

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar 2021

ECONOMICS AND FINANCIAL ACCOUNTING FOR ENGINEERS

(Common to All)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.1	i. Demonstrate Law of Demand	1M
	ii. Outline Production Function	1M
	iii. Determine of Break Even Point	1M
	iv. What is meant by Cost Analysis?	1M
	v. Define Monopoly.	1M
	vi. Features of Oligopoly	1M
	vii. Discuss about Double Entry System	1M
	viii. What are the uses of Accounting?	1M
	ix. Write any two solvency ratios	1M
	x. Define Current ratio.	1M
<hr/>		
Q.2(A)	Explain the Scope and Significance of Economics?	10M
	OR	
Q.2(B)	How do you identify the responsiveness of Quantity of Demand and Price? How do you classify the Price Elasticity of Demand?	10M
<hr/>		
Q.3(A)	What is Cost? Distinguish between long run cost and short run cost.	10M
	OR	
Q.3(B)	For the data given below evaluate 1) P/V Ratio 2) Margin of safety and 3) BEP <i>Data: Profit Rs 40000, Contribution Rs 60000, Sales Rs. 600000</i>	10M
<hr/>		
Q.4(A)	What is market? Explain features and price output determination of perfect competition market.	10M
	OR	
Q.4(B)	Distinguish between perfect and monopolistic competition	10M
<hr/>		
Q.5(A)	Write a short note on Book-Keeping and various Financial statements in a corporate company.	10M
	OR	
Q.5(B)	Journalize the following transactions in the books of M/S Sai & Co. 2018 October <i>1st Commenced business with cash Rs. 45000</i> <i>5th Purchased goods worth Rs. 25000 for cash</i> <i>8th wages paid Rs. 4000</i> <i>15th Sold goods for cash Rs. 8000</i> <i>20th Purchased goods from Lalitha Rs. 3000</i> <i>23th Sold goods to Siri Rs. 5000</i> <i>25th Cash received from Siri Rs. 5000</i> <i>30th Paid Salaries Rs. 3000</i>	10M
<hr/>		
Q.6(A)	Stock Rs 30000, Debtors Rs25000, Cash in Hand Rs 5000, Cash at Bank 14000, Creditors Rs 26000, Bills Payables Rs 12000, Marketable securities Rs 6000, Bills Receivables Rs 5000, Short term loan Rs 4000 and Outstanding expenses Rs 5000. Find out a) Current Ratio, 2) Quick Ratio and 3) Absolute liquid Ratio.	10M
	OR	
Q.6(B)	How do you classify different types of ratios?	10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS) SET-I

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations --Mar 2021

PRINCIPLES OF MANAGEMENT

(Common to ME, CSE, CSIT, CST)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- | | | |
|--------|--|-----|
| Q.1 | i. Define Management. | 1M |
| | ii. What is Managerial Ethics? | 1M |
| | iii. What is Planning? | 1M |
| | iv. Define Strategic Management. | 1M |
| | v. What is Delegation of Authority? | 1M |
| | vi. What is Job analysis? | 1M |
| | vii. Define Motivation. | 1M |
| | viii. What is mean by Leadership? | 1M |
| | ix. Explain Controlling. | 1M |
| | x. Feed Forward control | 1M |
| Q.2(A) | Explain in brief roles and functions of Manager. | 10M |
| | OR | |
| Q.2(B) | Elucidate about Global Environmental issues. | 10M |
| Q.3(A) | How would you explain Decision making process with an example? | 10M |
| | OR | |
| Q.3(B) | Discuss contemporary issues in planning process. | 10M |
| Q.4(A) | What is organization structure? Classify the various types of organization structures. | 10M |
| | OR | |
| Q.4(B) | Explain importance of change management. | 10M |
| Q.5(A) | Define motivation. Elaborate any two theories of motivation? | 10M |
| | OR | |
| Q.5(B) | Explain barriers of communication with the help of illustrations. | 10M |
| Q.6(A) | How would you explain the concept of value chain management in detail? | 10M |
| | OR | |
| Q.6(B) | Give a brief note on process and types of control. | 10M |

*** END***

Hall Ticket No:

Question Paper Code: 18BIO101

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC - AUTONOMOUS)

B.Tech., II Year I Semester (R18) Regular & Supplementary End Semester Examinations – March 2021

LIFE SCIENCE FOR ENGINEERS

(Common to CE, EEE & ECE)

Time: 3 Hours

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q. No. 1 are compulsory. In Q. No. 2 to 6 answer either Part - A or B only

- Q.1
- Name the carbon and energy source of chemolithotroph? 1 M
 - _____ is called as suicidal bags of the cell? 1 M
 - Name the metal ion present in Hemoglobin? 1 M
 - List out any two polymers made up of D-glucose. 1 M
 - What is glycolysis? 1 M
 - What is the main function of citric acid cycle? 1 M
 - Give an example for a protein molecule is also acts as a hormone. 1 M
 - Differentiate mitosis and meiosis processes? 1 M
 - The energy currency of a cell is 1 M
 - What are endergonic reactions? Give two examples. 1 M
-
- Q.2(A) What is a cell? With a neat diagram explain the cell components in detail. 10 M
- OR
- Q.2(B) How will you relate the living organism with manmade systems? Explain with two examples. 10 M
-
- Q.3(A) Discuss in detail the structure of proteins? 10 M
- OR
- Q.3(B) Discuss the importance, structure, properties and applications of starch and cellulose 10 M
-
- Q.4(A) Elaborately discuss about the synaptic and neuromuscular junctions. 10 M
- OR
- Q.4(B) Discuss tricarboxylic acid cycle with a neat diagram. Find out the ATP yield for this process. 10 M
-
- Q.5(A) Explain the functioning of Biosensors with an illustration. 10 M
- OR
- Q.5(B) Explain how the genetic code is transferred from DNA to RNA to Protein Synthesis? 10 M
-
- Q.6(A) Explain the mechanism of photosynthesis. 10 M
- OR
- Q.6(B) How would you apply the concept of K_{eq} and standard free energy in biological systems? And derive the relationship between them? 10 M

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – MAR'2021

FUNDAMENTALS OF ENGINEERING MECHANICS

(Civil Engineering)

Time: 3Hrs

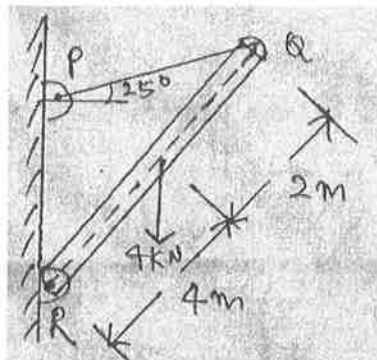
Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

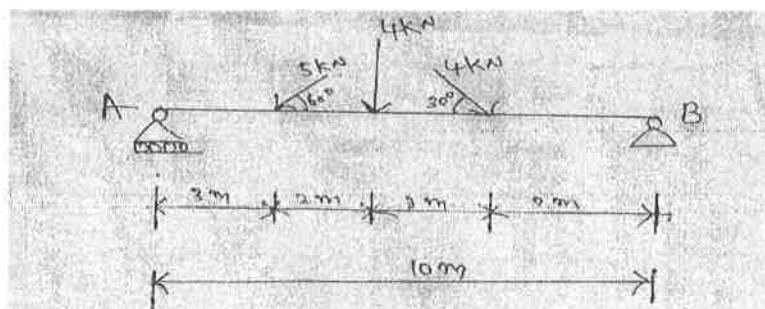
- Q.1
- | | | |
|-------|---|----|
| i. | Define coplanar and non-coplanar forces. | 1M |
| ii. | State parallelogram law of forces. | 1M |
| iii. | Distinguish between space diagram and free body diagram. | 1M |
| iv. | Illustrate dry friction. | 1M |
| v. | Define Moment of inertia. | 1M |
| vi. | Write the formula for centroid of a quarter circular arc. | 1M |
| vii. | What do you understand by kinematics? | 1M |
| viii. | Distinguish between linear and angular momentum. | 1M |
| ix. | Write the three equations of plane motion of a rigid body. | 1M |
| x. | Write down the equation of principle of work and energy for a rigid body. | 1M |

- Q.2(A) A 4000N load acts on the beam held by a cable PQ as shown in fig. The weight of the beam can be neglected. Draw the free-body diagram of the beam and find the tension in the cable PQ. Also find the reaction force at R. 10M

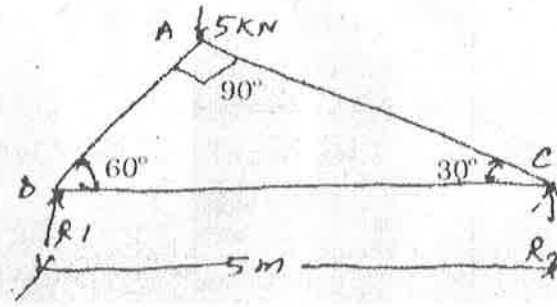


OR

- Q.2(B) A beam is acted upon by a system of forces as shown in fig. Find the support reactions. 10M



