

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)(Affiliated to JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD)
Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019**Subject: **BASIC ELECTRICAL & ELECTRONICS ENGINEERING**

Branch: Common to CE& ME

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 M

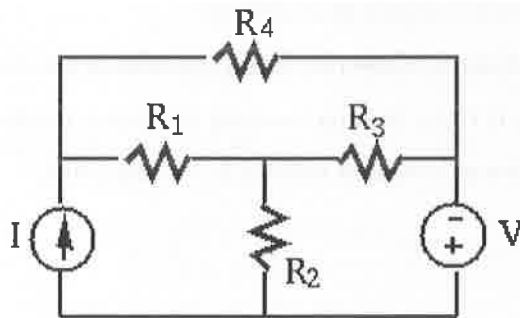
1. Define i) Energy ii) Faraday's law
2. A series RL circuit consists of resistance $R = 10 \Omega$ and Inductive reactance $X_L = 10 \Omega$. Evaluate the Power Factor of the circuit.
3. Define starting torque & maximum torque of an Induction motor?
4. Draw Voltage Current characteristics of a PN junction diode.
5. What is the necessity of Logic gates?

PART-B

Answer any FIVE questions of the following

5x10 M= 50M

1. a) Determine the current in each branch of the given network using KVL. (5 M)

Where $I=0.5A$, $V=6V$, $R_1=3\Omega$, $R_2=8\Omega$, $R_3=6\Omega$, $R_4=4\Omega$

- b) Three Capacitors of capacitance $2\mu F$, $4\mu F$ and $6\mu F$ respectively are connected in series to a 220V dc supply. Find the total capacitance i) Connected in series ii) Connected in parallel.
- a) Explain the generation of sinusoidal voltage wave form in detail.
 - b) A choke coil of inductance $0.08 H$ and resistance of 10Ω are connected in series with a $125 \mu F$ capacitor to a 230 V, 50 Hz supply. Determine the current taken from the supply and phase angle.
 - A voltage of $v = 200 \sin 100\pi t$ is applied to a load having $R=200 \Omega$ in series with $L=638 mH$. Estimate:

- i) Expression for current in $i = I_m \sin(\omega t \pm \phi)$ form
 - ii) Power consumed by the load
 - iii) Reactive power of the load
 - iv) Voltage across R and L
 - v) RMS voltage of the supply
4. a) Explain in detail about the stator voltage control of 3-phase induction motor.
- b) If a three phase induction motor with 6 poles runs at 970 rpm when connected to a 50 Hz supply, calculate
- (i) the percentage slip and
 - (ii) frequency of the rotor currents
5. a) Write a short note on types of electronic devices with applications.
- b) Explain the operation of half wave rectifier without filter with neat sketch and derive necessary expressions.
6. a) Write short notes on Half-wave rectifier with filters.
- b) Explain in detail about Common-Emitter configuration of transistor. Draw its input and output characteristics.
7. a) Describe in detail the operation of S-R flip flop with waveform.
- b) Define the following with respect to amplifiers
- (i) Voltage gain (ii) Current Gain (iii) Input impedance (iv) Output impedance
8. a) Write a short notes on i) Hexa decimal to octal ii) Binary to Hexadecimal.
- b) Draw the characteristics of common emitter as an amplifier.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: APPLIED CHEMISTRYBranch: Common to **EEE, ECE& CSE****Time: 3 hours****Max. Marks: 60****PART – A****Answer ALL questions of the following****5x2M=10 M**

1. Differentiate the temporary and permanent hardness of water.
2. Does coating of zinc on iron protect from corrosion? Zinc act as anode or cathode?
3. What is copolymerization? Give examples.
4. What is biodiesel? What are the advantages of biodiesel?
5. What do you mean by R_4 in green chemistry?

