

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, JUNE-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

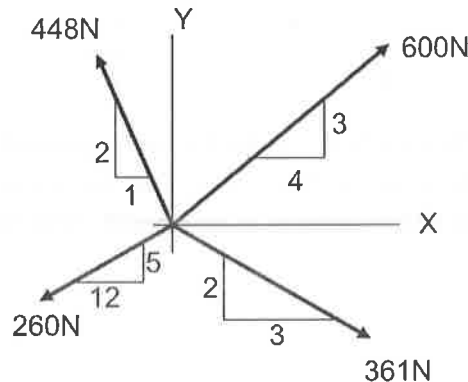
1. Explain about Triangle Law of Forces.
2. Define Lami's theorem and its converse.
3. Define area moment of inertia
4. Explain D'Alembert's principle.
5. What is Impulse momentum principle?

PART-B

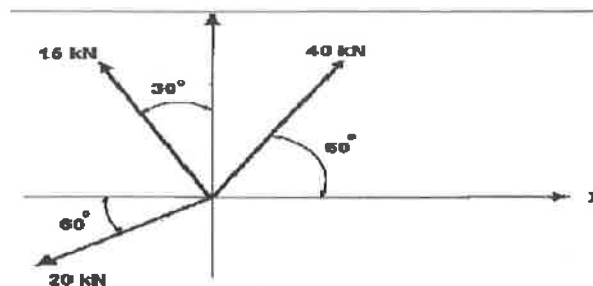
Answer any FIVE Questions of the following

5x10 Marks= 50Marks

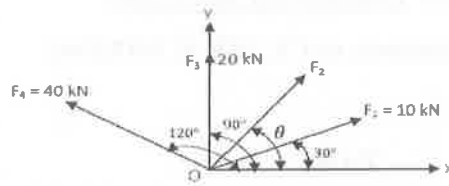
1. a) A system of four forces acting on a body is shown in fig. Determine the resultant.



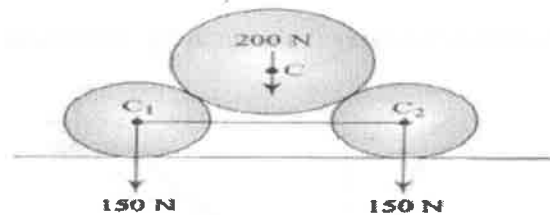
- b) Three forces of magnitude 40 kN, 15 kN and 20 kN are acting at a point O as shown in figure. The angles made by 40 kN, 15 kN and 20 kN forces with X axis are 60° , 120° and 240° respectively. Determine the magnitude and direction of the resultant force [5M]



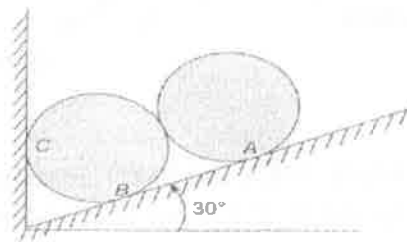
2. a) The resultant of four forces which are acting at a point O as shown in figure below is along Y-axis. The magnitude of forces F_1 , F_3 and F_4 are 10 kN, 20 kN and 40 kN respectively. The angles made by 10 kN, 20 kN and 40 kN with X- axis are 30° , 90° and 120° respectively. Find the magnitude and direction of force F_2 if resultant is 72 kN. [5M]



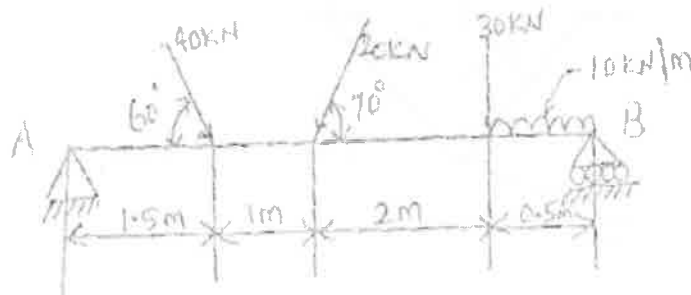
- b) Two locomotives on opposite banks of a canal pull a vessel moving parallel to the banks by means of two horizontal ropes. The tensions in these ropes are 2000N and 2400N while the angle between them is 60° . Find the resultant pull on the vessel and the angle between each of the ropes and the sides of the canal. [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) Two identical rollers, each of weight 80N are supported by an inclined plane and a vertical wall as shown in the Fig. . 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. [5M]