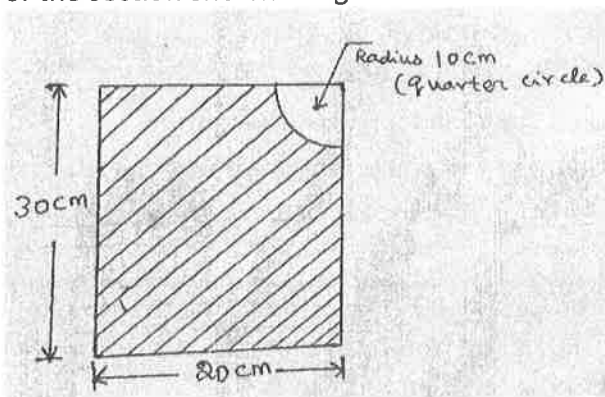
- Q.3(A) A truss with a span of 5m is carrying a load of 5 kN at its apex, as shown in fig. Find the forces in all the members by the method of joints. 10M



OR

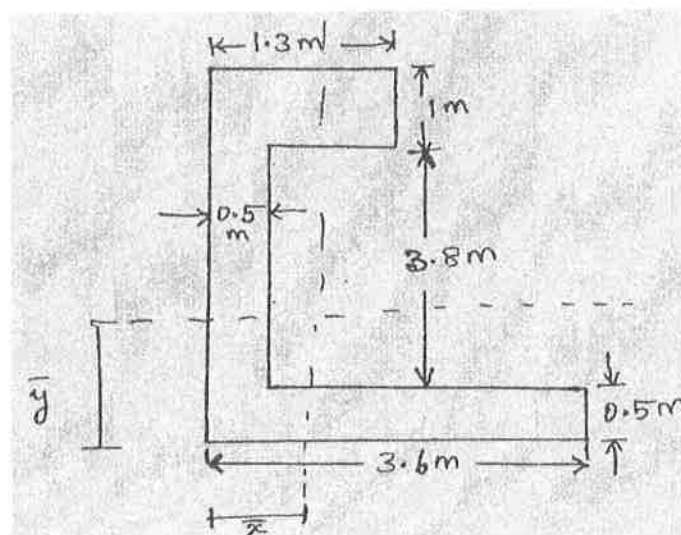
- Q.3(B) A ladder 4m long leans against a smooth wall at an angle of 60° with the horizontal. The weight of the ladder is 800 N. When a person weighing 700N stands at 1.2m from the bottom of the ladder, the ladder is just about to slide. Calculate the coefficient of friction between the ladder and the floor. 10M

- Q.4(A) Locate the centroid of the section shown in fig. 10M



OR

- Q.4(B) Determine the moment of inertia of the section shown in fig. about the centroidal XX and YY axes 10M

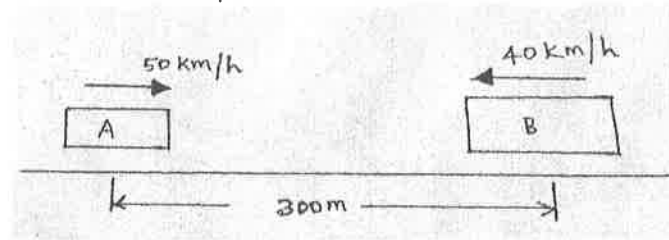


- Q.5(A) A car accelerates uniformly from a speed of 30 km/hour to a speed of 75 km/hour in 5 seconds. Determine the acceleration of the car and also the distance travelled during 5 seconds 10M

OR

Q.5(B) A 2000 Kg automobile moving with a velocity of 0.8 m/s , hits a wall and is brought to rest in 50×10^{-3} seconds. Determine the average impulsive force exerted by the wall on the car during the impact. 10M

Q.6(A) Two vehicles approach each other in opposite lanes of a straight horizontal roadway as shown in fig. Find the time and positions at which the vehicles meet if both continue to move with constant speed. 10M



OR

Q.6(B) A particle is projected in air with a velocity of 100m/s at an angle of 30° with the horizontal. Find i) The horizontal angle ii) The maximum height reached by the particle and iii) The time of flight 10M

*** END***

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – March 2021

SURVEYING AND GEOMATICS

(Civil Engineering)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- Q.1
- | | | |
|-------|---|----|
| i. | What is degree of a curve? | 1M |
| ii. | What do you understand by well-conditioned triangle? | 1M |
| iii. | What is the least count of a theodolite? | 1M |
| iv. | Define (a) raster data (b) vector data. | 1M |
| v. | What is a reverse curve? | 1M |
| vi. | What do you mean by Latitude and Departure? | 1M |
| vii. | What is the principle of triangulation? | 1M |
| viii. | List different types of scattering. | 1M |
| ix. | Define (a) wavelength (b) frequency of an electromagnetic wave. | 1M |
| x. | What is GPS & GIS? | 1M |
-
- Q.2(A) Discuss various methods of contouring. Explain the interpolation techniques used for contouring. 10M
- OR**
- Q.2(B) (i) The Fore bearings of the following lines are given. Evaluate the Back bearing: (i) FB of AB = $310^{\circ}30'$ (ii) FB of BC = $145^{\circ}15'$ (iii) FB of CD = $210^{\circ}30'$ (iv) FB of DE = $60^{\circ}45'$ (v) FB of EF = $15^{\circ}30'$. 5M
(ii) Discuss in detail the factors responsible for selection of contour interval. 5M
-
- Q.3(A) (i) What do you mean by direct and deflection angles. 5M
(ii) Discuss the method of measuring vertical angle using theodolite. 5M
- OR**
- Q.3(B) Classify the different arrangement of triangles in a triangulation system. 10M
-
- Q.4(A) Two straight lines intersect at chainage 1200.75 and angle of intersection is 65° . If the radius of the curve is 650 m. Determine: (i) tangent distance (ii) length of the curve (iii) length of the long chord (iv) degree of curve (v) apex distance. 10M
- OR**
- Q.4(B) (i) What is a transition curve? What are the advantages of a transition curve? 5M
(ii) What are different types of horizontal circular curves? 5M
-
- Q.5(A) (i) What are different types of EDM instruments? Explain in detail. 5M
(ii) Discuss in detail different types of waves used in EDM. 5M
- OR**
- Q.5(B) (i) What is longitude, latitude and elevation? 5M
(ii) Discuss the uses of an electronic total station? 5M
-
- Q.6(A) What is scattering? Explain the different types of scattering. 10M
- OR**
- Q.6(B) (i) Discuss raster and vector data types. 10M
(ii) Explain the electromagnetic spectrum and its various use in remote sensing.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar 2021

MECHANICS OF FLUIDS

(Civil Engineering)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- Q.1
- | | | |
|-------|--|----|
| i. | Define Surface tension. | 1M |
| ii. | Define three dimensional flow. | 1M |
| iii. | Define fluid statics. | 1M |
| iv. | Define Buoyancy. | 1M |
| v. | What is the velocity potential function? | 1M |
| vi. | List out the various parts of venture meter. | 1M |
| vii. | What is the HGL? | 1M |
| viii. | How do you call Most economical section in open channel? | 1M |
| ix. | Define Boundary layer. | 1M |
| x. | What is Reynold's number? | 1M |

-
- Q.2(A) What is fluid? Write the short not on following-
(a) Density (b) Specific Weight (c) Specific Gravity (d) Kinematic Viscosity (e) Dynamic Viscosity 10M

OR

- Q.2(B) Calculate the capillary rise in a glass tube of 2.5 mm diameter when immersed vertically in (a) water and (b) mercury. Take surface tensions $\sigma = 0.0725$ N/m for water and $\sigma = 0.52$ N/m for mercury in contact with air. The specific gravity for mercury is given as 13.6 and angle of contact = 130° . 10M

-
- Q.3(A) Derive an expression for the force exerted on a sub-merged vertical plane surface by the static fluid and locate the position of centre of pressure. 10M

OR

- Q.3(B) A rectangular pontoon is 5m long, 3m wide and 1.2m high. The depth of immersion of the pontoon is 0.8m in sea water. If the centre of gravity is 0.6m above the bottom of the pontoon, determine the meta-centric height. The density for sea water = 1025 kg/m^3 . 10M

-
- Q.4(A) Define the equation of continuity. Obtain an expression for continuity equation for a three-dimensional flow. 10M

OR

- Q.4(B) A horizontal Venturimeter with inlet and throat diameters 20 cm and 10 cm respectively is used to measure the flow of oil sp.gr. 0.8. The discharge of oil through venture meter is 60 lit/sec. Find the reading of the oil-mercury differential manometer. Take $C_d = 0.98$. 10M

Q.5(A) Find the head lost due to friction in a pipe of diameter 300mm and length 50m, through which water is flowing at a velocity of 3m/s using (i) Darcy's formula (ii) chezy's formula for which C=60. Take Kinematic viscosity is 0.01 stoke. 10M

OR

Q.5(B) Construct the expression for most economical trapezoidal channel. 10M

Q.6(A) Describe in detail the Buckingham's π theorem method of dimensional analysis. 10M

OR

Q.6(B) Find the displacement thickness, momentum thickness and energy thickness for velocity distribution in the boundary layer given by 10M

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

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – MAR'2021

ELECTRICAL CIRCUIT ANALYSIS

(EEE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- Q.1
- i. What do you mean by Supermesh? 1M
 - ii. What is the significance reciprocity theorem? 1M
 - iii. State maximum power transfer theorem for AC Circuits. 1M
 - iv. If a three-phase delta-connected balanced R-L load is connected to a balanced three-phase supply, what is the relation for three-phase power drawn by the load? 1M
 - v. Write the formula of time constant for series R-L circuit with DC excitation. 1M
 - vi. During switching instant what is the condition of Inductance? 1M
 - vii. The impedance matrices of two, two-port networks are given by $\begin{bmatrix} 5 & 4 \\ 2 & 3 \end{bmatrix}$ and $\begin{bmatrix} 13 & 8 \\ 6 & 25 \end{bmatrix}$ if two networks are connected in series. What is the impedance matrix of the combination? 1M
 - viii. What is the condition for a two port network to be reciprocal network? 1M
 - ix. Find the Laplace transform of $e^{2t} f(t)$ 1M
 - x. Write the transfer function of series resonance circuit 1M