PART-B**Answer any FIVE questions of the following****5x10 M= 50M**

1. a) Explain chlorination process in disinfection of water.
b) A sample of water is found to contain 40.5 mg/L $\text{Ca}(\text{HCO}_3)_2$, 46.5 mg/L $\text{Mg}(\text{HCO}_3)_2$, 27.6 mg/L MgSO_4 , 32.1 mg/L CaSO_4 and 22.45 mg/L CaCl_2 . Calculate the total hardness of water (At. Wts; $\text{Ca} = 40$, $\text{Mg} = 24$, $\text{Cl} = 35.5$, $\text{C} = 12$, $\text{S} = 32$, $\text{O} = 16$ and $\text{H} = 1$).
2. a) Write any four WHO specification of drinking water?
b) Describe briefly on Reverse Osmosis.
3. a) How does corrosion is controlled by sacrificial anodic methods?
b) Explain the Galvanization process.
4. a) What is Conductance? Explain specific and equivalent conductances. Give their units.
b) Write short note on calomel electrode.
5. Describe the preparation, properties and engineering applications of
a) Buna-S-rubber b) butyl rubber c) Poly Vinyl Chloride
6. a) Discuss the injection moulding method for the fabrication of plastics with a neat diagram.
b) Write short note on conjugated conducting polymers.
7. a) What are the constituents and characteristics of natural gas CNG?
b) Write short notes on Knocking.
8. a) Write the classification of Nano materials and also write applications of Nano materials.
b) Write short note on particle reinforced composites.

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Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2M=10 M

1. Find $\phi(x)$ to solve $x^3 + x^2 - 1 = 0$ in $[0, 1]$ used in Iteration method.
2. Show that $\nabla\Delta = \Delta - \nabla$.
3. Write the normal equations to fit a curve $y = ax^b$.
4. State the Adams – Bashforth predictor –corrector formula.
5. Write the finite difference scheme for the elliptic equation and explain the Standard Five Point Formula (SFPF) and Diagonal Five Point Formula (DFPF).

PART-B

Answer ANY FIVE questions of the following

5x10 M= 50M

1. a) Evaluate $\sqrt[3]{7}$ using Newton Raphson method.
b) Find the square root of 24 by Newton Raphson method.
2. a) Find the polynomial which fits the data in the following table using Gauss-Forward formula.

x	1	5	7	9	11
y	6	24	58	108	174

- b) Find the interpolating polynomial $f(x)$ from the table.

x	0	1	4	5
f(x)	4	3	24	39

3. Estimate the values of $f(22)$ and $f(42)$ from the following available data

x	20	25	30	35	40	45
f(x)	354	332	291	260	231	204

4. Find the first and second derivatives of the function tabulated below, at the point $x = 1.1$

x	1.0	1.2	1.4	1.6	1.8	2.0
f(x)	0	0.128	0.544	1.296	2.432	4.00

5. a) By the method of least squares, find the straight line that best fits the following data

x:	1	2	3	4	5
y:	14	27	40	55	68

- b) Find $f^1(3)$ and $f^{11}(3)$ for the following data.

x	3.0	3.2	3.4	3.6	3.8	4.0
f(x)	-14	-10.032	-5.296	-0.256	6.672	14

6. By using the classical R-K fourth order method find the solution of the equation

$$\frac{dy}{dx} = 1 + y^2, \quad y(0) = 0 \text{ for } x = 0.2, 0.4 \text{ and } 0.6$$

7. a) Given $\frac{dy}{dx} = x^2(1+y)$, $y(1)=1$, $y(1.1)=1.233$, $y(1.2)=1.548$, $y(1.3)=1.979$. Evaluate $y(1.4)$ by Milne's Predictor-Corrector Method.

- b) Compute $y(0.1)$ by Range – Kutta method of 4th order for the differential equation

$$\frac{dy}{dx} = xy + y^2, \quad y(0) = 1.$$

8. Solve the partial differential equation $\nabla^2 u = -10(x^2 + y^2 + 10)$ over the square with sides $x = y = 0, x = y = 3$. Given that $u = 0$ on the boundary and mesh length = 1.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **DATA STRUCTURES THROUGH C**Branch: **ECE****Time: 3 hours****Max. Marks: 60****PART – A****Answer ALL questions of the following****5x2M=10 M**

1. What is the difference between `#include<stdio.h>` and `#include"stdio.h"`?
2. How many pre-processor directives are there?
3. List the basic operations carried out in a linked list.
4. What is pop? Write the code for pop operation in stack.
5. Write any three differences between Tree and Graph.

