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: <u>APPLIED PHYSICS – II</u>

Branch: **Common to CE, ME, MINING, CSE, EEE & ECE**

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   **5x2Mark=10 Marks**

1. What is Meissner effect?

2. What is the physical significance of wave function Ψ?

3. Define Hall effect and mention its any two applications.

4. Why surface to volume ratio is very large for nanoparticles compared to bulk materials.

5. What is coloumb's law?

PART-B

Answer any FIVE Questions of the following   **5x10 Marks= 50Marks**

1. a) Define magnetization and show that $B = \mu_0(H+M)$.   **(3M+4M+3M)**

   b) Explain paramagnetisam in Transition and Rale earth elements.

   c) A magnetizing field of 600 A/m, produces a magnetic flux of $2.4x10^{-5}$ weber, in an iron bar of
   0.2 cm^2 cross sectional area. Calculate permeability and susceptibility of the bar.

2. a) Derive susceptability of super conductor in Ideal condition.

   b) Write short notes on numerical displays.

3. a) State Heisenberg uncertainty principle. Show that electrons cannot exist within the
   nucleus on the basis of the above principle.

   b) Describe the experimental verification of matter waves using Davisson Germer's
   experiment.

4. a) What is Bloch theorem? Explain.

   b) Write notes on Liquid Crystal Display.

5. a) What are nanomaterials? Explain why the properties of nanoparticles are different

   b) Explain synthesis of nanoparticles through ball milling method?.   **(6M+4M)**

6. a) Define i) Nano science   ii) Nano Technology   iii) Nano scale

   b) How nano materials are synthesized by using chemical vapor deposition technique.

7. a) Explain about divergence and curl of a vector field with an example.

   b) What is displacement current? How does it differs from conduction current?

   c) Write four Maxwell's equation and outline their physical meaning.   **(4M+4M+2M)**

8. a) Explain Faraday's law and Lenz's law of electromagnetic induction.

   b) Derive an equation of electromagnetic wave for free space.

   c) Derive Amper's law with Maxwell's correction.   **(3M+4M+3M)**

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

Subject: **Engineering Mechanics**

Branch: **Common to CE, ME & MINING**

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2Mark=10 Marks

1. State the polygon law to determine the resultant of concurrent forces.
2. Define Free body diagram
3. Define area moment of inertia
4. Define the terms velocity and acceleration.
5. What is Impulse momentum principle?

PART-B

**Answer any FIVE Questions of the following**   5x10 Marks= 50Marks

1. a) The body on the incline shown in fig. is subjected to the vertical and horizontal forces as

shown. Find the components of each force along X-Y axes parallel and perpendicular to

the incline.   [5M]
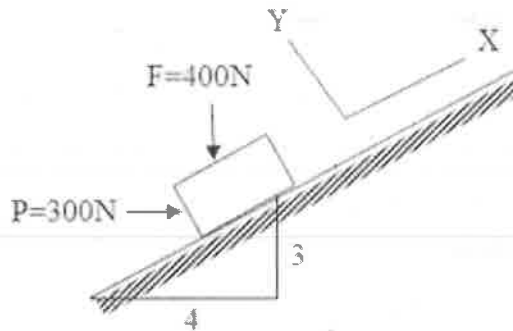
b) A 12 m bar of negligible weight rests in a horizontal position on the smooth inclines as

shown in fig. . Compute the distance at which load T =100 N should be placed from point

B to keep the bar horizontal.   [5M]
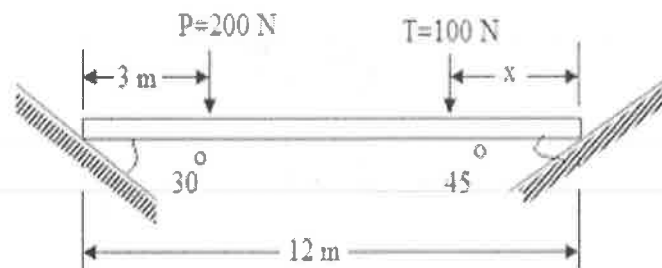
2. a) A force of 100 N is acting at a point making an angle of 30^0 with the horizontal. Determine the components of this force along X and Y axis. [5M]