- Q.2(A) What is the power loss in both 1Ω resistors? Apply Thevenin's theorem in the circuit shown in fig. 1. 10M

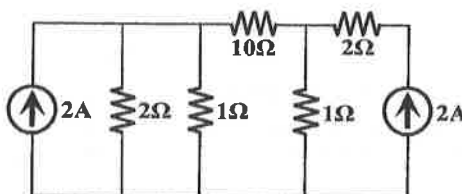


Fig. 1

OR

- Q.2(B) Find the Norton's equivalent circuit (between a and b) for the network shown in Fig. 2. 10M

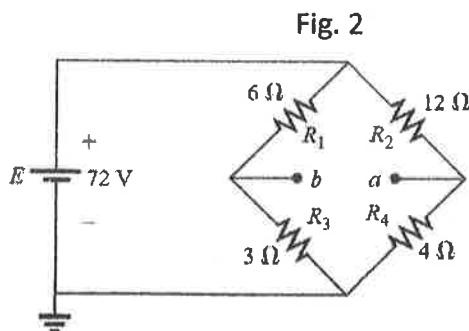


Fig. 2

- Q.3(A) i) Write the advantages of three phase system. 10M
 ii) A coil of resistance 6Ω and inductance 100 mH in series with a $110 \mu\text{F}$ capacitor, is connected to a 230 V , 50 Hz supply. Calculate (a) the current flowing, (b) the phase difference between the supply voltage and current, (c) the voltage across the coil and (d) the voltage across the capacitor.

OR

- Q.3(B) A 440V , three-phase supply feeds an unbalanced three-wire, star-connected load. The branch impedances of the load are $Z_R = (4 + j8) \Omega$, $Z_Y = (3 + j4) \Omega$, $Z_Z = (15 + j20) \Omega$. Find the line currents and voltage across each phase impedance. Assume RYB phase sequence. 10M

- Q.4(A) For an R-C series circuit, a DC voltage is applied at $t=0$. Find the expression for current $i(t)$. 10M

OR

- Q.4(B) An RLC circuit shown in Fig. 4, consists of resistance $R=4 \Omega$, inductance $L=1.5\text{H}$, and capacitance $C=1.5\text{F}$ in series with a 25V constant source when the switch is closed at $t=0$. Obtain $i(t)$. 10M

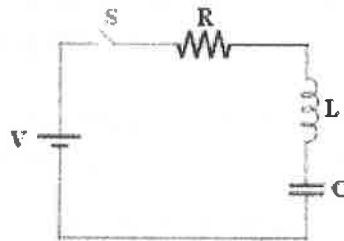


Fig. 4

- Q.5(A) Find the Z and Y parameters for a π -type attenuator section shown in Fig. 6 and also draw equivalent circuit. 10M

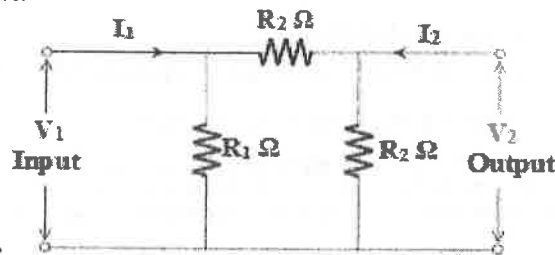


Fig. 6

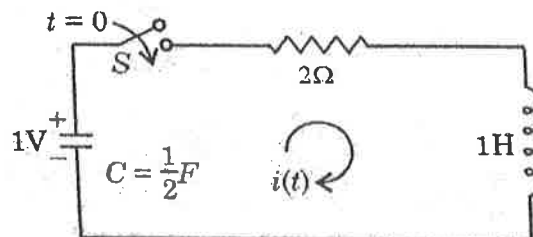
OR

- Q.5(B) Derive transmission line parameters in terms of Z-parameters and Y-parameters 10M

- Q.6(A) Write the Laplace transform of some common forcing functions with neat sketches. 10M

OR

- Q.6(B) For the series RLC Circuit shown with the capacitor initially charged to voltage of 1 V as indicated. Find the expression for $i(t)$. Also draw the s-domain representation of the circuit 10M



*** END***

--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – March 2021

ANALOG ELECTRONICS

(Electrical and Electronics Engineering)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- | | | | | | | | | | | |
|--|---|--------|--|--|-----------|--|--|--------|--|--|
| Q.1 | <ul style="list-style-type: none"> i. Give the comparison of BJT and FET. 1M ii. If the current gain $\alpha = 0.94$, then what is value of CE- amplifiers current gain β? 1M iii. Draw the transfer characteristics of Junction Field effect Transistor 1M iv. What is CMRR in operational amplifier? 1M v. What is line and load regulation in Voltage regulator? 1M vi. Draw the circuit diagram for integrator. write its output voltage equation 1M vii. What are the effects of positive feedback? 1M viii. Find the transfer function of first order high pass filter 1M ix. What is MEMS? Give its application 1M x. What is meant by resolution of DAC? 1M | | | | | | | | | |
| <table border="0" style="width: 100%;"> <tr> <td style="width: 10%; vertical-align: top;">Q.2(A)</td> <td style="width: 80%;"> <ul style="list-style-type: none"> (i) Explain the fixed bias for CE- Bipolar Junction Transistor and hence derive stability factor and operation quiescent point. 5 M (ii) Describe briefly about clipper and clamper circuits with proper circuit diagram. 5 M </td> <td style="width: 10%;"></td> </tr> <tr> <td colspan="3" style="text-align: center;">OR</td> </tr> <tr> <td style="vertical-align: top;">Q.2(B)</td> <td> <ul style="list-style-type: none"> (i) Explain the Fixed bias circuit for BJT and hence derive the stability factor. 5 M (ii) In a biasing with feedback resistor method a silicon transistor is used, the operating point is 7V and 1mA and $V_{CC} = 12V$. Assume that $\beta = 100$. Determine the value of R_B. 5 M </td> <td></td> </tr> </table> | | Q.2(A) | <ul style="list-style-type: none"> (i) Explain the fixed bias for CE- Bipolar Junction Transistor and hence derive stability factor and operation quiescent point. 5 M (ii) Describe briefly about clipper and clamper circuits with proper circuit diagram. 5 M | | OR | | | Q.2(B) | <ul style="list-style-type: none"> (i) Explain the Fixed bias circuit for BJT and hence derive the stability factor. 5 M (ii) In a biasing with feedback resistor method a silicon transistor is used, the operating point is 7V and 1mA and $V_{CC} = 12V$. Assume that $\beta = 100$. Determine the value of R_B. 5 M | |
| Q.2(A) | <ul style="list-style-type: none"> (i) Explain the fixed bias for CE- Bipolar Junction Transistor and hence derive stability factor and operation quiescent point. 5 M (ii) Describe briefly about clipper and clamper circuits with proper circuit diagram. 5 M | | | | | | | | | |
| OR | | | | | | | | | | |
| Q.2(B) | <ul style="list-style-type: none"> (i) Explain the Fixed bias circuit for BJT and hence derive the stability factor. 5 M (ii) In a biasing with feedback resistor method a silicon transistor is used, the operating point is 7V and 1mA and $V_{CC} = 12V$. Assume that $\beta = 100$. Determine the value of R_B. 5 M | | | | | | | | | |
| <table border="0" style="width: 100%;"> <tr> <td style="width: 10%; vertical-align: top;">Q.3(A)</td> <td style="width: 80%;"> Explain the Enhancement MOSFET and draw its characteristics. 10M </td> <td style="width: 10%;"></td> </tr> <tr> <td colspan="3" style="text-align: center;">OR</td> </tr> <tr> <td style="vertical-align: top;">Q.3(B)</td> <td> Describe the principle of voltage divider biasing in JFET and find out the quotient points from Shockley's equation. 10M </td> <td></td> </tr> </table> | | Q.3(A) | Explain the Enhancement MOSFET and draw its characteristics. 10M | | OR | | | Q.3(B) | Describe the principle of voltage divider biasing in JFET and find out the quotient points from Shockley's equation. 10M | |
| Q.3(A) | Explain the Enhancement MOSFET and draw its characteristics. 10M | | | | | | | | | |
| OR | | | | | | | | | | |
| Q.3(B) | Describe the principle of voltage divider biasing in JFET and find out the quotient points from Shockley's equation. 10M | | | | | | | | | |
| <table border="0" style="width: 100%;"> <tr> <td style="width: 10%; vertical-align: top;">Q.4(A)</td> <td style="width: 80%;"> Discuss about important characteristics of negative feedback amplifiers in detail. 10M </td> <td style="width: 10%;"></td> </tr> <tr> <td colspan="3" style="text-align: center;">OR</td> </tr> <tr> <td style="vertical-align: top;">Q.4(B)</td> <td> <ul style="list-style-type: none"> (i) Describe about the PGA with proper circuit diagram. 5 M (ii) With circuit diagram, explain gain control in Instrumentation amplifier and give its advantages. 5 M </td> <td></td> </tr> </table> | | Q.4(A) | Discuss about important characteristics of negative feedback amplifiers in detail. 10M | | OR | | | Q.4(B) | <ul style="list-style-type: none"> (i) Describe about the PGA with proper circuit diagram. 5 M (ii) With circuit diagram, explain gain control in Instrumentation amplifier and give its advantages. 5 M | |
| Q.4(A) | Discuss about important characteristics of negative feedback amplifiers in detail. 10M | | | | | | | | | |
| OR | | | | | | | | | | |
| Q.4(B) | <ul style="list-style-type: none"> (i) Describe about the PGA with proper circuit diagram. 5 M (ii) With circuit diagram, explain gain control in Instrumentation amplifier and give its advantages. 5 M | | | | | | | | | |
| <table border="0" style="width: 100%;"> <tr> <td style="width: 10%; vertical-align: top;">Q.5(A)</td> <td style="width: 80%;"> Explain the working principle and operation of RC phase shift oscillator with diagram. Also write the conditions for oscillation. 10M </td> <td style="width: 10%;"></td> </tr> </table> | | Q.5(A) | Explain the working principle and operation of RC phase shift oscillator with diagram. Also write the conditions for oscillation. 10M | | | | | | | |
| Q.5(A) | Explain the working principle and operation of RC phase shift oscillator with diagram. Also write the conditions for oscillation. 10M | | | | | | | | | |