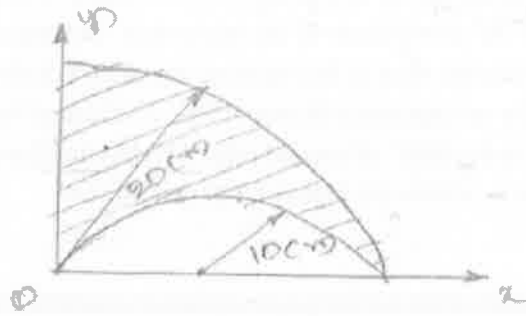


- b) Find reactions at points A & B [5M]



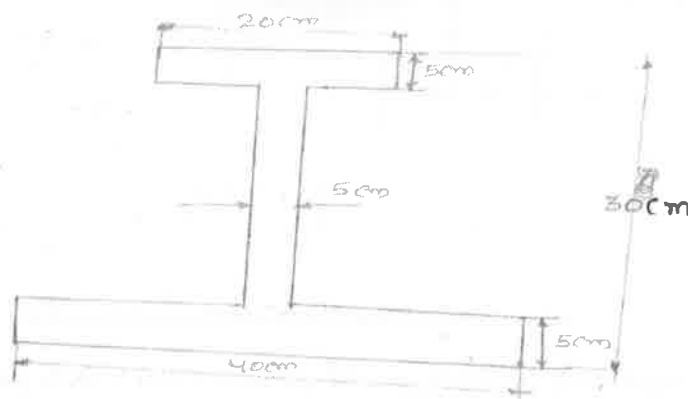
5. a) Locate the centroid of the shaded area as shown in Figure

[5M]



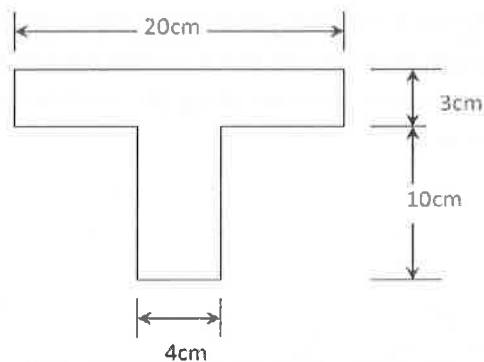
b) Locate the centroid of plain area as shown in Fig.

[5M]



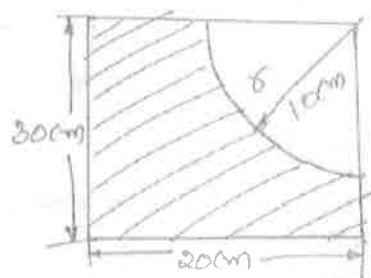
6. a) Locate the centroid of the plane lamina as shown in figure.

[5M]

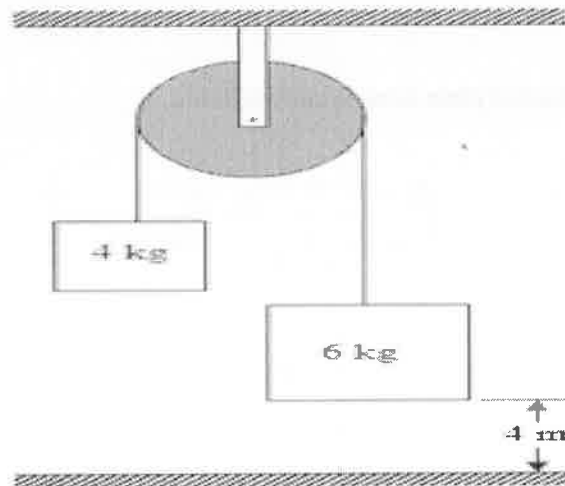


b) Find the centroid of the shaded area as shown in figure.

