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 REGULAR END EXAMINATIONS, MAY-2018

Subject: **Engineering Graphics**

Branch: **Common to CE, MINING & CSE (Readmitted Students)**

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

Answer ALL questions of the following   **5x12Mark=60 Marks**

1. A thin circular disc of 50 mm diameter is allowed to roll without slipping on a horizontal plank. Draw the curve traced by any point on the circumference of the disc. Draw a normal and tangent at any point on the curve.

OR

2. a) Construct a diagonal scale to read up to 1/100 of kilometers having given the value of R.F. = 1/50,000 and to measure up to 8 kilometers. Indicate on the scale, a distance of 6.76 kilometers.

   b) The ordinate of a point P on the curve is 50 mm and is at a distance of 25 mm from the vertex. Draw the parabola.

3. The front view of a 125mm long line PQ measures 75mm and its top view measures 100mm its end Q and the midpoint M are in the first quadrant being 20mm from both the planes, draw the projections of the line PQ.

OR

4. A line AB, 80 mm long has its end A 10 mm below HP and 15 mm behind VP. If the line is inclined at 40^0 to HP and the top view makes 50^0 with VP. Draw the projections, if the line is in third quadrant.

5. 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.

OR

6. A square prism, having a base with a 40 mm side and a 60 mm axis, is resting on its base on the HP with a side perpendicular to the VP. It is cut by an Auxiliary vertical plane making 30^0 to the VP and contains the axis of the prism. Draw its top view and sectional front view.

7. A right regular hexagonal prism of base edge 20 mm and height 50 mm rests on its base with one of its base edges perpendicular to VP. A section plane inclined 45^0 to HP cuts its axis at its middle. Draw the complete development of the truncated prism including the sectioned surface.

OR

8. A solid is in the form of a cylinder of base diameter 50 mm up to a height of 60 mm and thereafter tapers into a frustum of a cone of top diameter 30 mm. The total height of the solid is 90 mm. Draw the isometric projection of the solid.

9. Describe any six commands in the **modify** toolbar of AUTOCAD software along with their syntax.

OR

10. Draw the orthographic projections of the object whose isometric view is shown below.
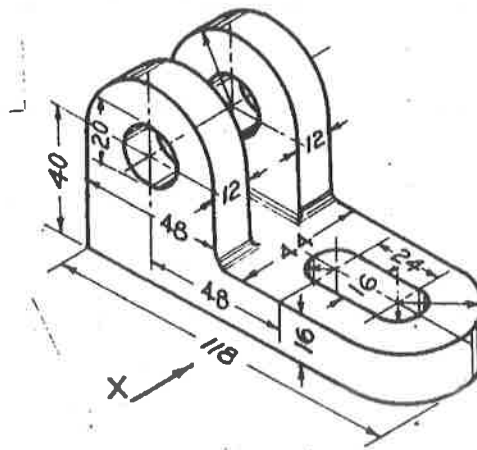
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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Basic Electrical and Electronics Engineering**

Branch: **Common to EEE, ECE, CSE, IT & CE (Readmitted Students)**

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 60

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

1. Draw the representation of Voltage dependent Voltage Source and Current dependent Current Source.
2. Define permiability
3. Draw impedance triangle for RL series Circuit.
4. Write any two applications of diode?
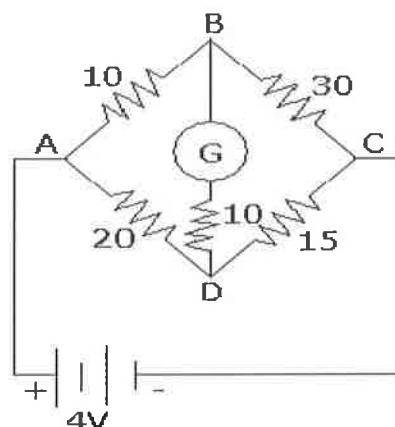5. What are the advantages of full wave rectification?

PART-B
Answer ALL questions of the following　　　　　　　　　**5x10 Marks= 50Marks**

1. Determine V1 using nodal analysis.
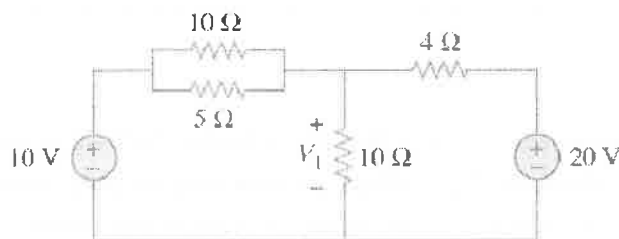
OR

2. Determine the current in all the bridge arms of the circuit as shown in fig. Find the value of the current through the galvanometer and its direction (Galvanometer and all resistances are in ohms).