Q.5(A) Explain the working principle and operation of RC phase shift oscillator with diagram. Also write the conditions for oscillation. 10M

OR

Q.5(B) (i) Derive transfer function for Low pass Butterworth filter. 5 M

(ii) Design above circuit of Butterworth LPF at a high cutoff frequency of 2KHz. Assume capacitor $C = 0.005 \mu\text{F}$. 5 M

Q.6(A) (i). Explain the operation of weighted resistor DAC? 5 M

(ii) What output voltage would be produced by a D/A converter whose output range is 0 to 10V and whose input binary number is 5 M

a. 10 (for a 2bit D/A converter)

b. 1.0110 (for a 4 bit DAC)

c. 2.10111100 (for a 8 bit DAC)

OR

Q.6(B) (i) Explain about temperature sensor (LM 35) 5 M

(ii) Explain successive Approximation ADC with block diagram. 5 M

***** END*****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar 2021

DC MACHINES & TRANSFORMERS

(EEE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- Q.1
- i. What do we call the ratio of the induced voltage to the rate of change of current causing it? 1M
 - ii. Highly permeable materials have property to attract more and more magnetic field lines into themselves. By doing so magnetic field increases inside the material and gets highly magnetize, in results their magnetic flux increases. (True/ False) 1M
 - iii. Which statement(s) is(are) correct for the construction of a DC generator? 1M
 - i) Brush is a form of rotating switch
 - ii) Armature is a rotating part
 - iii) For field system, electromagnet isn't suitableLow reluctance material is preferable for armature core
 - iv. What do you mean by armature reaction in DC generator? 1M
 - v. Which method is best to control the speed of a dc shunt motor above the base speed? 1M
 - vi. List the tests that are conducted for dc shunt and separately excited machines? 1M
 - vii. What is the effect of inserting resistance in the field circuit of a dc shunt motor on its speed and torque? 1M
 - viii. What is the name of the transformer coil across which load is connected? 1M
 - ix. List the types of tap changing transformers? 1M
 - x. List the advantages f delta connection of 3-phase transformers. 1M
-
- Q.2(A)
- i. With net diagrams explains that a bar magnet is an inherent dipole source. 10M
 - ii. Derive an expression for the energy stored in a linear magnetic circuit.

OR

- Q.2(B) An iron ring of mean length 50 cm has an air gap of 1 mm and winging of 200 turns. If the relative permeability of iron is 400, when a current of 1 A flows in the winding. Determine the flux density neglecting leakage and fringing. 10M
-

- Q.3(A) In a 220 V DC compound generator, $R_a = 0.08 \Omega$, $R_{sh} = 20 \Omega$ and $R_{se} = 0.05 \Omega$. The generator supplies a load of 80 A at 220 V. Find the induced emf and armature current, when the machine is connected as i) long shunt ii) short shunt 10M

OR

- Q.3(B) How the voltage is build up in a DC shunt generator? Sketch the magnetization curve. From the characteristics, give the expression for the critical resistance and critical speed. 10M
-

- Q.4(A) How is back emf produced in a dc motor? Also, derive an expression for this emf. 10M

OR

Q.4(B) A 5 kW, 220 V shunt motor has an armature resistance of 0.04Ω and a field resistance of 220Ω . At no load, the motor runs at 1,200 rpm and draws a current of 4 A. At full load and rated voltage, the current drawn is 22 A and the armature reaction causes a drop of 2 % in flux. Determine i) full-load speed ii) full-load torque. 10M

Q.5(A) i. Draw the complete phasor diagram for a 1-ph transformer when the load pf is leading? 4M
ii. Differentiate the auto-transformer with ordinary transformer. 4M

OR

Q.5(B) i. Why is the transformer core loss substantially independent of load current? 2M
ii. A 20 kVA, 250V/2500V, 50 Hz, 1-ph transformer gave the following test result;
SC Test: 120 V, 8 A, 320 W
OC Test: 250 V, 1.4 A, 105 W
Find the circuit parameters and draw the equivalent circuit of the transformer referred to LV winding. 8 M

Q.6(A) Explain the physical connections and phasor diagrams of i) D z0 and ii) Yd11 10M

OR

Q.6(B) Two transformers A and B are connected in parallel to a load of $1 + j 2\Omega$. The impedances in secondary are $Z_A = 0.14 + j 0.6\Omega$ and $Z_B = 0.2 + j 0.8\Omega$. Their no load terminal voltages are $E_A = 207\text{ V}$ and $E_B = 205\text{ V}$. find the power output and power factor of each transformer. 10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – MAR 2021

PARTIAL DIFFERENTIAL EQUATIONS and PROBABILITY & STATISTICS

(Mechanical Engineering)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- Q.1
- i. Form the partial differential equation by eliminating the arbitrary constants $z = ax^3 + by^3$ 1M
 - ii. Write the form of one dimensional wave equation? 1M
 - iii. Define moment generating function of a random variable X . 1M
 - iv. If coin is tossed twice, the probability of getting at least one head is? 1M
 - v. Area of normal curve between $\mu - 2\sigma$ and $\mu + 2\sigma$ is 1M
 - vi. State Chebychev's inequality? 1M
 - vii. Write the conditions for joint $p.d.f.$? 1M
 - viii. Write the limits for coefficient of correlation? 1M
 - ix. Define level of significance. 1M
 - x. Explain alternative hypothesis? 1M
-
- Q.2(A)
- i. Form the PDE by eliminating the arbitrary constants from $z = (x^2 + a)(y^2 + b)$. 5M
 - ii. Form the PDE by eliminating the arbitrary functions from $z = f(x) + e^y g(x)$. 5M
- OR**
- Q.2(B) A tightly stretched flexible string has its ends fixed at $x = 0$ and $x = l$. At time $t = 0$, the string is given a shape defined by $F(x) = \mu x(l - x)$, where μ is a constant, and then released. Find the displacement any point x of the string at any time $t > 0$. 10M
-
- Q.3(A) A computer center has three printers A, B, and C, which print at different speeds. Programs are routed to the first available printer. The probability that a program is routed to printers A, B and C are 0.6, 0.3 and 0.1 respectively. Occasionally a printer will jam and destroy the printout. The probability that printers A, B and C will jam are 0.01, 0.05 and 0.04 respectively. Your program is destroyed when a printer jams. What is the probability that printer A is involved? Printer B involved? 10M
- OR**
- Q.3(B) Define Geometric Distribution? Find moment generating function and its mean, variance. 10M
-
- Q.4(A) Let X be binomial with $n=20$ and $p=0.3$. use the normal approximation to approximate each of the following: 10M
- (i) $P[X \leq 3]$ (ii) $P[X = 4]$ (iii) $P[X \geq 4]$ (iv) $P[3 \leq X \leq 6]$
- OR**
- Q.4(B) State and prove Chebychev's inequality? 10M

Q.5(A) Let X denote the number of defective gauges selected and Y the number of 10M non-defective gauges selected. The joint density for (X, Y) is given below:

$X \backslash Y$	0	1	2	3	4
0	0	0	0	0	1/35
1	0	0	0	12/35	0
2	0	0	18/35	0	0
3	0	4/35	0	0	0

Find (i) $E(X)$ (ii) $E(Y)$ (iii) $E(XY)$ (iii) $Cov(X, Y)$

OR

Q.5(B) Obtain the line of regression Y on X and estimate Y when $X = 45$ for the following 10M data:

X	56	42	72	36	63	47	55	49	38	68
Y	147	125	160	118	149	128	150	145	115	152

Q.6(A) A sample of height of 6400 soldiers have a mean of 67.85 inches and a standard deviation of 2.56 inches while a sample of heights of 1600 sailors has a mean of 68.55 inches and a standard deviation of 2.52 inches. Do the data indicate that the sailors are on the average taller than soldiers? 10M

OR

Q.6(B) Samples of two types of electric light bulbs were tested for length of life and following 10M data were obtained:

	Type I	Type II
Sample size	$n_1 = 8$	$n_2 = 7$
Sample mean	$\bar{x}_1 = 1,234hrs$	$\bar{x}_2 = 1,036hrs$
Sample S.D.	$s_1 = 36hrs$	$s_2 = 40hrs$

Is the difference in the means sufficient to warrant that type I is superior to type II regarding length of life?