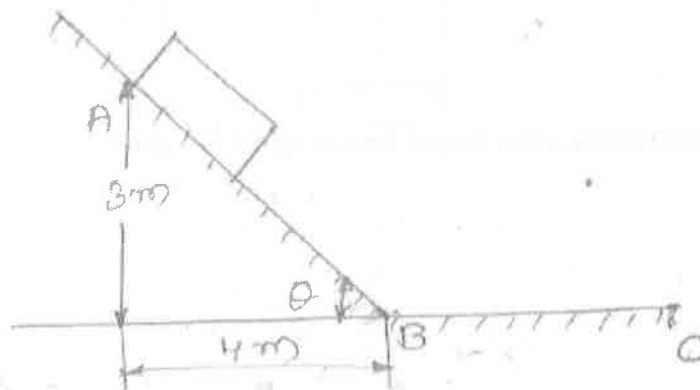
[5M]



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 $(1/100)^{\text{th}}$ of second after striking the floor, determine the force of impact and height to which the lighter block would rise? [5M]



8. a) A body weight 300N is pushed up a 30° plane by a 400 N force acting parallel to the plane. If the initial velocity of the body is 1.5 m/sec and the coefficient of kinetic friction is $\mu = 0.2$, What velocity will the body have after moving 6m? [5M]
- b) A small block from rest at point A and slides down the inclined plane as shown in Fig. What is the distance along the horizontal plane will it travel before coming to rest? The coefficient of kinetic friction between the block of either plane is 0.3. Assume that the initial velocity with which it starts to move along BC is of the same magnitude as that gained in sliding from A to B. [5M]



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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018Subject: Applied ChemistryBranch: **Common to EEE, ECE & CSE**

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. Why most of the metals are found in the ore form and not in the pure form? Explain.
3. Define Elastomers. Give example.
4. What is octane gating?.
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; $\text{CaSO}_4 = 10.6\text{mg}$, $\text{Mg}(\text{HCO}_3)_2 = 32.6\text{mg}$, $\text{CaCl}_2 = 150\text{mg}$, silica = 30mg, turbidity = 12mg and $\text{Ca}(\text{HCO}_3)_2 = 48.2\text{mg}$. Calculate the temporary, permanent & total hardness of water.
b) Write short notes on Reverse Osmosis.
2. a) Calculate the amounts of lime (90% pure) and soda (98% pure) for the treatment of 1 million litres of water containing: $\text{Ca}(\text{HCO}_3)_2 = 8.1\text{ ppm}$; $\text{CaCl}_2 = 33.3\text{ ppm}$; $\text{MgCl}_2 = 38\text{ ppm}$ and $\text{Mg}(\text{HCO}_3)_2 = 14.6\text{ ppm}$.
b) Explain Ion-exchange process with neat diagram.
3. a) What are batteries? How are they classified? Explain the construction & functioning of lead-acid cell.
b) Write short notes on sacrificial anodic protection.
4. a) Explain the chemistry involved in charging discharging of Ni-Cd battery.
b) Explain chemical corrosion in detail.
5. a) What are conducting polymers? Give examples. Explain conjugated conducting polymers.
b) Write the preparation, properties & applications of Buna-S-rubber.
6. a) Discuss the mechanism of free radical polymerization with suitable example.
b) Write a note on different types of polymerizations.
7. a) What is cracking? Explain the Fixed bed catalytic cracking with a neat diagram.
b) What is combustion? Discuss HCV and LCV of fuel.
8. a) Explain ultrasound and microwave assisted reactions of green chemistry.
b) Discuss the important applications of Nanomaterials.

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Branch: CE, MINING, ME, CSE, EEE & ECE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

1. Draw the B-H curve for a ferromagnetic material and identify the retentivity and coercive field on the curve?
2. What are the properties of matter waves?
3. Write a note on effective mass of an electron.
4. Why surface to volume ratio is very large for nanoparticles compared to bulk materials.
5. Mention the Physical significance of divergence and curl of a vector field.