PART-B**Answer ANY FIVE questions of the following****5x10 M= 50M**

1. a) State and explain the Towers of Hanoi problem using Recursion.
b) Explain design methodology and implementation of an algorithm.
2. a) Write a C program to implement Selection sort method.
b) List out file status functions.
3. a) What is command line argument? Explain command line argument with example.
b) Write short notes on searching methods.
4. a) Explain Array and linked list representation of sparse matrix.
b) Write a C program to perform search operation in a single linked list.
5. Write a C program to implement Queue operations using linked list.
6. a) Given In order traversal of a binary tree is D,G,B,E,A,H,F,I,C and pre order traversal is A,B,D,G,E,C,F,H,I construct binary tree.
b) Write a C program to convert Infix Expression to Postfix Expression.
7. a) Explain the procedure for constructing a binary tree using preorder and inorder traversal with suitable example.
b) What is graph? How is it different from Tree? Write a short note on linked list representation of the graph.
8. a) Explain the adjacency matrix representation of graph.
b) Explain the operations on a binary tree.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **APPLIED PHYSICS-II**Branch: **COMMON TO ALL****Time: 3 hours****Max. Marks: 60****PART – A****Answer ALL questions of the following****5x2M=10 M**

1. How does the energy-band structure of a solid determine whether it is a conductor, a semi conductor, or an insulator.
2. Classify nano materials and give examples for them.
3. What are transition elements?
4. What is wave function?
5. State the gauss law of electrostatics.

PART-B**Answer ANY FIVE questions of the following****5x10 M= 50M**

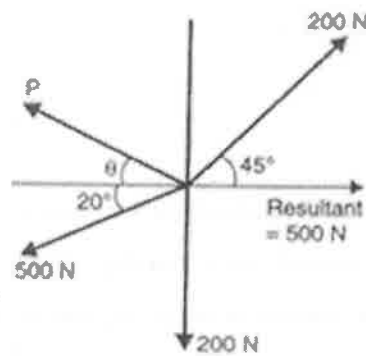
1. Define the terms i) Magnetic Induction ii) Magnetic Permeability iii) Magnetic dipole iv) Magnetic dipole moment.
2. a) Explain the terms potential well and potential barrier. How does a particle with energy lower than the barrier height, tunnel through it?. Give one example.
b) Describe the experimental verification of matter waves using Davisson Germer's experiment.
3. a) Find the probability of finding the particle at center of the box in ground state having width of $2A^\circ$.
b) Derive de-Broglie's wavelength associated with an electron.
4. a) Discuss the band theory of solids and explain the band formation of solids.
b) Explain about drift and diffusion currents in semiconductors.
5. What is an intrinsic semiconductor? Write the expression for electron concentration and hole concentration and deduce from them that the Fermi energy level is at the middle of the conduction band and valence band of the intrinsic semiconductor.
6. a) How nano materials are synthesized by using chemical vapor deposition technique.
b) Describe the properties of carbon nanotubes.
7. a) Derive an equation of electromagnetic wave for free space.
b) Derive Ampere's law with Maxwell's correction.
8. Derive the four Maxwell's equations in Integral form.

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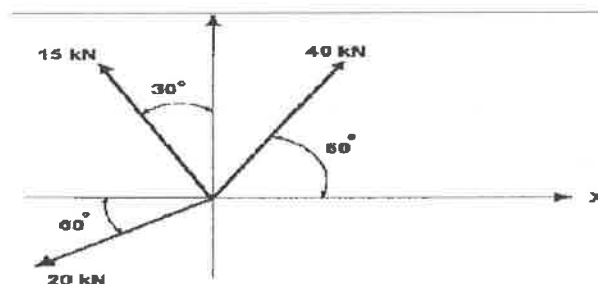
1. Under what conditions the work done upon a body does become zero.
2. State Newton's laws of motion.
3. State the parallel axis theorem and write the units for radius of gyration.
4. Explain perpendicular Theorem.
5. Define the terms angular velocity and angular acceleration.

PART-BAnswer **ANY FIVE** questions of the following**5x10 M= 50M**

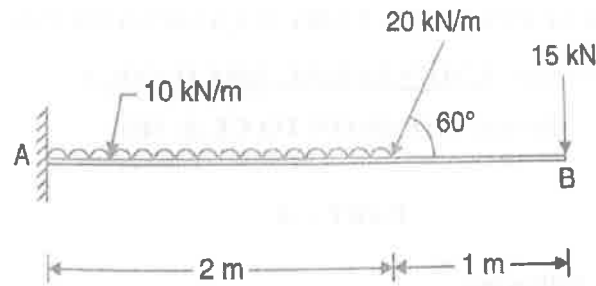
1. a) The four coplanar forces are acting at a point as shown in the Fig. One of the forces is unknown and its magnitude is shown by P. The resultant is having a magnitude of 500N and acting along x-axis. Determine the unknown force P and its inclination with x-axis.