$t_{0.05, 13}$ (righttail) = 1.77

***** END*****

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations –Mar 2021

ENGINEERING MECHANICS

(Mechanical Engineering)

Time: 3Hrs

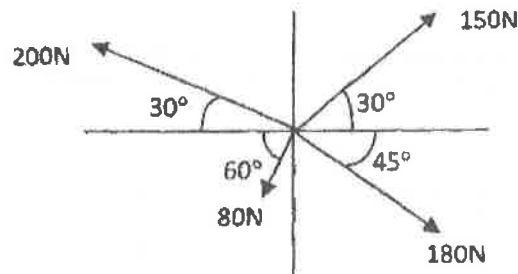
Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

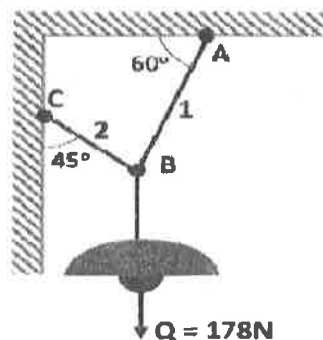
- Q.1
- | | | |
|-------|--|----|
| i. | What is parallelogram law of forces? | 1M |
| ii. | Define coplanar concurrent force system. | 1M |
| iii. | What is a perfect plane truss? | 1M |
| iv. | Give an example of dry and wet friction. | 1M |
| v. | Write the SI units of mass moment of inertia and area moment of inertia of a lamina. | 1M |
| vi. | Write any two significance of Moment of Inertia. | 1M |
| vii. | State curvilinear and rectilinear motion. | 1M |
| viii. | Define law of conservation of momentum. | 1M |
| ix. | State the D'Alembert's principle. | 1M |
| x. | What are the parameters that define rectilinear motion? | 1M |

- Q.2(A) Determine the resultant of concurrent forces shown in the figure below 10M



OR

- Q.2(B) An electric light fixture of weight $Q = 178\text{ N}$ is supported as shown in the figure. Find the tensile forces "S1" and "S2" in the wire BA and BC. 10M

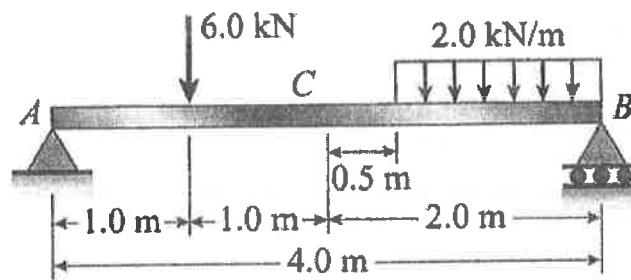


Q.3(A) Draw the free body diagram and find the maximum angle θ at which the box of weight 10M 2.5 kg will start sliding down the inclined plane (take $g=10 \text{ m/s}^2$) as shown in the figure. Assume coefficient of static friction to be 0.35.

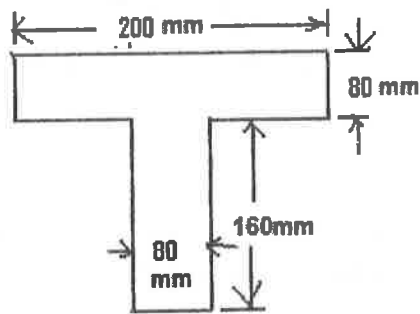


OR

Q.3(B) Calculate the support reactions for the beam as shown in the figure 10M

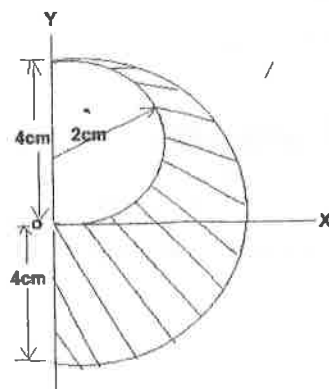


Q.4(A) Find the Centre of Gravity of a T section about X-X shown below, about an axis 10M passing through its centroids



OR

Q.4(B) Find the Centroid of the composite plate is as shown in below about x-y axis 10M



- Q.5(A) A body weighing 196.2 N slides up a 30° inclined plane under the action of an applied force 300 N acting parallel to the inclined plane. The co-efficient of friction, μ is equal to 0.2. The body moves from rest. Determine: 10M
- (i) Acceleration of the body,
 - (ii) Distance travelled by body in four seconds,
 - (iii) Velocity of body after four seconds,
 - (iv) Kinetic energy of the body after four seconds,
 - (v) Work done on the body in four seconds,
 - (vi) Momentum of the body after four seconds,
 - (vii) Impulse applied in four seconds.

OR

- Q.5(B) A car weighing 60KN and moving at 72kmph along the main road collides with a truck of weight 120 KN which emerges at 18 kmph from a cross road at right angles to the main road. If two vehicles lock after collision, what will be the magnitude and direction of the resulting velocity according to momentum impulse method 10M

-
- Q.6(A) A ball of mass 20 kg moving with a velocity of 5 m/s strikes directly another ball of mass 10 kg moving in the opposite direction with a velocity of 10 m/s. Determine the velocity of first ball in terms of the velocity of second ball after impact. 10M

OR

- Q.6(B) A bullet of 25 g mass is fired with a speed of 400 m/s. What is its kinetic energy? If the bullet can penetrate 20 cm in a block of wood, what is the average resistance of the wood? If the bullet were fired into a similar block of 10 cm thick wood, what would be the exit speed? 10M

*** END***

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech. II Year I Semester (R18) Regular & Supplementary End Semester Examinations –March 2021**BASIC THERMODYNAMICS**

(Mechanical Engineering)

Time: 3Hrs**Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
--

All parts of Q. No 1 are compulsory. In Q. No 2 to 6 answer either Part-A or B only
--

- | | | |
|-----|---|----|
| Q.1 | i. Explain path and process. | 1M |
| | ii. State Zeroth law of thermodynamics. | 1M |
| | iii. Name the processes of Carnot cycle. | 1M |
| | iv. What is a pure substance? | 1M |
| | v. State Kelvin-Planck statement. | 1M |
| | vi. What is a heat pump? | 1M |
| | vii. What do you mean by the term 'Entropy'? | 1M |
| | viii. What is the difference between ideal gas and perfect gas? | 1M |
| | ix. What is the thermodynamic cycle? | 1M |
| | x. Draw the T-s diagram of Brayton cycle. | 1M |
-
- | | | |
|--------|--|-----|
| Q.2(A) | To a closed system 150 kJ of work is supplied. If the initial volume is 0.6 m^3 and pressure of the system changes as $P = 8-4V$, where 'P' is in bar and V is in m^3 , determine the final volume and pressure of the system. | 10M |
| | OR | |
| Q.2(B) | Briefly explain the following
(a) Path function and point function
(b) Open system, closed system and isolated system | 10M |
-
- | | | |
|--------|---|------|
| Q.3(A) | Draw the phase equilibrium diagram for a pure substance on P-T coordinates. Why does the fusion line for water have negative slope. | 10 M |
| | OR | |
| Q.3(B) | Steam initially at 1.5 MPa, 30°C expands reversibly and adiabatically in a steam turbine to 40°C . Determine the ideal work output of the turbine per kg of steam | 10M |
-
- | | | |
|--------|--|-----|
| Q.4(A) | State and prove Clausius theorem and also Establish the equivalence of Kelvin plank and Clausius statements of second law of thermodynamics | 10M |
| | OR | |
| Q.4(B) | i. A reversible heat pump is used to maintain a temperature of 0°C in a refrigerator when it rejects the heat to the surroundings at 25°C . If the heat removal rate from the refrigerator is 1440 kJ/min, determine the cop of the machine and work required. | 6M |
| | ii. If the required input to run the pump is developed by a reversible engine which receives heat at 380°C and rejects heat to atmosphere, then determine the overall cop of the system. | 4M |
-
- | | | |
|--------|---|-----|
| Q.5(A) | Derive Maxwell's equations and state their importance in thermodynamics | 10M |
| | OR | |
| Q.5(B) | i. Write down the first and second Tds equations. | 3M |
| | ii. Explain Joule-Kelvin effect. | 7M |
-
- | | | |
|--------|---|-----|
| Q.6(A) | List down the assumptions made for the analysis of Diesel cycle. Derive an expression for the thermal efficiency of the Diesel cycle. | 10M |
| | OR | |
| Q.6(B) | In a steam power plant operating on ideal Rankine cycle steam enters the turbine at 20 bar with an enthalpy of 3248 KJ/Kg-K and an entropy of 7.127 KJ/Kg-K. The condenser pressure is 0.1 bar. Find the cycle efficiency and specific steam consumption in Kg/KW-hr. Do not neglect pump work. | 10M |

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – March 2021**MATERIALS SCIENCE & ENGINEERING**

(Mechanical Engineering)