PART-B

Answer any FIVE Questions of the following

5x10 Marks= 50Marks

1. a) What is ferromagnetic Curie temperature? Discuss the behavior of a ferromagnetic material below Curie temperature.
b) Briefly explain the following i). SQUIDS and ii) Smart magnets
2. a) What is diamagnetism? Explain its properties with temperature.
b) Explain hysteresis loop observed in ferromagnetic materials.
3. a) Show that energy of a micro particle confined in an infinite one-dimensional potential well of length 'L' is given by $E_n = (n^2 h^2) / (8mL^2)$ where the symbols have their usual meaning. In the above situation the particle cannot have zero energy. Explain, why?
b) Calculate the wavelength associated an electron raised to a potential of 1600 V. (8M+2M)
4. a) Explain the phenomenon of quantum tunneling effect across a thin barrier of width L using Schrodinger wave equation.
b) Show that the wavelength λ associated with an electron of mass 'm' and Kinetic energy 'E' is given by $\lambda = h/(2mE)^{1/2}$
5. a) Explain how the materials are classified into conductors, semiconductors and insulators with the help of energy band diagram.
b) Explain Hall Effect and obtain an expression for Hall coefficient for an extrinsic semiconductor. Explain the application of Hall effect. (4M+6M)
6. a) What is p-type semiconductor? Deduce an expression for carrier concentration in p-type semiconductor.
b) Discuss the band theory of solids and explain the band formation of solids.
7. a) Define i) Nano science ii) Nano Technology iii) Nano scale
b) How nano materials are synthesized by using chemical vapor deposition technique.
8. What is Induced EMF? Explain Induced EMF in conductor.

Code No.: 50582

MR15-2015-16 & 2016-17 Batch

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

Subject: Data Structures through C

Branch: Common to EEE & ECE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

1. What is the time complexity of sum of 'n' natural numbers?
2. What is **argc** and **argv** in command line arguments explain with syntax's.
3. Write any two advantages of sparse matrix.
4. Differentiate stack and queue.
5. Compare full binary tree and complete binary tree.

PART-B

Answer any FIVE Questions of the following

5x10 Marks= 50Marks

1. a) What is a data structure? Explain different types of data structures with examples.
b). Write short notes on
i) Direct recursion ii) Indirect recursion
2. a) Write an algorithm to find maximum and minimum element in an array.
b) Write a C program to calculate power series using recursion.
3. a) Write a C program to generate implement linear search using non recursion.
b) Write a C program to implement Selection Sort method.
4. a) Write short notes on File I/O.
b) Write short notes on Searching methods.
5. a) Write a C program to implement sparse matrix using linked list.
b) Compare singly and doubly linked list to perform insertion and deletion operations.
6. Write a C program to implement circular linked list with its operations.
7. a) Write a C program to find the reversing list using stacks.
b) Explain DEQUEUE operations and write applications of queue.
8. Write a C program for the implementation of Binary search and calculate the time complexity for both best and worst cases.

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Branch: CE, MINING, ME & CSE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

1. Derive an Newton Raphson formula to find \sqrt{N} where N is a positive number
2. Given $y_3=2, y_4=-6, y_5=8, y_6=9$ and $y_7=17$ calculate $\Delta^4 y_3$.
3. Evaluate $\int_0^1 \frac{1}{1+x} dx$ using Trapezoidal rule with $h = 0.25$
4. Using modified Eulers method find $y(0.1)$ if $\frac{dy}{dx} = x^2 + y^2$, $y(0)=1$.
5. Classify the partial differential equation

$$\frac{d^2 u}{dx^2} + 4 \frac{d^2 u}{dx dy} + (x^2 + 4y^2) \frac{d^2 u}{dy^2} = \sin(x+y)$$