   b) Determine the reactions developed in the cantilever beam shown in Fig. [5M]
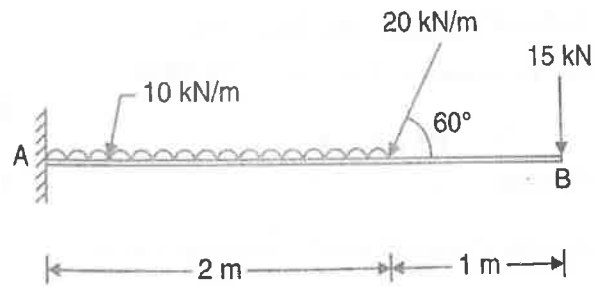

3. Two identical iron spheres each of radius 50mm and weight 150 N is connected with a string of length 160mm, and rest on a horizontal smooth floor. Another sphere of radius 60mm and weight 200N rest over them. Determine the tension in the string and reaction at all contact surfaces. [10M]
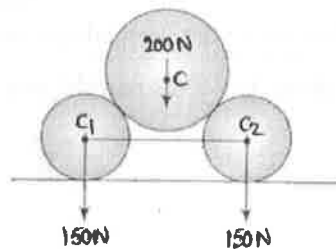
4. a) Determine the coordinates of centriod of a semi circular Area of radius R. [5M]

   b) A bullet is fired from a height of 120m at a velocity of 360 Kmph at an angle of 30^0 up wards. Neglecting air resistance, find

   i) total time of flight,

   ii) horizontal range of the bullet,

   iii) maximum height reached by the bullet, and

   iv) find velocity of the bullet just before touching the ground. [5M]

5. a) Determine the centroid of a semi circle of radius R. [5M]

   b)Find the moment of inertia about the centroidal axis for the given L-Section. [5M]
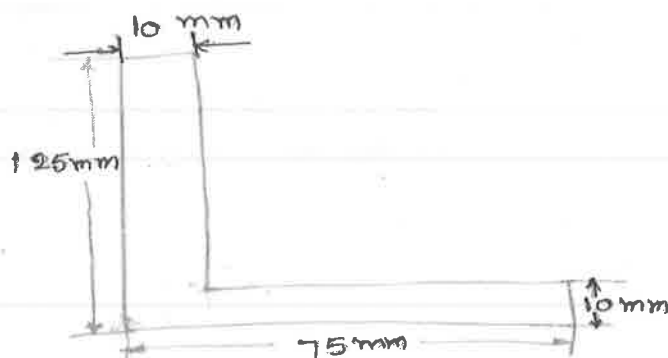
6. a) The angular motion of rigid body is defined by the relation $\theta = 3t + 2t^2 - t^3$ m, where θ is in radians and t is in seconds. Determine the angular position, velocity and acceleration at t= 2s. Also, determine the angular acceleration when angular velocity is zero. **[5M]**

   b) In fig., a force of 30 N is applied on the lower block of 5 kg mass, over which another block of mass 3 kg mass rests. Determine the acceleration of the blocks and the tension in the string assuming it to be inextensible. The coefficient of kinetic friction for all contact surfaces is 0.15. **[5M]**
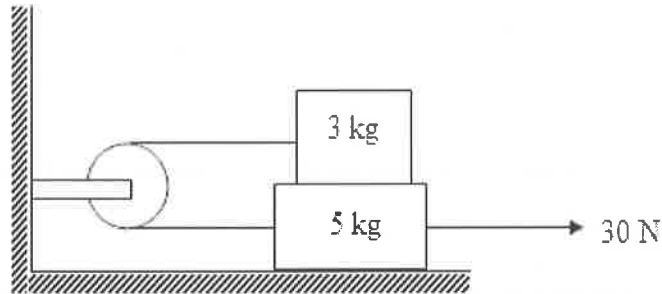
7. a) A ball is thrown from the top of a building of 30 m height with an initial velocity of 30 m/s at an angle of 30° downwards to the horizontal. Determine the time of flight and the distance from which the foot of the building to where it strikes the ground. **[5M]**

