

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-2018**Subject: **Physics of Materials**Branch: **Common to CE, ME & MINING**Time: **3 hours**Max. Marks: **60****PART – A**Answer **ALL** questions of the following**5x2Mark=10 Marks**

1. Write the expression and value of Bohr magneton?
2. Define Polarizability?
3. Define Acceptance angle and Numerical aperture of an optical fiber.
4. What are Ultrasonic waves?
5. What is blistering defect in NDT?

PART-BAnswer **ALL** questions of the following**5x 10 Marks= 50Marks**

1. (a) Write properties of Ferro magnetic substances [6M]
(b) Give some applications of superconductors. [4M]
(OR)
2. a). Describe critical temperature, critical magnetic field and critical currents in superconductors.
b). What is meant by magnetic levitation? Discuss the BCS theory of superconductivity.
3. a) Derive the expression for electronic polarizability.
b) The dielectric constant of He gas at NTP is 1.0000684. Calculate electronic polarizability of He atoms if gas contains 2.7×10^{25} atoms/m³. [7M+3M]
(OR)
4. a) Derive Clausius- Mosotti equation. [6M]
b) The electric field between the plates of a parallel plate capacitor is 5×10^3 V/m. Calculate electric displacement (**D**) when a material of dielectric constant 6 is introduced between the plates. [4M]
5. a) Obtain the expression for acceptance angle of an optical fiber [5 M]
b) Explain absorption and bending losses in optical fibers. [5 M]
(OR)
6. a) Derive the expression for numerical aperture of an optical fiber. [6M]
b) Calculate the numerical aperture and acceptance angle of a fiber with a core index 1.54 and cladding index of 1.50 when the fiber is inside water of refractive index 1.33. [4M]
7. a) Explain production of ultrasonics by Magnetostriction method [5M]
b) Detection of ultrasonics by sensitive flame and Kundt's method [5 M]
(OR)
8. a) Explain Piezo and inverse Piezo affects [5 M]
b) Explain detection of ultrasonics by thermal detector method [5 M]
9. a) What is the principle of ultrasonic testing? [6M]
b) Write the benefits of NDT. [4M]
(OR)
10. a) Explain the ultrasonic inspection method of testing. Mention its limitations. [6M]
b) Explain how flaws in a solid can be detected by NDT using ultrasonics. [4M]

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Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

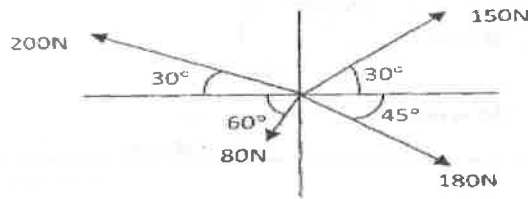
1. Define the terms Coplanar system of forces, Collinear forces, Coplanar concurrent forces
2. State Pappus & Guldinus Theorems.
3. Define polar moment of inertia
4. What you mean by uniform rectilinear motion and uniformly accelerated rectilinear motion?
5. State and explain the work-energy principle.

PART-B

Answer ALL questions of the following

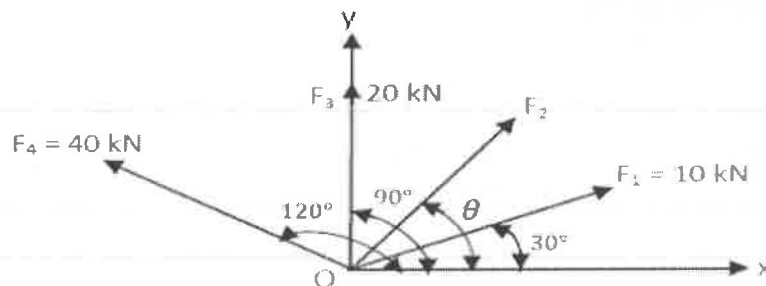
5x 10 Marks= 50Marks

1. a) State and prove the parallelogram law of forces.
b) Determine the resultant of the concurrent force system as shown in figure.