Time: 3 Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- Q.1
- | | | |
|-------|---|----|
| i. | Recall bonding force and bonding energies. | 1M |
| ii. | Define space lattice and unit cell. | 1M |
| iii. | Name the different types of dislocations. | 1M |
| iv. | What is a work hardening mechanism? | 1M |
| v. | List out the different heat treatment processes. | 1M |
| vi. | Compare Annealing and Normalizing processes. | 1M |
| vii. | Define Lever rule. | 1M |
| viii. | What is the difference between CCT and TTT plots? | 1M |
| ix. | Differentiate between ferrous and non-ferrous metals. | 1M |
| x. | What are the types of cast iron available commercially? | 1M |
-
- Q.2(A) What is an Atomic Packing Factor? Derive APF for an FCC Unit Cell. 10M
- OR**
- Q.2(B) Compare and contrast between primary and secondary bonding in metals. 10M
-
- Q.3(A) Explain in detail about the various types of Point defects in metals? 10M
- OR**
- Q.3(B) Distinguish steady state & non-steady state diffusion systems. Also write the expression for both Fick's laws. 10M
-
- Q.4(A) Draw the stress vs strain curve for a mild steel and define the following: 10M
(i) Tensile strength, (ii) Ductility (iii) Malleability (iv) Hardness and (v) Toughness
- OR**
- Q.4(B) Define annealing. Explain the types of annealing process in detail with neat sketch. 10M
-
- Q.5(A) Construct the Fe-Fe₃C phase diagram and write down all the important reactions in it. 10M
- OR**
- Q.5(B) Draw TTT diagram of Eutectoid Steel. Explain its significance for the industry. 10M
-
- Q.6(A) Define Cast Iron. What are the various types of Cast irons? Explain them with neat microstructures. 10M
- OR**
- Q.6(B) Summarize and infer in detail about the classification of polymers based on source, structure, polymerization and molecular forces. 10M

END

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar' 2021

(Regulations: R18)

NETWORK THEORY

(ECE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

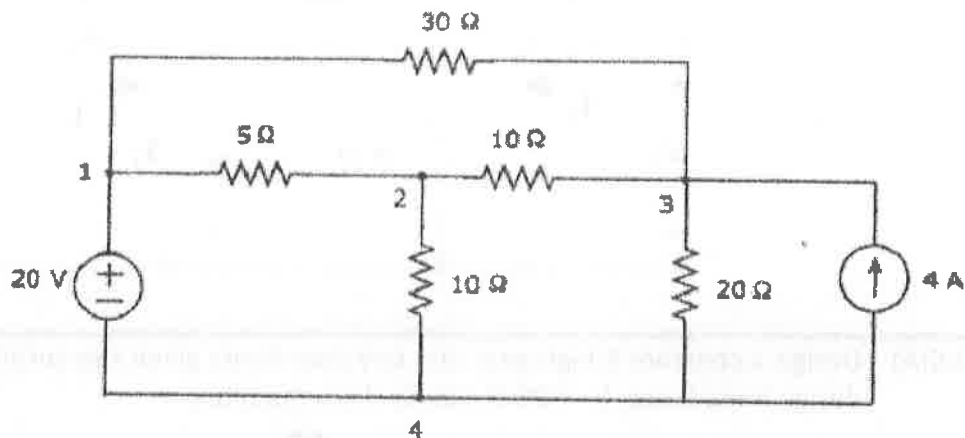
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- Q.1
- | | | |
|-------|---|----|
| i. | Define graph and a tree. | 1M |
| ii. | State superposition theorem. | 1M |
| iii. | Write the formula for resonance frequency for parallel tank circuit. | 1M |
| iv. | Draw the impedance plot of the series RLC circuit. | 1M |
| v. | Find the Laplace transform of $\sin \omega t$. | 1M |
| vi. | What is the advantage of Laplace transform analysis of the circuits? | 1M |
| vii. | Write the expressions for hybrid parameters. | 1M |
| viii. | Write down the relationship between Y parameters and ABCD parameters. | 1M |
| ix. | Define decibel. | 1M |
| x. | State an one difference between constant-k and m-derive filters. | 1M |

- Q.2(A) State and explain Thevenin's Theorem with suitable example. 10M

OR

- Q.2(B) For the network shown below draw the graph and write down the incidence matrix, tie set matrix and cut set matrix.



- Q.3(A) (i) Derive the expression for resonance frequency for series RLC circuit. 5M
(ii) Explain the universal reactance curves of series resonant circuit 5M

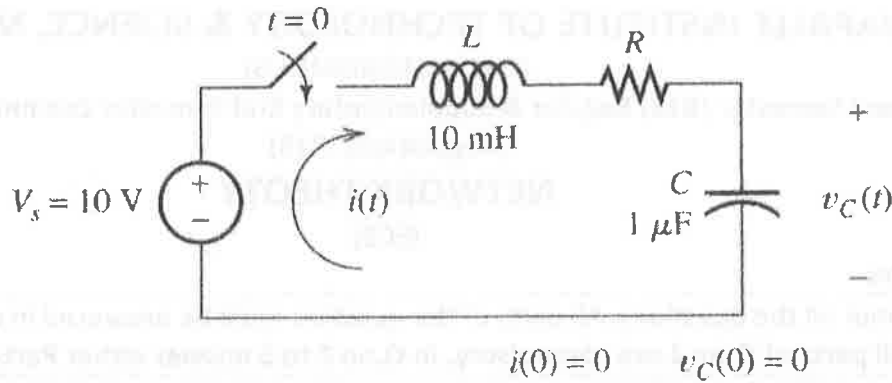
OR

- Q.3(B) Derive the expression for V_L becomes maximum in series RLC circuit. 10M

- Q.4(A) Write any five properties of Laplace Transforms. 10M

OR

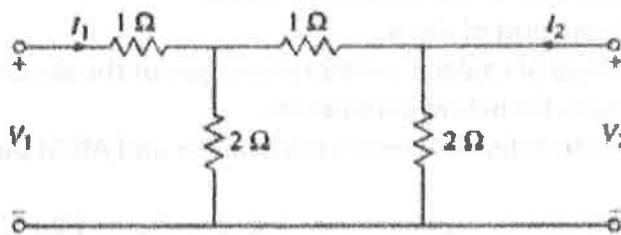
Q.4(B) For the circuit shown in figure find the voltage across capacitor ($V_c(t)$) for $t \geq 0$, when $R = 10 \Omega$ and $V_s = 10 \text{ V}$.



Q.5(A) (i) Derive the interrelationship between ABCD and Z parameters.

5M

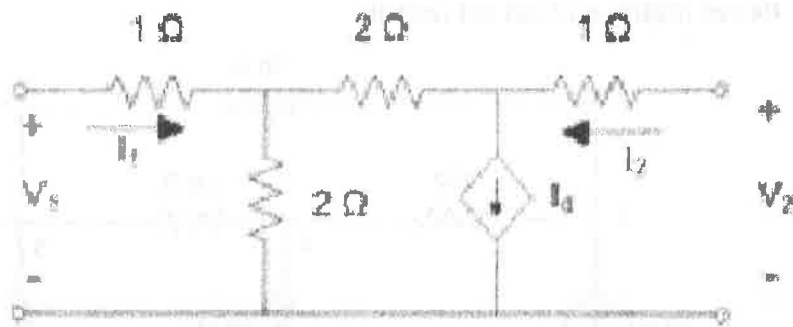
(ii) Find the Y parameters of the two-port shown in Figure .



5M

OR

Q.5(B) Determine hybrid parameter's for the network shown below.



10M

Q.6(A) Design a constant k high pass and low pass filters given the cutoff freq = 3000 Hz and design impedance, $k = 500 \Omega$. Finally draw the filter.

10M

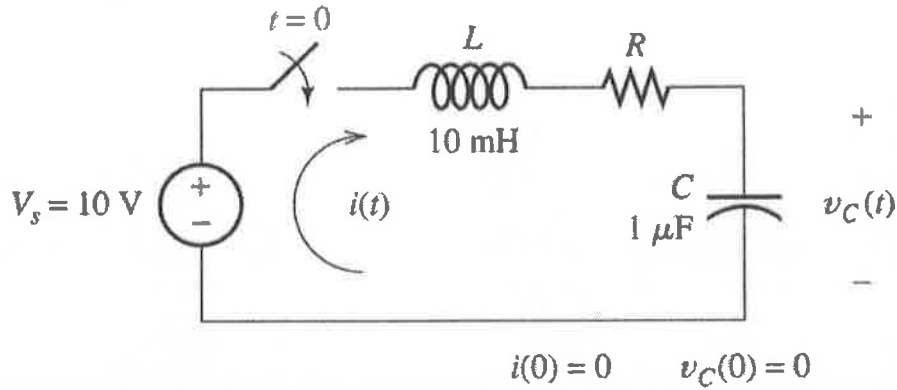
OR

Q.6(B) Derive the characteristic impedance and propagation constant of symmetrical π network.

10M

*** END***

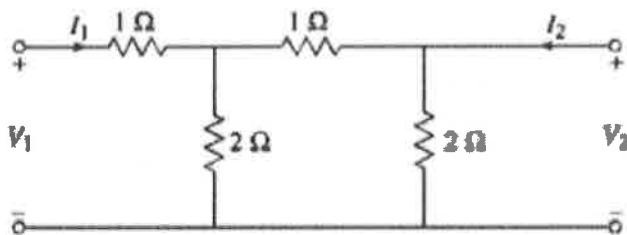
Q.4(B) For the circuit shown in figure find the voltage across capacitor ($V_C(t)$) for $t \geq 0$, when $R = 10\text{M}$ = 10 ohms.