   b) The block and pulley arrangement shown in fig. is released from rest. If the 6 kg block comes to rest in $(1/100)^{th}$ of second after striking the floor, determine the force of impact and height to which the lighter block would rise? **[5M]**
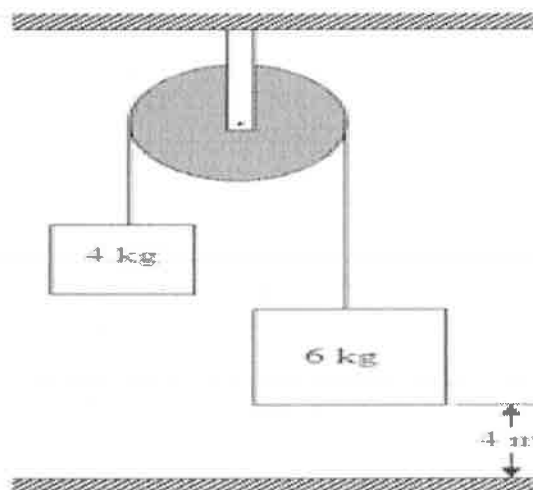
8. a) Explain the concept of pile and pile hammer. **[3M]**

   b) A pile hammer weighing 20kN drops from a height of 750mm on a pile of 10kN. The pile penetrates 100 mm per blow. Assuming that the motion of the pile is resisted by a constant force, find the resistance to penetration of the ground. **[7M]**

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JANUARY-2019

Subject: **Basic Electrical & Electronics Engineering**

Branch: **Common to CE, ME & MINING**

Time: **3 hours**   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2Mark=10 Marks

1. State Maximum Power Transfer Theorem.

2. A resistance of 200 Ω and an inductance of 400 mH is connected in series, is input supply frequency is 50 Hz, determine the power factor of the circuit.

3. Define the following for single phase transformer
   i) Efficiency   ii) Regulation

4. Draw the symbol for i) CC Transistor   ii) N-Channel

5. a) Define Feedback Amplifier.

   b) List out the various types of Flipflops

PART-B

Answer any FIVE Questions of the following   5x10 Marks= 50Marks

1. a) Derive the expressions for Self & mutual inductances .

   b) Illustrate Superposition Theorem with an example

2. a) State and explain Faraday's laws.   **4M**

   b) Find the equivalent resistance across x-y for the given network.   **6M**
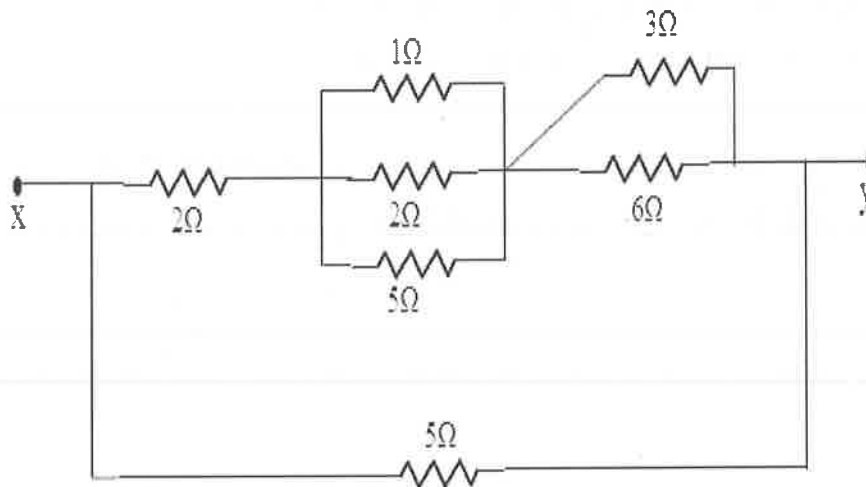
3. a) Find the current through each resistor of the circuit shown in below figure.

0.5Ω

1Ω   1Ω   2Ω   1Ω

15 V   20 V
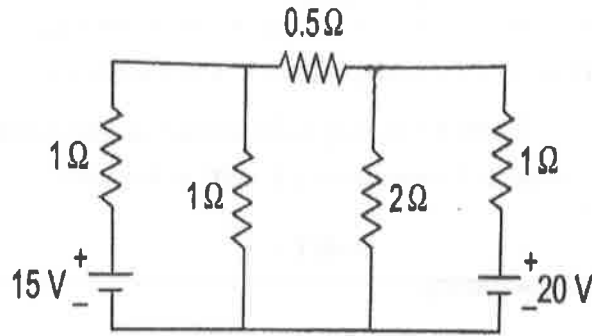
b) A resistance of 120 Ω and a capacitive reactance of 250 Ω are connected in series across an A.C voltage source. If a current of 0.9 A is flowing in the circuit, find out

(i) Power factor   (ii) Supply voltage   (iii) voltage across resistance and capacitance

(iv) Active power and Reactive power.