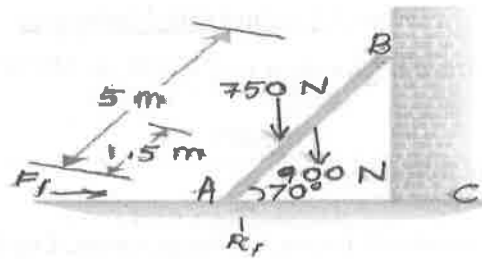


(OR)

2. a) State and prove Lami's Theorem.
b) The resultant of four forces which are acting at a point O as shown in figure below is along Y-axis. The magnitude of forces F_1 , F_3 and F_4 are 10 kN, 20 kN and 40 kN respectively. The angles made by 10 kN, 20 kN and 40 kN with X-axis are 300° , 90° and 120° respectively. Find the magnitude and direction of force F_2 if resultant is 72 kN.

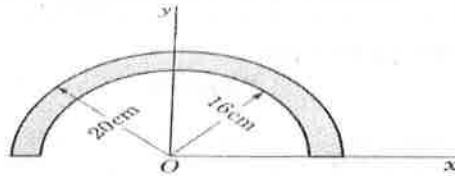


3. A ladder 5m long rests on a horizontal ground and leans against a smooth vertical wall at angle 70° with horizontal. The weight of ladder is 900N and acts at its middle. The ladder is at the point of sliding, when a man weighing 750N stands on a rung 1.5m from the bottom of ladder. Calculate coefficient of friction between ladder and floor.

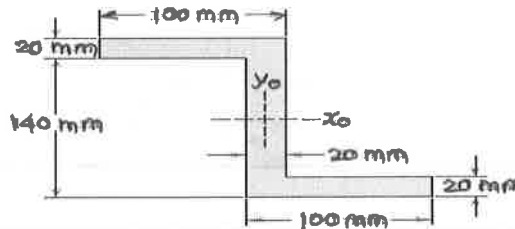


(OR)

4. Find the coordinates of the centroid of semicircular area as shown below.



5. Determine the moment of inertia of the Z section about its centroidal x_0 and y_0 axes



(OR)

6. State and prove the theorem of parallel axis theorem applied to moment of inertia.
7. A man weighing 'W' newton entered a lift which moves with an acceleration of ' a ' m/sec^2 . Find the force exerted by the man on the floor of lift when
- Lift is moving downwards
 - Lift is moving upwards

(OR)

8. A ball is thrown upwards from the top of a 50 m high building with an initial velocity of 20 m/s. At the same instant, another ball is thrown upwards with an initial velocity of 30 m/s from the ground. Determine when and where they will meet each other and also find velocity of each ball at the instant.
9. Derive (a) work energy equation (b) work done by spring

(OR)

10. A weight of 50 N suspended from a spring vibrates vertically with an amplitude of 7.5 cm and a frequency of 1 oscillation per second. Find the stiffness of the spring.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JANUARY-2019**Subject: Engineering Graphics****Branch: Common to CE, ME & MINING****Time: 3 hours****Max. Marks: 60****PART-B****Answer ALL questions of the following****5x 12 Marks= 60Marks**

1. Construct a conic when the distance of its focus from its directrix is 50 mm and its eccentricity is $\frac{2}{3}$ also draw a normal and tangent at any point on the curve.
(OR)
2. a) Construct a plain scale to compute time in minutes and distance covered by a train in km., when the train passes between two stations 250 km apart in five hours. The scale should have R.F. $\frac{1}{500000}$. Show the distance covered in 45 minutes on the scale.
b) A train is running at a speed of 40 km/hr. Construct a plane scale to read up to a km and a minute. The scale should measure up to 50 km. The RF of the scale is 1:25000. On the scale show the distance covered by the train in 39 minutes.
3. A line AB 65mm long has its end A, 10mm above HP and 25mm in front of VP. It is inclined at 65° to HP and 25° to VP. Draw its projections.
(OR)
4. Draw the projections of the following points on the same ground line keeping the projectors 25mm apart
A. in the H.P. and 20mm behind V.P.
B. 40mm above H.P. and 25mm in front of V.P.
C. in the V.P. and 40 mm above the H.P.
D. 25mm below H.P. and 25mm Behind V.P.
E. 15mm above H.P. and 50mm behind V.P.
F. 40mm below H.P. and 25mm in front of V.P.
G. in both H.P. and V.P.
5. A cylinder of base diameter 50mm and height 65mm rests on its base on HP, it is cut by a plane perpendicular to VP and inclined at 30° to HP and meets the axis at a distance 30mm from the base. Draw the front view, sectional top view and true shape of the section.