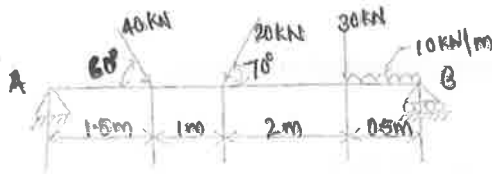
- b) Three forces of magnitude 40 kN, 15 kN and 20 kN are acting at a point O as shown in figure. The angles made by 40 kN, 15 kN and 20 kN forces with X axis are 60° , 120° and 240° respectively. Determine the magnitude and direction of the resultant force



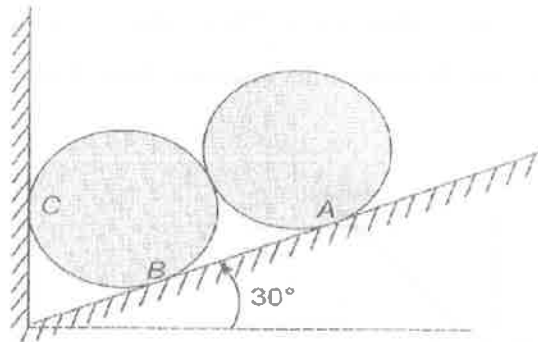
2. a) A force of 100 N is acting at a point making an angle of 30° with the horizontal. Determine the components of this force along X and Y axis.
- b) Determine the reactions developed in the cantilever beam shown in Fig.



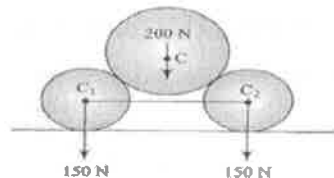
3. a) Find reactions at points A & B



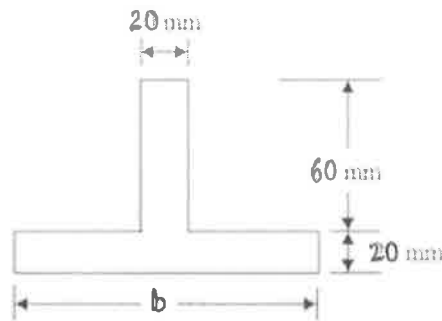
- b) Two identical rollers, each of weight 80 N are supported by an inclined plane and a vertical wall as shown in the Fig. 2. Determine the reactions at the points of supports A, B and C assuming all the surfaces to be smooth. Also find the reaction forces between the spheres.



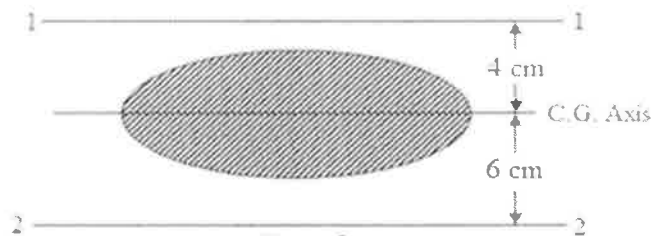
4. Two identical iron spheres each of radius 50 mm and weight 150 N is connected with a string of length 160 mm, and rest on a horizontal smooth floor. Another sphere of radius 60 mm and weight 200 N rest over them. Determine the tension in the string and reaction at all contact surfaces.



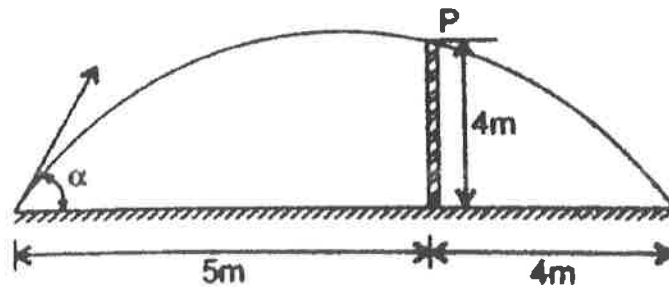
5. a) Determine the dimension b that will locate the centroidal axis at 40 mm above the base of the section shown in fig. .