4. A coil has an inductance of 0.05 H and a resistance of 10Ω. It is connected to a sinusoidal 200 V, 20 Hz supply. Calculate the impedance, current, power consumed and power factor.

5. a) Explain the Principle of operation of 3phase Induction motor.

    b) Derive the condition for maximum efficiency of single phase transformer.

6. a) Explain with a neat diagram how the input and output characteristics of CB configuration can be obtained.

    b) Explain the operation of center tapped full wave rectifier with neat diagram.

7. a) Draw the circuit diagram of a voltage series feedback amplifier and derive the expression for voltage gain with feedback.

    b) Draw JK flipflop and explain the operation.

8. a) Briefly Analyse the performance measures of negative feedback amplifiers.

    b) Distinguish between SR and JK flipflops.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JANUARY-2019

Subject: **Engineering Graphics**

Branch: **Common to EEE, ECE, CSE**

Time: 3 hours   Max. Marks: 60

Answer any FIVE Questions of the following   **5x12 Marks= 60Marks**

1. a) Draw a parabola if the distance of the focus from the directrix is 60mm.
    b) Construct a hyperbola, when the distance of the focus-directrix is 65mm and eccentricity is 3/2.

2. a) Draw a vernier scale of R.F. = 1/25 to read centimeters upto 4 meters and on it, show lengths representing 2.39 m and 0.91m.
    b) Draw an involute of a pentagon of side 35 mm.

3. The line AB of 70 mm long, has its end A, 20 mm above H.P. and 15 mm in front of V.P. The line is inclined at 30^0 to H.P and 60^0 to V.P. Draw its projections.

4. a) A point 30mm above xy line is the plan view of two points P and Q. the elevation of P is 45mm above the H.P. while that of the point Q is 35mm below the H.P. Draw the projections of the points and state their position with reference to the principal planes and the quadrant in which they lie.
    b) Two pegs fixed on a wall are 4.5 m apart. The distance between the pegs measured parallel to the floor is 3.6m. If one peg is 1.5 m above the floor, find the height of the second peg and the inclination of the line joining the two pegs, with the floor.

5. An equilateral triangular plane ABC of side 35, has its plane parallel to V.P and 20 away from it. Draw the projections of the plane when one of its sides is
    (i) Perpendicular of H.P   (ii) Parallel to H.P   (iii) Inclined to H.P at an angle of 45^0

6. A regular pentagon of 30 side, is resting on one of its edges on H.P, which is inclined at 45^0 to V.P. Its surface is inclined at 30^0 to H.P. Draw its projections.

7. A hexagonal prism, side of base 25 mm and axis 50 mm long rests on its base in H.P. Its axis is parallel to V.P. Draw the orthographic projections and provide the isometric projection of the solid. Show the isometric scale.

8. Figure shows the Isometric view of the object. Draw the front view, Top view, and side view

Code No.: 50B03

MR15

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

Subject: **Applied Chemistry**

Common to Branch: CSE, EEE, ECE

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2Mark=10 Marks

1. Write different units to measure of hardness?
2. What is Nernst equation? Mention the terms present in Nernst equation.
3. Write the preparation, properties and engineering applications of Nylon-6.
4. What is meant by calorific value of a fuel?
5. Give any two principles of Green Chemistry?

PART-B

Answer any FIVE Questions of the following   5x10 Marks= 50Marks

1. a) A sample of hard water contains the following dissolved salts per liter; $CaSO_4$ =10.6mg,
   $Mg(HCO_3)_2$ =32.6mg, $CaCl_2$= 150mg ,silica=30mg, turbidity=12mg and
   $Ca(HCO_3)_2$ =48.2 mg. Calculate the temporary, permanent & total hardness of water.

   b) Write short notes on Reverse Osmosis.

2. a) Explain Alkalinity of water.
   b) What are the causes and disadvantages of hardness of water? Mention the types of hardness .