(OR)

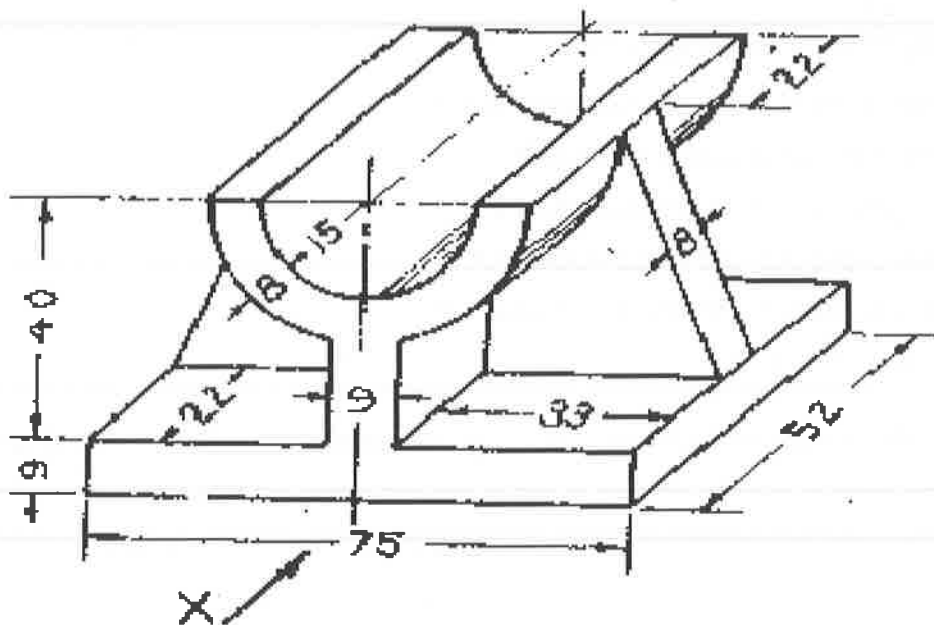
6. A Cone base 75 mm diameter and axis 80 mm long is resting on its base on H.P. It is cut by a section plane perpendicular to the V.P., inclined at 45° to the H.P. and cutting the axis at a point 35 mm from the apex. Draw the front view, sectional top view, sectional side view and true shape of the section.
7. A hexagonal pyramid of base side 30mm and height 60mm rests on its base on HP with two of its base edges perpendicular to VP. It is cut by a plane perpendicular to VP and inclined at 25° to HP, meeting the axis at a point 25mm above the base of the pyramid. Draw the isometric projection of the truncated pyramid.

(OR)

8. A cylinder of base diameter 40mm and height 60mm rests on its base on HP. It is cut by a plane perpendicular to VP and inclined at 45° to HP. The cutting plane meets the axis at a distance of 15mm from the top surface. Draw the isometric view of the truncated cylinder.
9. Explain the following Editing entities with figures
(i) FILLET (ii) ROTATE (iii) ARC (iv) OFFSET (v) ELLIPSE (vi) LINE

(OR)