- b) If the moment of inertia of the shaded area (25 cm^2) shown in fig. about 1-1 axis is 7400 cm^4 then determine the moment of inertia of area about 2-2 axis.



6. a) Find the least initial velocity with which a projectile is to be projected that it clears a wall 4m height located at a distance of 5m, and strikes the ground at a distance 4 m beyond the wall as shown in figure. The point of projection is at the same level as the foot of the wall.



- b) A stone is projected upwards from the ground with velocity of 16 m/sec at an angle of 60° to the horizontal. With what velocity must another stone be projected at an angle of 45° to the horizontal from the same point in order:
- to have the same horizontal range?
 - to attain the same maximum height?
7. a) The mass of fly wheel is 109 Kg and its radius of gyration is 0.38 m. Calculate the kinetic energy stored in when rotating at 200 rev/min. [6M]
- b) State the work energy principle. Write its equation. [4M]
8. a) What do you understand by potential energy and kinetic energy of a body?
- b) Define the term coefficient of Restitution.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **DATA STRUCTURES**Branch: **CSE**Time: **3 hours**Max. Marks: **60****PART – A**Answer **ALL** questions of the following**5x2M=10 M**

1. Write any two differences between Double Linked List and Circular Linked List.
2. Define Algorithm. What are the properties of Algorithm?
3. What is Push? Write the code for push operation in stack.
4. State the properties of a Binary Tree.
5. Define AVL Tree with an example.

PART-BAnswer **ANY FIVE** questions of the following**5x10 M= 50M**

1. a) Differentiate primitive and non-primitive data structures.
b) Write different categories of data structures.
2. a) Write a C program to Reverse a list using stack.
b) Differentiate between recursive and iterative algorithms with suitable examples.
3. a) Explain different operations on a single linked list.
b) Write a subordinate to concatenate two singly linked lists.
4. Write a C program to perform following operations in circular linked list:
a) Insert after a particular node. b) Insert before a particular node.
c) Delete a node from the beginning. d) Delete a node from the end of the list.
5. a) i) Convert into postfix $A/B^C + D * E - A * C$.
ii) What is polish notation. Give an example.
b) Explain Enqueue and Dequeues operation in linear Queue.
6. Write a C program to implement stack operations using linked list.
7. a) Explain Adjacency matrix representation of a graph.
b) Write a short note on DFS.
8. a) Construct an AVL tree with the following data elements:
10,9,12,15,8,5,18,1.
b) What is multi-way search tree?

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2019Subject: **ELECTRONIC DEVICES AND CIRCUITS**Branch: **ECE****Time: 3 hours****Max. Marks: 60****PART – A****Answer ALL questions of the following****5x2M=10 M**

1. Define load regulation & line regulation in a voltage regulator.
2. Explain the mechanism of avalanche breakdown.
3. Write a brief note on transistor as an amplifier.
4. Compare FET & MOSFET.
5. Define operating point.

PART-B**Answer ANY FIVE questions of the following****5x10 M= 50M**

1. a) Explain the working of P-N junction under forward bias and reverse bias with neat circuit diagrams.
b) Derive the expression for the diffusion capacitance C_D in case of P-N junction diode.
2. a) Explain the concept Drift Current and Diffusion Current.
b) Explain different types of Resistances of a PN Diode.
3. a) Explain the V-I characteristics of a zener diode and explain its working as a voltage regulator.
b) Difference between LED and LCD.
4. a) With neat waveforms explain operation of Half-wave Rectifier.
b) Compare half-wave, full-wave & bridge rectifiers.
5. a) Draw the circuit diagram of transistor CE configuration and describe the static input and output characteristics.
b) Explain transistor as current controlled device.
6. a) Explain the construction, operation and characteristics of depletion mode MOSFET.
b) Explain different terminals of a JFET.
7. a) Define and explain the parameters transconductance, drain resistance and amplification factor of a JFET. Establish the relation between them.
b) With the help of suitable diagrams explain the working of different types of MOSFETs.
8. a) Write short notes on Voltage divider bias.
b) Derive stability factor 's' for collector to base bias.