3. a) Explain the copper electroplating ?
   b) Explain the Galvanization process.

4. a) Distinguish between chain growth and step growth mechanisms of polymerization.
   b) Discuss the injection moulding method for the fabrication of plastics with a neat diagram.

5. a) Why are gaseous fuels more advantageous than solid fuels?
   b) Explain the determination of calorific value of a fuel by Junker's gas calorimeter.

6. a) Write short notes on Wind Power and hydro power.
   b) Give the classification of fuels basing on their occurrence and physical state, with relevant examples.

7. a) Explain ultrasound and microwave assisted reactions of green chemistry.
   b) Discuss the important applications of Nanomaterials?

8. a) Write a short note on nanocomposites.
   b) Explain the concept of Bisurfactants.

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

Subject: **Electrical Circuit Analysis and synthesis**

Branch: EEE

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2Mark=10 Marks

1. In an DC circuit state the condition for maximum power transfer.
2. Write the major advantages of 3-phase supply compared to 1-phase supply.
3. Define ABCD-parameters; also write its symmetry conditions.
4. In a series RL circuit R= 100 ohms and L = 10 mH. What is the time constant?
5. Write the conditions for a polynomial is to be Hurwitzian.

PART-B

Answer any FIVE Questions of the following   5x10 Marks= 50Marks

1. a) State and explain reciprocity theorem with an example.   (5)

    b) Determine the power loss in the 10 ohms resistor using Thevenin's theorem   [5]
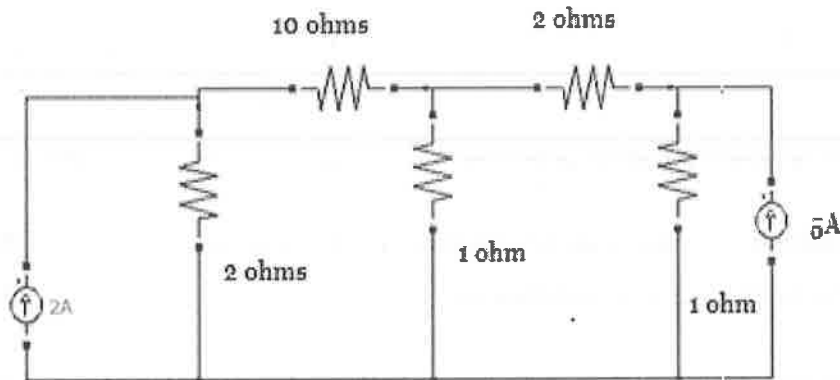
2. a) State and prove the Millman's theorem   [5]

    b) State and explain compensation theorem   [5]

3. Explain the measurement of power by using two-wattmeter method. Also discuss the effect of power factor on wattmeter readings.

4. a) Find the Z parameters of the given network   [5]
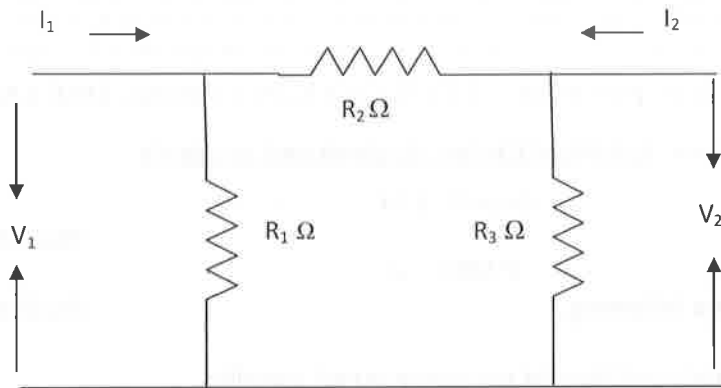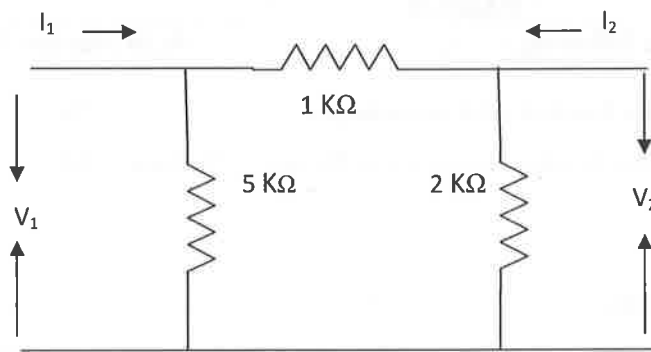

b) Obtain ABCD parameters in terms of Z-parameters   [5]