3. a) Explain concept of self and mutual inductance
    b) Explain series magnetic circuit

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) Explain steady state analysis of pure capacitance with sinusoidal excitation
    b) A 318μF capacitance is connectd across 230V 50hz supply. Determine
        i) Capacitive reactance   ii) RMS value of currant

OR

6. A) Define Average value, RMS value, Maximum value, Form factor and Peak factor.
    b) Find the Average value, RMS value for sinusoidal voltage

7. a) Explain temperature dependence of VI characteristics of PN junction diode
    b) A silicon diode has saturation current of 7.5 μA at room temperature 300^oK. calculate saturation current at 400^oK.

OR

8. Explain zener diode operation and its characteristics with neat sketches.

9. A sinusoidal voltage whose Vm=24V is applied to half wave rectifier. The diode may be considered to be ideal and R_L=1.8KΩ is connected as load. Find out peak value of current, RMS value of current, DC value of current and ripple factor.

OR

10. a)Explain principle of operation and characteristics of LED and LCD diode
    b) compare LED and LCD

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: Engineering Graphics

Branch: ME

Time: 3 hours   Max. Marks: 60

PART – A

Answer ALL questions of the following   **5x12Mark=60 Marks**

1. A circle having a 50 mm diameter rolls within a circle with a 150 mm diameter with internal contact. Draw the locus of a point lying on the circumference of the rolling circle for its complete turn. Name the curve. Also draw a tangent and a normal to the curve, at a point that is 40 mm from the centre of the bigger circle.

OR

2. Draw a straight line AB of any length. Make a point F, 80 mm from AB. Trace the paths of a point P moving in such a way that the ratio of its distance from the point F, to its distance from AB is 3:2. Plot at least 10 points. Name each curve. Draw a normal and a tangent to each curve at a point on it 45mm from F.

3. Regular pentagon of 25mm side has one side on the ground its plane is inclined at 45° to the H.P. and perpendicular to the V.P. draw its projections.

OR

4. 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.

5. A hexagonal prism of base 30mm and axis 60mm rests on its base on HP with its axis perpendicular to HP and one of the base edge parallel to VP. The solid is cut by a plane which is perpendicular to VP, inclined at 40° to HP and bisecting the axis of the prism. Draw the front view, sectional top view and true shape of the section.

OR

6. A cube of side 30 mm rests on the H.P on its end with the vertical faces equally incline to the V.P. It is cut by a plane perpendicular to the V.P. and inclined at 30° to the H.P. meeting the axis at 25 mm above the base. Draw its front view, sectional top view and true shape of the section.

7. 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.

OR

8. Draw the isometric view of a hexagonal prism, with side of base 25mm and axis 60mm long. The prism is resting on its base on H.P with an edge of the base parallel to VP.

9. Draw the orthographic views of the following figure
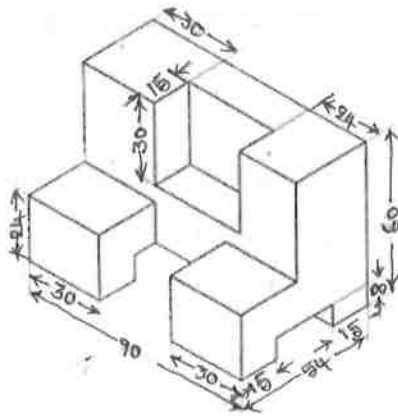
OR

10. Explain the following drawing entities with figures (i) Line (ii) Polygon (iii) Arc (iv) Ellipse and (v) Circle

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Engineering Mechanics**

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

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

PART-A

Answer ALL Questions of the following   5x2M=10M

1. Define the terms Coplanar system of forces, Collinear forces, Coplanar concurrent forces

2. Distinguish static and dynamic friction

3. Explain the term radius of gyration
4. What you mean by uniform rectilinear motion and uniformly accelerated rectilinear motion?

5. Define Work done by a spring

PART-B

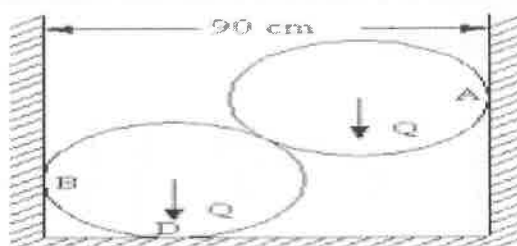**Answer ALL Questions of the following**   5x10M=50M

