, 2021. 12M

Debit Balances	Rs.	Credit Balances	Rs.
Purchases	60,000	Capital	60,000
Sales Returns	3,000	Creditors	10,000
Buildings	46,000	Reserve for Bad debts	2,000
Furniture	7,000	Sales	80,000
Debtors	30,000	Commission	3,000
Cash	4,200	Purchase Returns	500
Carriage on Purchases	800	Bank OD	24,000
Trade Expenses	6,000	Outstanding Expenses	500
Bank Charges	1,000	Outstanding Salaries	500
Salaries	11,000		
Telephone Expenses	500		
Drawings	1,000		
Opening Stock	9,000		
Insurance Premium	500		
Bad Debts	500		
	1,80,500		1,80,500



**Adjustments:**

- (i) Closing Stock as on 31-12-2021 was Rs. 20,000.
- (ii) Depreciate Furniture @ 10%, buildings @ 20% p.a.
- (iii) Provide an amount of Rs. 2,000 for bad debts. On the remaining balance of debtors provide 5% for bad and doubtful reserves.
- (iv) Commission received in advance Rs. 500.
- (v) A provision of discount 10% has to be made on creditors.

**UNIT-V**

9. What is meant by ratio? And explain the types of ratios

12M

(OR)

10. The following is the Balance Sheet of a company as on 31<sup>st</sup> March 2020.

12M

Liabilities	Rs.	Assets	Rs.
Share capital	2,00,000	Land and Building	1,40,000
Profit & loss a/c	30,000	Plant and Machinery	3,50,000
General Reserve	40,000	Stock	2,00,000
12% Debentures	4,20,000	Sundry Debtors	1,00,000
Sundry Creditors	1,00,000	Bills Receivable	10,000
Bills Payable	50,000	Cash at Bank	40,000

**Calculate:**

- (i) Current Ratio
- (ii) Quick Ratio
- (iii) Inventory to Working capital
- (iv) Debt to equity Ratio
- (v) Current Assets to Fixed Assets