5. a) Find the Y parameters of the given network   [5]

b) Obtain Z parameters in terms of ABCD –parameters   [5]

6. a) Write the procedure to evaluate initial conditions in RLC circuits.   (5)

   b) Write Initial conditions of Transient Response.   (5)

7. Derive an expression for the transient response of an RLC series circuit excited by DC
   Voltage V .   [10]

8. Synthesize the network in the two Foster forms (RL impedance and RC admittance) of the
   given function   [10]

$$F(s) = \frac{(s+1)(s+5)}{(s+3)(s+7)}$$

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

Subject: <u>Electronic Devices and Circuits</u>

Branch: ECE

Time: **3 hours**   Max. Marks: 60

PART – A

Answer ALL questions of the following   **5x2Mark=10 Marks**

1. Define and formulate Diode reverse saturation current.
2. Draw the symbols for SCR, LED.
3. A transistor has α=0.98. If emitter current of the transistor is 1 mA, determine base
   current and gain factor 'β'.
4. What are the advantages of MOSFET over JFET?
5. What are different Compensation Techniques?

PART-B

Answer any FIVE Questions of the following   **5x10 Marks= 50Marks**

1. a) The reverse bias saturation current for a P-N junction diode is 1μA at 300°K. Determine its
      a.c resistance at 150 mV forward bias.   **(4)**

   b) Explain the working of P-N junction under forward bias and reverse bias with neat
      circuit diagrams.   **(6)**

2. a) A Silicon Diode has a saturation current of 7.5 μA at room temperature 300°K. Calculate
      saturation current at 400°K.   **(5)**

   b) Derive the expression for the diffusion capacitance C_D in case of P-N junction diode.   **(5)**

3. a) Show that ripple factor of full wave rectifier with capacitive filter is $\gamma = \dfrac{1}{4\sqrt{3}fcR_L}$.   **(6)**

   b) Difference between LED and LCD.   **(4)**

4. a) Draw the input and output waveforms for half wave rectifier. Calculate Ripple factor,
      efficiency and % of regulation.   **(5)**

   b) Explain the operation of Tunnel diode and draw its V-I characteristics.   **(5)**

5. a) Write different current Amplification Factors.   **(5)**

   b) In a CB Transistor circuit, I_B = 10mA and I_C = 9.8mA. Find value of I_E.   **(5)**

6. a) Define α, β and deduce the relation between them.   **(5)**

   b) Derive Reach-Through (or) Punch-Through.   **(5)**

7. a) Explain the operation of JFET with its V-I characteristics.   **(5)**
   b) Explain Transfer Characteristics of JFET.   **(5)**

8. Explain Thermistor and Sensistor Compensation Techniques with diagram.

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

Subject: **Data Structures**

Branch: CSE

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   5x2Mark=10 Marks

1. How do you measure the algorithm running time?

2. Define Sparse matrix and give an example

3. List the applications of queue.

4. Define a graph.

5. What is balancing factor in AVL tree?

PART-B

Answer any FIVE Questions of the following   5x10 Marks= 50Marks

1. a) Explain different cases of time complexity.

   b) Write different categories of data structures.

2. a) Write a C program to solve towers of Hanoi problem.

   b) Define recursion. Write a C program to calculate GCD of two numbers using recursion?

3. a) Write an algorithm for creating a Double linked list.

   b) Write the representations of Sparse matrix.

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 begin   d) delete a node from end.

5. a) Explain the operations of Stack.

   b) Explain the dis-advantages of liner Queue.

6. a) Convert the following expression A+ (B*C)*((C*D+F) /G) into postfix form.

   b) Explain the operations of queue with suitable algorithms and examples.

7. a) Discuss recursive implementation of tree traversal methods.

   b) Explain BFS with an example.

8. a) Explain various rotations of AVL Trees maintaining balance factor while insertion takes place.

   b) Explain Splay trees with example