PART-B

Answer any FIVE Questions of the following

5x10 Marks= 50Marks

1. Find an approximate root of $x \log_{10} x - 1.2 = 0$ by false position method.
2. a) Find a root of $xe^x = 2$ using method of false position.
b) Evaluate $\sqrt[3]{7}$ using Newton Raphson method.
3. From the following data find $y(42)$ and $y(88)$

x	40	50	60	70	80	90
y	184	204	226	250	276	304

4. a) Find the missing value from the table

x	0	1	2	3	4
y	1	3	9	-----	81

- b) Using Lagranges interpolation find $y(2)$ from the following data

x	0	1	3	4
y	0	1	81	256

5. 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

6. Find a and b so that $y = ab^x$ best fits the following data

x	0.2	0.3	0.4	0.5	0.6	0.7
y	3.16	2.38	1.75	1.34	1.00	0.74

7. Find $y(0.2)$ and $y(0.4)$, given that, $\frac{dy}{dx} = y + e^x$, $y(0) = 0$ by modified Euler's method.
8. Solve the Poisson's equation $\nabla^2 f = 2x^2 y^2$ over the square domain $0 \leq x \leq 3$ and $0 \leq y \leq 3$ with $f = 0$ on the boundary and $h = 1$.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018Subject: Electronic Devices and Circuits

Branch: ECE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

1. Determine a.c resistance for semiconductor diode with a forward bias of 0.25V Reverse saturation current at room temperature is of $1.2\mu\text{A}$.
2. What are the applications of tunnel diode?
3. A transistor has $\alpha=0.98$. If emitter current of the transistor is 1 mA, determine base current and gain factor ' β '.
4. Define pinch off voltage.
5. Derive relation for stability factor 'S'.

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 $1\mu\text{A}$ 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) Write the volt-ampere equation for a PN diode. (5)
b) Define what is a PN diode and mention some applications. (5)
3. a) Write short notes on UJT (5)
b) Write short notes on Varactor diode (5)
4. a) Compare Half Wave, Full wave and Bridge Rectifier. (6)
b) Write short notes on LCD. (4)
5. a) Obtain the input-output characteristics of Common-collector amplifier? (5)
b) Draw the circuit diagram of a transistor in CE configuration and explain the output Characteristics with the help of different regions. (5)
6. a) If the value of $\beta = 50$. Find value of α . (5)
b) How a P-Type and N-Type is formed in a Transistor. (5)
7. a) Explain the operation of JFET with its V-I characteristics. (5)
b) Explain Transfer Characteristics of JFET. (5)
8. a) Draw the Thevenin's equivalent circuit for Self Bias Circuit. (6)
b) Derive the stability factor of a self bias circuit. (4)

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Branch: EEE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

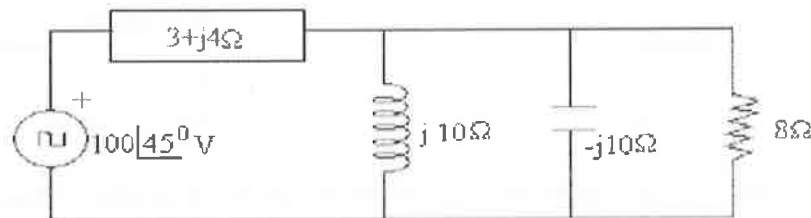
1. In a balanced Y-connected power system, calculate the phase voltage (E_{phase}) if the line voltage (E_{line}) is 480 volts.
2. Write the expressions for Z parameters of a two port network.
3. Define the transient state of an electric circuit
4. Write the conditions for a polynomial is to be Hurwitzian.
5. State Norton's Theorem.

PART-B

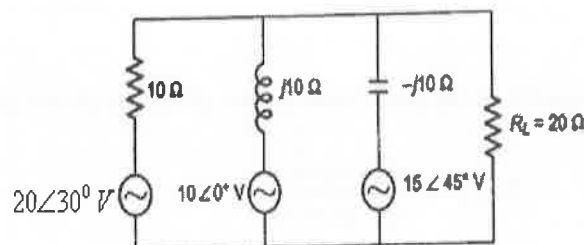
Answer any FIVE Questions of the following