Q.5(A) (i) Derive the interrelationship between ABCD and Z parameters.

5M

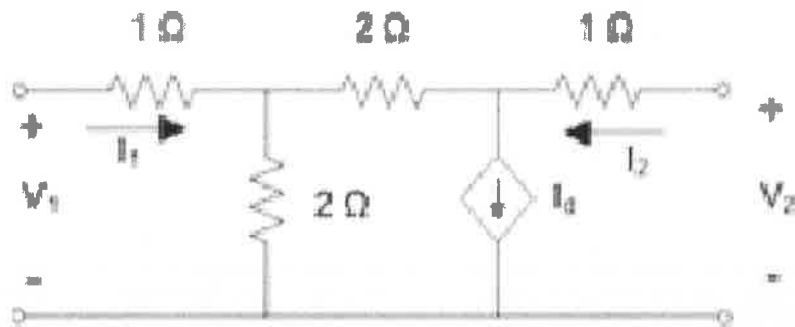
(ii) Find the Y parameters of the two-port shown in Figure .



5M

OR

Q.5(B) Determine hybrid parameter's for the network shown below.



10M

Q.6(A) Design a constant k high pass and low pass filters given the cutoff freq = 3000 Hz and design impedance, $k = 500\ \Omega$. Finally draw the filter.

10M

OR

Q.6(B) Derive the characteristic impedance and propagation constant of symmetrical π network.

10M

*** END***

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar' 2021

(Regulations: R18)

DIGITAL SYSTEM DESIGN

(ECE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- | | | | |
|--------|---|---|-----|
| Q.1 | i. | What is mean by NIBBLE? | 1M |
| | ii. | Convert $(65)_7$ to equivalent decimal number. | 1M |
| | iii. | Find minimum number of NAND gates required to design XOR gate | 1M |
| | iv | Write the differences between combinational and sequential circuits | 1M |
| | v. | Design one bit comparator | 1M |
| | vi | Write the characteristic equation for D-flip flop | 1M |
| | vii. | List the bipolar logic families | 1M |
| | viii. | Define Noise Margin | 1M |
| | ix. | What is the acronym VHDL stands for? | 1M |
| | x. | Define synthesis. | 1M |
| | | | |
| Q.2(A) | Explain De Morgan's Theorem. And Simplify the following Boolean expression (i) using laws of Boolean algebra (ii) using K-map | | 10M |
| | $F(A,B,C,D)=A'B(D'+CD)+B(A+A'CD)$ | | |
| | OR | | |
| Q.2(B) | Perform the following operations using 2's Complement method. | | 10M |
| | a.48-23 b. 23-48 c. 48-(-23) d. -48-23 | | |
| | | | |
| Q.3(A) | Explain about 8-bit Carry Look ahead Adder. | | 10M |
| | OR | | |
| Q.3(B) | Represent the decimal number 54 and 37 in 8-bit BCD format and compute their BCD sum. Implement the combinational logic circuit for implementing BCD addition of above two numbers. | | 10M |
| | | | |
| Q.4(A) | Write the procedure for conversion of one flip-flop to other. Using the same, convert T flip-flop to D flip-flop. | | 10M |
| | OR | | |
| Q.4(B) | What do you mean by Ripple counter? Design Mod-4 asynchronous down counter using JK flip-flops and draw the timing diagram. | | 10M |
| | | | |
| Q.5(A) | What is programmable logic array (PLA)? Discuss the design of a combinational circuit with suitable example. | | 10M |
| | OR | | |
| Q.5(B) | Explain in detail about CMOS logic family. | | 10M |
| | | | |
| Q.6(A) | Write the VHDL code for 2x1 multiplexer and 2x4 decoder. | | 10M |
| | OR | | |
| Q.6(B) | What is the significance of FSM and explain with suitable example | | 10M |

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar' 2021
(Regulations: R18)**ELECTRONIC DEVICES AND CIRCUITS**

(ECE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- Q.1
- | | | |
|-------|---|----|
| i. | Name two applications of Hall effect in the field of semiconductors. | 1M |
| ii. | Why Avalanche breakdown occurs at higher reverse voltage compared to Zener breakdown? | 1M |
| iii. | Define the pinch-off voltage of a JFET. | 1M |
| iv. | Define the threshold voltage of an n-channel enhancement MOSFET. | 1M |
| v. | What is clipping? | 1M |
| vi. | Why biasing is necessary in MOSFET amplifier circuits? | 1M |
| vii. | What should be the operating region of BJT when it acts as amplifier? | 1M |
| viii. | Draw the small-signal equivalent circuit of a BJT. | 1M |
| ix. | What do you mean by diffusion capacitance in a p-n junction diode | 1M |
| x. | Draw the high-frequency model for a MOSFET. | 1M |
-
- Q.2(A) Derive the expression for Hall voltage, carrier concentration and mobility. 10M
- OR**
- Q.2(B) (i) Draw I-V characteristic of a p-n junction diode. Explain its operation in the forward-biased and reverse-biased conditions. 6M
- (ii) Calculate the cut-in voltage of a silicon p-n junction diode. $N_a = 2 \times 10^{17}/\text{cm}^3$ and $N_d = 10^{15}/\text{cm}^3$. $kT/q = 0.0259\text{V}$, $n_i = 1.45 \times 10^{10}/\text{cm}^3$. 4M
-
- Q.3(A) i) Explain the operation of an n-p-n transistor in the forward active region. Draw the input and output characteristics of a transistor in common-emitter configuration. 5M
- (ii) Explain early effect in BJT? Establish a relation between " α " and " β " in a BJT. 5M
- OR**
- Q.3(B) With the help of neat diagrams, explain the structure and operation of an n-channel enhancement mode MOSFET. Also draw and explain its drain and transfer characteristics. 10M
-
- Q.4(A) Draw the circuit of a full-wave bridge rectifier and explain its operation. Derive the expression for V_{dc} , V_{rms} , and efficiency. 10M
- OR**
- Q.4(B) Explain how BJT can be used as an amplifier and a switch. 10M
-
- Q.5(A) Draw the small signal equivalent circuit diagram of CE amplifier and derive the equation for voltage gain, input and output resistance. 10M
- OR**
- Q.5(B) Illustrate in detail about small-signal model of MOSFET. 10M
-
- Q.6(A) Explain BJT internal capacitances and its high frequency model. 10M
- OR**
- Q.6(B) Explain the high frequency response of common-source amplifier using its high-frequency equivalent circuit. 10M

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar 2021**PROBABILITY MODELS AND STATISTICS**

(Common to CSE, CSIT, CST)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

- Q.1
- i. Define axiomatic definition of probability. 1M
 - ii. If $p(A) = 1/2$, $p(B) = 1/4$ and $p(A \cap B) = 1/8$ find $p(A \cup B)$ 1M
 - iii. Define joint probability density function. 1M
 - iv. Define moment generating function of a random variable. 1M
 - v. Define the Stochastic process? 1M
 - vi. Define a Markov chain. 1M
 - vii. Find P_n in M/M/1 Queue. 1M
 - viii. Write the limits for coefficient of correlation. 1M
 - ix. Define degrees of freedom? 1M
 - x. If $n=40$ and $\sigma=5$ the standard error of mean is _____ 1M

-
- Q.2(A) i. Two dice are rolled. What is the probability that at least one is a six? If the two faces are different, what is the probability that at least one is a six? 5M
- ii. State and prove Bayes theorem? 5M

OR

- Q.2(B) For the continuous probability function $f(x) = kx^2 e^{-x}$; $x \geq 0$. Find (a) the value of k 10M
(b) $E(X)$ (iii) $V(X)$

-
- Q.3(A) Derive moment generating function of geometric distribution and find mean and variance. 10M

OR

- Q.3(B) The joint p.d.f. of X and Y is $f(x, y) = 4y(x-y)e^{-(x+y)}$; $0 < x < \infty$, $0 < y < x$. Compute the conditional expectation of X given $Y = y$. Compute $E(X/Y = y)$? 10M

-
- Q.4(A) Let the transition probability matrix of a two-state Markov chain be given by 10M

$$P = \begin{bmatrix} p & 1-p \\ 1-p & p \end{bmatrix} \text{ Show by mathematical induction that}$$

$$P^{(n)} = \begin{bmatrix} \frac{1}{2} + \frac{1}{2}(2p-1)^n & \frac{1}{2} - \frac{1}{2}(2p-1)^n \\ \frac{1}{2} - \frac{1}{2}(2p-1)^n & \frac{1}{2} + \frac{1}{2}(2p-1)^n \end{bmatrix}$$

OR

- Q.4(B) Define Poisson process. Let $\{N_i(t), t \geq 0\}$ be a Poisson process with rate λ . Let S_n denote the time of the n^{th} event. Find
- (a) $E(S_4)$,
 - (b) $E(S_4 / N(1) = 2)$,
 - (c) $E[(N(4) - N(2)) / N(1) = 3]$.

- Q.5(A) For the $M/M/1$ queue, determine
- (a) the probability that no customers arrive during a service period
 - (b) the probability that ' n ' customers arrive during a service period
 - (c) the average number of arrivals during a service period.

OR

- Q.5(B) Compute Pearson's coefficient of skewness for the following data:

Class	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
f	5	9	14	20	25	15	8	1

- Q.6(A) Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that the proportions of men and women in favour of the proposal are same against that they are not, at 5% level.

OR

- Q.6(B) Two horses A and B were tested according to the time (in seconds) to run a particular track with the following results.