- 10. Draw the orthographic views of the following figure**



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1. a) I _____ (understood) his words.. (write appropriate **prefix** to form the antonym of the word given)
- b) The _____ (exam) is scheduled at 10 AM
(write appropriate **suffix** to form the noun form of the word)
2. (a) Raju hits Ravi. (Change into passive voice)
- (b) He has reading a book ----- . (Correct the sentence)
3. a) break down . (write the meaning of this **phrasal verb**)
- b) be on cloud nine (write the meaning of this **idiom**)
- 4a) Ram reads good fiction, _____ ? (write the suitable **question tag**)
- b) The art of hand writing (write **one-word substitute**)
5. a) He prefers milk than coffee. (correct the sentence)
- b) He said, "I am going home today." (change to 'Indirect Speech')

PART-BAnswer **ALL** questions of the following**5x 10 Marks= 50Marks**

1. Minimalism is a tool to achieve fulfillment and happiness in life." Substantiate.
(OR)
2. Growth and contribution ,those are bedrocks of happiness-comment, according to the lesson "Minimalism "
3. According to Abdul Kalam, technology is the fulcrum of a knowledge society. Discuss.
(OR)
4. (a) Draft paragraph on causes and effects of pollution in Delhi ?
(b)Write a short paragraph on 'my favourite subject.'
5. Write an essay on 'child labour in India.' (word limit : 300 words)
(OR)
6. Write an essay on "Campus Placements boon or bane".
7. Write a letter to the Commissioner of your city requesting to provide street lights and children's park for your colony
(OR)
8. Write a letter to your Head of the Department requesting for the change of examination dates. State your reasons.
9. How would you describe the speaker's attitude towards relations in America? do the speaker's feelings change throughout the poem "I Too"?How so?
(OR)
10. Lead a content life not show off life. Do you agree with Burnam? Give your reasons

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018

Subject: Data Structures

Branch: Common to EEE, ECE, CSE & IT

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

1. Define Recursion with example
2. What is Linked List? Give an example.
3. Write an algorithm to evaluate post fix expression.
4. Define full binary tree.
5. Differentiate Zig rotation and Zag rotation in splay tree.

PART-B

Answer ALL questions of the following

5x 10 Marks= 50Marks

1. Explain asymptotic notations with an example?
(OR)
2. Write the recursive algorithm for finding GCD of two numbers and factorial of a number.
3. a) Explain about the insert and delete operations in a singly linked list.
b) Define singly linked list. Explain its node structure.
(OR)
4. Write a C program to implement circular linked list insertion operation.
5. a) How to represent Queues? Discuss.
b) Write an algorithm for infix to postfix conversion.
(OR)
6. a) Write a C program to implement linear queue operations using a linked list.
b) Explain input restricted dequeue and its operations.

7. a) Construct a binary tree having the following traversal sequences:

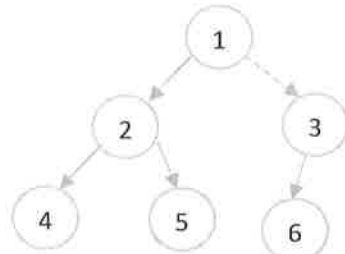
Postorder traversal: 25, 36, 39, 35, 60, 50, 45

Inorder traversal: 25, 35, 36, 39, 45, 50, 60

- b) What is DFS? Which traversal technique is used for the DFS and also explain the concept of DFS with example.

(OR)

8. a) How can a binary tree be represented using an array? Write array representation and list representation for the following tree -



- b) Construct a binary tree for the following preorder and in order traversals

Preorder: A B D I E J H C F K L G M

Inorder: D I B H J E A F L K C G M

9. Discuss the procedure for inserting an element into an AVL tree.

(OR)

10. Construct AVL tree for the list

{25,30,35,40,45,50,55,60,65,70,75}

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Branch: Common to EEE, ECE, CSE & IT

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

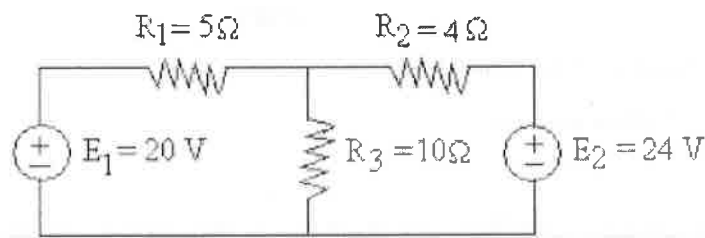
1. Define R-L-C parameters.
2. Define permeability
3. Define phase and phase difference
4. Write any two applications of diode?
5. Write the applications of Tunnel Diode.