5x10 Marks= 50Marks

3. Determine the current through $8\ \Omega$ resistor by using Thevenin's theorem. Also verify it.

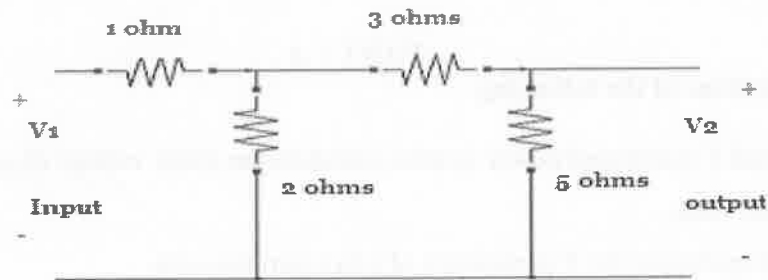


4. State the Millman's theorem and using Millman's theorem find the current through R_L in the circuit shown in following figure

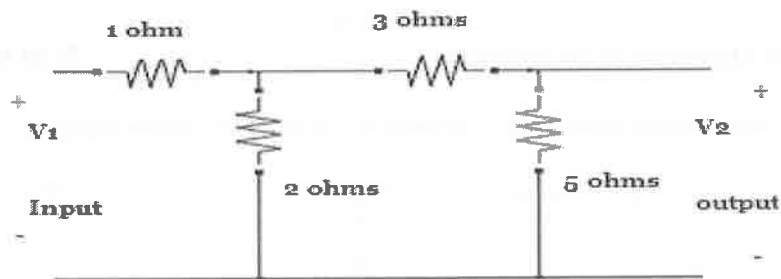


5. An unbalanced four wire star connected load has a balanced voltage of 400V, the loads are $Z_1 = (4+j8)\ \Omega$, $Z_2 = (3+j4)\ \Omega$, $Z_3 = (15+j20)\ \Omega$. Calculate line currents and current in the neutral wire.

4. A star connected alternator (i.e , AC power generator) supplies a delta connected load. The impedance of each branch is $(6+j8)$ ohms, the line voltage is 400V. Obtain the current in phase of the load. Also find the current in each phase of the alternator. What is the power drawn by the load and its power factor?
5. Determine Z and Y-parameters for the following circuit



6. Determine ABCD parameters for the following circuit



7. a) A series RC circuit with $R=20\ \Omega$ and $C=0.1$ farads has a constant voltage source of 10 V applied at time $t=0$. Determine the transient current $i(t)$. Assume zero initial conditions.
- b) Write about Nature of inductor and capacitor during initial conditions and final conditions.
8. Synthesize the network in the two Cauer forms (RL impedance and RC admittance) of the given function

$$Z(s) = \frac{2(s+1)(s+3)}{(s+2)(s+4)}$$

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Gundlapochampally (H), Maisammaguda (V), Medchal (M), Medchal-Malkajgiri (Dist), Hyderabad**I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018**Subject: Data Structures

Branch: CSE

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

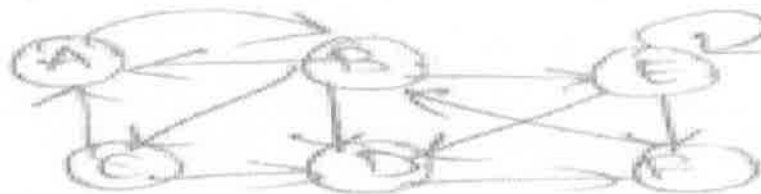
1. Write any four examples for linear data structure.
2. State the different types of linked lists.
3. Define DEQUEUE.
4. Define full Binary Tree and Complete Binary Tree
5. Give any two examples for self-balancing binary search tree.

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 short note on Linear and Binary Recursion.
b) Write a C program to Reverse a list using stack
3. a) Define sparse matrix. Write a program for sparse matrix using array implementation.
b) Write a program to implement circular linked list.
4. a) Explain different operations on single linked list.
b) i) List out any two applications of linked list.
ii) Write the node structure of doubly linked list.
5. 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.
6. Write a C program to implement input restricted deque.
7. a) Write the chain representation of the graph.