X	28	30	32	33	33	29	34
Y	29	30	30	24	27	29	---

Test whether two horses have the same running capacity
 $F_{0.05}(5,6) = 4.39$

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Feb'2021

(Regulations: R18)

DATA STRUCTURES

(Common to CSE, CSIT, CST)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- Q.1
- i. List the application of stacks. 1M
 - ii. What is a node structure of doubly linked list? 1M
 - iii. Define queue full condition. 1M
 - iv. What is the time complexity for insertion sort? 1M
 - v. Let $T(n) = 3n^5 + 2n^2 - 1$, then $O(T(n)) = ?$ 1M
 - vi. Define BST. 1M
 - vii. What are the properties of Red Black trees? 1M
 - viii. What is a binary search tree? 1M
 - ix. Differentiate between tree and graph. 1M
 - x. Define full binary tree. 1M
-
- Q.2(A) Write algorithms to perform the following operations on a doubly linked list.
(i) Insert a node with data 'y' after a node whose data is 'x'.
(ii) Delete a node whose data is 's'. 10M
(iii) Insert a node with data 'a' as the 1st node of the list.
- OR**
- Q.2(B) Write an algorithm to evaluate postfix expression. Trace the algorithm on the following input $623+-84/+23^+$ (all numbers are single digits). 10M
-
- Q.3(A) Discuss about implementation of queues using linked list. 10M
- OR**
- Q.3(B) Sort the following using heap sort algorithm.
45, 78, 21, 42, 12, 65, 15, 23, 54, 67, 34, 90, 78, 32 10M
-
- Q.4(A) Explain Merge Sort algorithm/pseudo code with the help of an example.
Mention the best case and worst case time complexity of Merge sort algorithm. 10M
- OR**
- Q.4(B) What is a collision in hashing? How it can be solved? 10M
-
- Q.5(A) What is a BST? Construct a BST for the following values. And analyze the height of the constructed BST. 34, 67, 12, 89, 45, 43, 9, 34, 89, 32, 63, 83, 64, 49, 51 10M
- OR**
- Q.5(B) Explain the process of displaying the nodes of a binary tree at a particular level. 10M
-
- Q.6(A) What are the properties of Red-Black tree? Construct a Red-Black tree with the following values. 46, 81, 50, 23, 73, 93, 58, 62, 79, 48, 28, 89, 70 10M
- OR**
- Q.6(B) How AVL tree can be balanced? 10M

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

QP Code: 18CSE104/18CST102/18CSIT103

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar' 2021

(Regulations: R18)

OBJECT ORIENTED PROGRAMMING USING JAVA

(Common to CSE, CST, CSIT)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

Q.1	i. What is programming language?	1M
	ii. Difference between method and constructor.	1M
	iii. Why Java is strongly typed language?	1M
	iv. Define package.	1M
	v. What is exception?	1M
	vi. List two methods in Thread class.	1M
	vii. Name the various Character Stream classes.	1M
	viii. Differentiate between LinkedList and LinkedHash Set.	1M
	ix. What is Adapter Class?	1M
	x. Explain JApplet.	1M
Q.2(A)	What are the various categories of data types in Java?	10M
	OR	
Q.2(B)	Examine the various types of constructors with example codes.	10M
Q.3(A)	Investigate why Strings are immutable in Java? How to create an object of type String?	10M
	OR	
Q.3(B)	Why do we need method overriding? Explain with example code and highlight the rules for method overriding.	10M
Q.4(A)	Write a java program with a user defined exception involving all the five keywords of exception handling.	10M
	OR	
Q.4(B)	Discuss a thread life cycle with neat sketch and give various methods in Thread class.	10M
Q.5(A)	Distinguish Byte Stream Classes and Character Stream Classes.	10M
	OR	
Q.5(B)	Describe any five collection framework with necessary illustration.	10M
Q.6(A)	Explain different types of Buttons each with example.	10M
	OR	
Q.6(B)	Differentiate JFrame and JApplet.	10M

*** END***

Hall Ticket No:

--	--	--	--	--	--	--	--	--	--

Question Paper Code: 18CSE105/18CST103

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Regular & Supplementary End Semester Examinations – Mar' 2021

(Regulations: R18)

DATABASE MANAGEMENT SYSTEMS

(Common to CSE, CST)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- | | | | |
|-----------|------|---|-----|
| Q.1 | i. | Define DBMS. | 1M |
| | ii. | Define view. Write syntax to create view. | 1M |
| | iii. | Compare Rollback with Commit SQL commands. | 1M |
| | iv. | Define Triggers. | 1M |
| | v. | What is functional dependency? | 1M |
| | vi. | Write about first and second normal forms with suitable example. | 1M |
| | vii. | What is Transaction? Explain its four important Properties. | 1M |
| | Vii. | What is Scheduling? | 1M |
| | ix. | What is SQL injection? | 1M |
| | x. | What is the difference between authentication and authorization? | 1M |
| <hr/> | | | |
| Q.2(A) | | What is entity relationship Model? Explain. | 10M |
| OR | | | |
| Q.2(B) | | Explain in detail about Database Management System advantages over file management system. | 10M |
| <hr/> | | | |
| Q.3(A) | | Explain in detail about SQL Queries. | 10M |
| OR | | | |
| Q.3(B) | | Explain in detail about Cursors and its types. | 10M |
| <hr/> | | | |
| Q.4(A) | | Define Functional Dependency? Explain Armstrong's axioms or rules with an example. | 10M |
| OR | | | |
| Q.4(B) | | Explain the role of keys in Relational Database. Elaborate the various types of keys. | 10M |
| <hr/> | | | |
| Q.5(A) | | What is transaction? Explain the ACID Properties of transactions? | 10M |
| OR | | | |
| Q.5(B) | | What is lock in DBMS? What is difference between lock-based- time stamp based and validation-based protocols for concurrency control. | 10M |
| <hr/> | | | |
| Q.6(A) | | Write about DAC and RBAC protocols. | 10M |
| OR | | | |
| Q.6(B) | | Explain Mandatory access control of database security. | 10M |

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R18) Supplementary End Semester Examinations – Mar' 2021
(Regulations: R18)

DIGITAL LOGIC DESIGN
(CSIT)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either Part-A or B only

- | | | | |
|-----|-------|---|----|
| Q.1 | i. | Convert $(1011011011)_2$ to $()_{16}$ | 1M |
| | ii. | Convert $(35)_8$ to $()_{10}$ | 1M |
| | iii. | Find the 2's complement of 0101101. | 1M |
| | iv. | Convert Gray code 1101 to Binary. | 1M |
| | v. | State De-Morgan's theorem. | 1M |
| | vi. | Write the truth table of Full Adder. | 1M |
| | vii. | What is a Multiplexer? | 1M |
| | viii. | What is race around condition? | 1M |
| | ix. | How JK flip flop can be converted to T flip flop? | 1M |
| | x. | List different types of memories. | 1M |

Q.2(A) State and prove two De Morgan's laws using logic gates. 10M

OR

- | | | | |
|--------|-----|--|-----|
| Q.2(B) | i) | Simplify the expression $f=(B + BC)(B + \bar{B}C)(B + D)$ | 5 M |
| | ii) | Simplify the following three variable expression and realize the final expression. | 5 M |
| | (a) | $Y = \sum m(1,3,7)$ | |
| | (b) | $Y = \prod M(2,5,6)$ | |

- | | | | |
|--------|------|---|-----|
| Q.3(A) | (i) | simplify the boolean expression using K map
$F = \bar{A} + AB + AB\bar{D} + A\bar{B}\bar{D} + C$ | 5 M |
| | (ii) | Reduce the following using 4 variable K map
$F = \sum m(0,1,4,5,6,7,9,11,15) + d(10,14)$ | 5 M |

OR

- | | | | |
|--------|---|--|-----|
| Q.3(B) | Implement the function following Boolean expression | $F = \sum m(0,2,3,4,7,9,15) + d(6,8,11)$ | 10M |
| | Using i) NAND – AND logic | ii) AND – NOR logic | |

- | | | | |
|--------|------|---|-----|
| Q.4(A) | (i) | Implement a Boolean Function $F(x, y, z) = \sum m(1, 3, 5, 7)$ with a 4x1 Multiplexer | 5 M |
| | (ii) | Design a 4 bit Gray to Binary converter | 5 M |

OR

- | | | | |
|--------|---|--|-----|
| Q.4(B) | Implement 3 line to 8 line decoder using combinational logic with truth table | | 10M |
|--------|---|--|-----|

- | | | | |
|--------|---|--|-----|
| Q.5(A) | Draw the circuit of the edge triggered JK flip flop using NAND gates and explain the operation using truth table. | | 10M |
|--------|---|--|-----|

OR

- | | | | |
|--------|------|---|-----|
| Q.5(B) | (i) | Design 4 bit ripple counter using T flip flops and explain the operation. | 5 M |
| | (ii) | Design 4 bit serial in, serial out shift register using JK flip flops. | 5 M |

Q.6(A) (i) What are the types of memory used in digital system? Draw the block diagram of 4x4 RAM. 5 M

(ii) Implement the given Boolean functions using PAL 5 M

$$F1(A, B, C) = \sum m(0, 1, 4, 6)$$

$$F1(A, B, C) = \sum m(2, 3, 5, 7)$$

OR

Q.6(B) Explain TTL logic family and its characteristics 10M

*** END***