PART-B

Answer ALL questions of the following

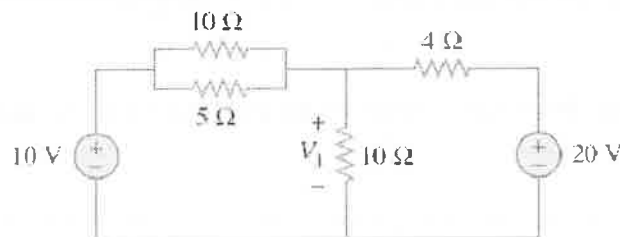
5x 10 Marks= 50Marks

1. a) Write the differences between mesh and nodal analysis.
b) Using Nodal Analysis find the current through R_3 .

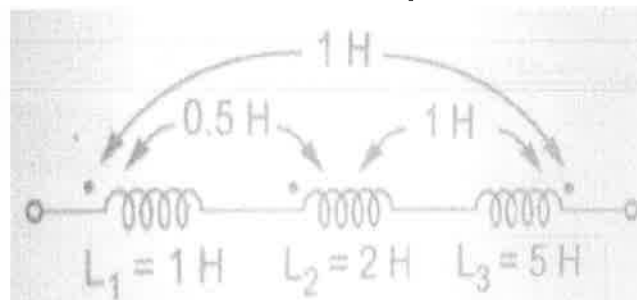


(OR)

2. Determine V_1 using mesh analysis.



3. a) The air gap in magnetic circuit is 1.5mm long and 2500mm² in cross sectional area. calculate
i) reluctance ii)MMF required to set up a flux of 800 μwb in air gap .
b) Find the total inductance of three series connected coupled coils as shown in figure below:



(OR)

4. a) Explain parallel magnetic circuit
b) An iron ring of cross sectional area of 6cm^2 is wound with a wire of 100 turns and has a sawcut of 2mm. calculate the magnetizing current required to produce a magnetic flux of 0.1mwb if mean length of magnetic path is 30cm and relative permeability of iron is 470.
5. A coil of inductance 80mH and resistance of 60Ohm is connected to a 230V, 50Hz supply. Find the following: impedance, the current flowing, the phase difference between the supply voltage and current, voltage across the inductance, voltage across the resistance, active power, reactive power and draw the phasor diagram.

(OR)

6. Explain the sinusoidal response of series RC circuit with circuit diagram, phasor diagram and waveforms along with mathematical expressions.
7. a) Explain temperature dependence of VI characteristics of PN junction diode
b) A silicon diode has saturation current of $7.5\text{ }\mu\text{A}$ at room temperature 300°K . calculate saturation current at 400°K .

(OR)

8. a) Explain formation of depletion layer
b) Write about barrier potential
9. A sinusoidal voltage whose $V_m=24\text{V}$ is applied to half wave rectifier. The diode may be considered to be ideal and $R_L=1.8\text{K}\Omega$ is connected as load. Find out peak value of current, RMS value of current, DC value of current and ripple factor.