- b) Given in-order traversal of a binary tree is E, A, C, K, F, H, D, B, G and pre-order traversal is F, A, E, K, C, D, H, G, B. Construct the binary tree using above traversals.
8. a) Insert the following elements into an empty AVL Tree 20, 15, 5, 10, 12, 17, 25, 19
b) Construct a B-tree of order 3 with the following elements
10, 20, 15, 3, 2, 16, 21, 25, 30, 40.

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I B.TECH II SEMESTER SUPPLEMENTARY EXAMINATIONS, JUNE-2018Subject: Engineering Graphics

Branch: CSE, EEE & ECE

Time: 3 hours

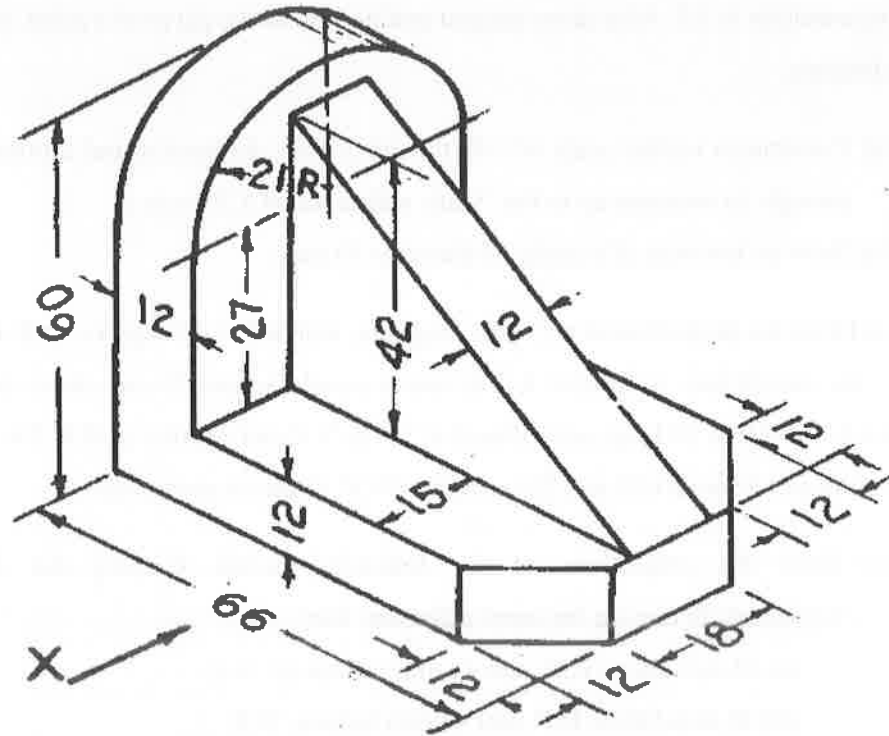
Max. Marks: 60

Answer any FIVE Questions of the following

5x12 Marks= 60Marks

1. Construct hyperbola, when the distance of the focus from the directrix is equal to 50 mm and eccentricity is $\frac{3}{2}$. Also draw tangent and normal to the curve at a point 30mm from the directrix.
2. a) Construct a vernier scale of 1:40 to read metres, decimeters and centimeters and long enough to measure up to 6m. Mark a distance of 5.76m on it.
b) Draw an Involute of a circle of diameter 50 mm.
3. a) Draw the projection of a 75 mm long line, inclined at 30 degrees to V.P., with one of its end 20 mm in front of it. The line is parallel to and 20 mm above the H.P.
b) A line AB is 30 long and inclined at 30° to V.P and parallel to H.P. The end A of the line is 15 above H.P and 20 in front of V.P. Draw its projections.
4. a) Draw the projections of the following points, keeping the distance between the projectors 30 mm on the same reference line:
(i) 50 mm above H.P. and 45 mm in front of V.P.
(ii) 45 mm below H.P. and 45 mm behind V.P.
(iii) On H.P. and 35 mm in front of V.P.
(iv) On H.P. and 25 mm behind V.P.
b) The top view of a 75mm long line measures 55mm. The line is in the VP, its one end being 25mm above the HP, draw its projections.
5. a) A Pentagonal prism, side of base 25mm and axis 50mm long, rests with one of the edges of base on HP. Its axis is inclined 30° to HP. Draw its projection.
b) A hexagonal plane of side 30mm has an edge on HP. Its surface is inclined at 45° to HP. Draw its projection.
6. A semicircular plate of 80mm diameter has its straight edge in the VP and inclined at 45° to the HP. The surface of the plate makes an angle of 30° with the VP. Draw its projections.

7. a) Draw the isometric view of a cone of base diameter 50 mm and axis height 80 mm.
 b) Draw the isometric view of pentagonal pyramid of side of base 40 mm and axis height 75 mm resting on its base on H.P.
8. Draw the following views of the object given below.
 a) Front View b) Top View and c) Side View from the right.



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Branch: CE, MINING & ME

Time: 3 hours

Max. Marks: 60

PART – A

Answer ALL questions of the following

5x2Mark=10 Marks

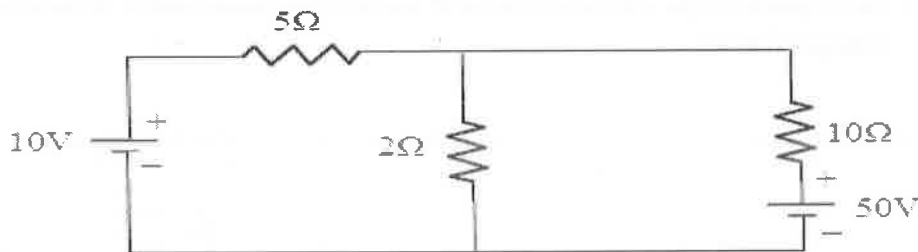
1. State the superposition theorem. Give its application.
2. Define form factor & Peak factor for a sinusoidal waveform.
3. Draw the constructional diagram of core type transformer.
4. Draw the symbol for CC Transistor
5. Draw an AND Gate using NAND Gate.

PART-B

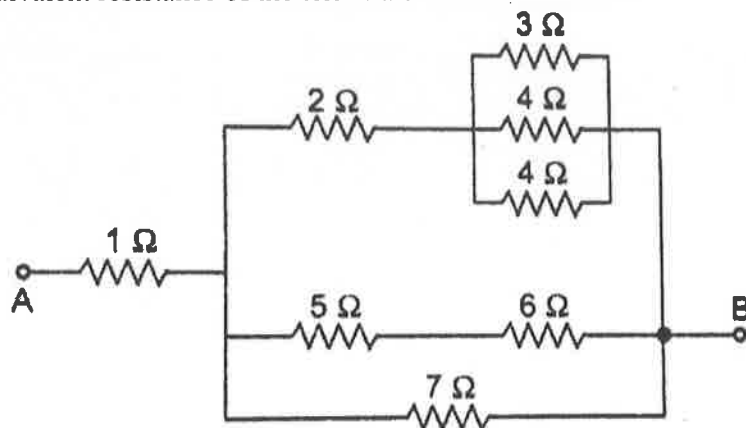
Answer any FIVE Questions of the following

5x10 Marks= 50Marks

1. a) Derive equivalent capacitance in series & parallel.
b) Determine the currents in each branch for the given circuit using mesh analysis.



2. a) Discuss the following
(i) KCL (ii) KVL (iii) Lenz's law (iv) Faraday's 1st law
b) Obtain the equivalent resistance of the terminals between A and B.



3. a) Draw the Phasor diagram representation of R-C Series circuit.
b) Find the expression for the current, and calculate the power, when a voltage represented by $v = 230 \sin 100\pi t$ is applied to a coil of 50Ω resistance and 0.159 H inductance.
4. Define and explain average value, RMS value, form factor and peak factor. Also derive the expression for form factor and peak factor for sinusoidal wave.
5. a) Give the constructional details & Types of Alternator.
b) A $3300/250$ V 50 Hz single phase transformer is built on core having flux of 2wb , $N_1=200$ turns, $N_2 = 100$ turns. Find emf in i) primary ii) Secondary.
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) Define regulation. Explain the EMF method to determine the regulation of an alternator.
b) Draw speed-torque characteristics and explain the speed control of induction motor (stator voltage control).