(OR)

10. Find average value, RMS value, Form Factor and Peak factor for half wave and full wave rectifier

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018Subject: Applied PhysicsBranch: **Common to EEE, ECE, CSE & IT**Time: **3 hours**Max. Marks: **60****PART – A**Answer **ALL** questions of the following**5x2Mark=10 Marks**

1. State Gauss law in magnetostatics and write any two applications of Gauss law?
2. Define electric susceptibility and electric polarization
3. Mention any two differences between spontaneous and stimulated emissions?
4. Write the drawbacks of quantum free electron theory.
5. Define Fermi energy level, conduction band and valance band

PART-BAnswer **ALL** questions of the following**5x 10 Marks= 50Marks**

1. a) State Ampere's law and derive differential form of Ampere's law. [4 M]
b) Apply Ampere's circuital law to determine the magnetic field at a point due to a long straight current carrying conductor [3 M]
c) A long straight wire carries a current of 48.8A. An electron travelling at 1.08×10^7 m/s is 5.20 cm from the wire. Calculate the force that acts on the electron if the electron velocity is directed
(a) towards the wire, (b) parallel to the current. [3 M]

(OR)

2. a) Derive electromagnetic wave equation in free space (7)
b) Explain physical significance of Divergence of a vector (3)
 3. a) What is internal field of an atom? Derive an expression for it (4)
b) Write a brief description of various types of polarization (6)
- (OR)**
4. a) Define electronic polarization, polarizability and polarization vector [6 M]
b) The dielectric constant of Helium gas at NTP is 1.0000684. Calculate the electronic polarizability of a He atoms if the gas contains 2.7×10^{25} atoms/m³. [4 M]
 5. a) Explain construction and working of a semiconductor laser. [7 M]
b) Discuss applications of lasers in various fields [3 M]

(OR)

6. a) Explain construction and working of Ruby laser? (7)
b) Write about optical and electrical pumping. (3)

7. a) How does the band theory differ from the free electron theory in explaining electrical properties of solids (7)

b) Write a note on (i) Mean free path (ii) Relaxation time (3)

(OR)

8. a) Explain the formation of energy bands in solids and briefly explain how the solids are classified on the basis of energy band gap. [7 M]

b) Explain briefly E-k curve. [3 M]

9. Derive an expression for carrier concentration in intrinsic semiconductors

(OR)

10. a) Give a brief note on the principle, construction and working of LED [6 M]

b) What are the advantages and disadvantages of LED [4 M]

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, DECEMBER-2018Subject: Applied ChemistryBranch: **Common EEE, ECE, CSE & IT****Time: 3 hours****Max. Marks: 60****PART – A****Answer ALL questions of the following****5x2Mark=10 Marks**

1. Write chemical formulas for temporary and permanent hardness.
2. What is mean reference electrode? Give examples
3. What are elastomer? Give examples.
4. Why natural gas is called fossil fuel?
5. Give two examples of natural composite materials.

PART-B**Answer ALL questions of the following****5x 10 Marks= 50Marks**

1. Write a brief account on (a) Caustic embrittlement (b) Boiler corrosion (c) Scales & Sludges.
(OR)
2. (a) What is potable water? Give the specifications of potable water according to WHO.
(b) 50 ml of sample water consumed 15 ml of 0.01 M EDTA before boiling and 5 ml of the same EDTA after boiling. Calculate the degree of total hardness, permanent hardness and temporary hardness.
3. Explain electrochemical corrosion theory mechanism.
(OR)
4. Explain the construction & working of galvanic cell with suitable examples.
5. a) Differentiate Addition & Condensation polymerization with examples.
b) Explain free radical polymerization mechanism of addition polymer.
(OR)
6. (a) Define the following with suitable examples.
i) polymer ii) plastics iii) Fibers iv) Rubbers
b) Give a brief account on Biodegradable polymers.
7. a) What is natural gas. Give characteristics & applications of natural gas.
b) Define fuel. How are fuels classified?
(OR)
8. a) Define the terms i) HCV ii) LCV
b) Calculate the gross & net calorific values of coal having the following composition.
Carbon = 85 %, Hydrogen = 8%, sulphur = 1%, Nitrogen = 2%, ash = 4%. (Latent of heat is 587 cal/gm)
9. a) Write the principles of green chemistry.
b) Explain any two solvent free reactions.
(OR)
10. Explain the concept of R_4M_4 with special reference to Econoburette and survisometer?