1. Find the tension in the each cable in the following figure
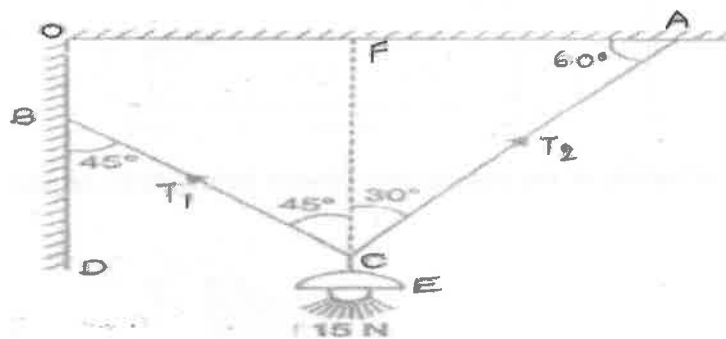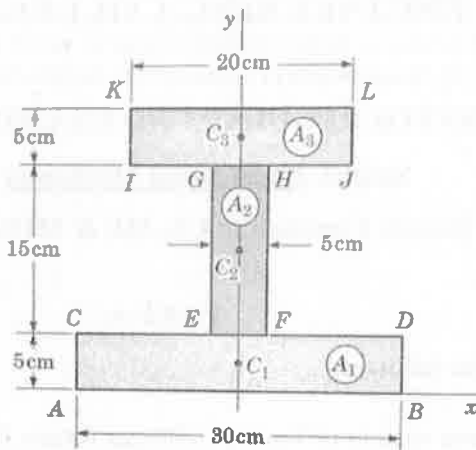

OR

2. Two spheres, of each of weight 1000 N and radius of 25 cm rest in horizontal channel of width 90 cm as shown in fig   Find the reactions on the points of contact A, B and D
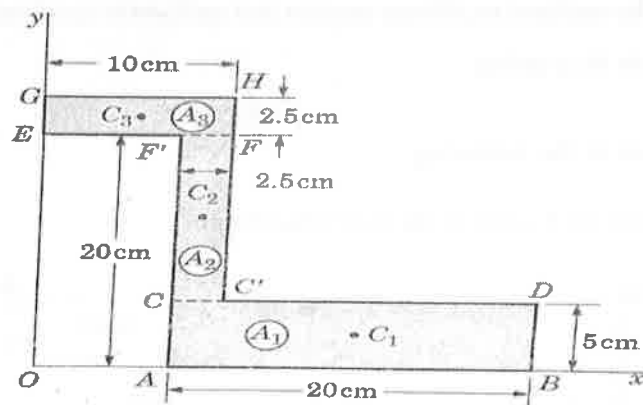
3. Determine the centroid of the cross-sectional area of an unequal I-section shown below.
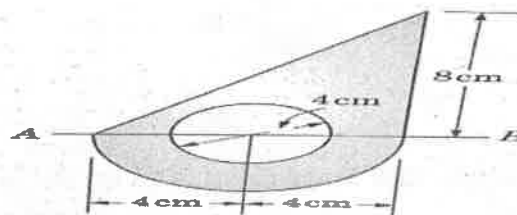

OR

4. Find the centroid of the cross-sectional area of a Z-section as shown below.
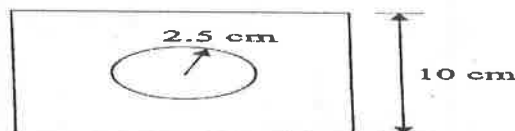

5. Find the moment of inertia of the shaded area (shown below) with respect to the centroidal axis parallel to AB.

OR

6. Determine the moment of inertia of a square of 10 cm side from which a circle with a diameter of 5 cm has been removed from its center.

7. 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.

OR

8. A block of mass $m_2 = 8$ kg resting on a rough horizontal plane is pulled by an inextensible string, whose other end is attached to a block of mass $m_1 = 5$ kg and passing over a rough surface as shown in figure 5. Determine the acceleration of the system and the tension in each portion of the string. The coefficient of friction at all contact surfaces is 0.2.
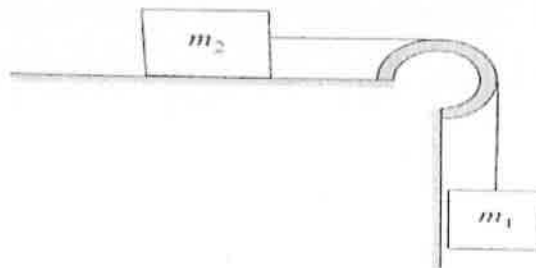

Figure 5

9. a) Write short notes on spring constant.

   b) Derive an expression for the period of a simple pendulum.

OR

10. A block of mass 5 kg resting on a 30° inclined plane is released. The block after travelling a distance of 0.5m along inclined plane hits a spring of stiffness 15N/cm. Find the maximum compression of spring. Assume coefficient of friction between block and the inclined plane is 0.2.

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Code No.: **70B10**

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Applied Chemistry**

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

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

PART-A

Answer ALL Questions of the following   **5x2M=10M**

1. What is Reverse Osmosis?
2. How do anodic and cathodic area affect rate of corrosion?
3. Differentiate vulcanized rubber with non vulcanized rubber.
4. Define combustion
5. What are nano materials?

PART-B

Answer ALL Questions of the following   **5x10M=50M**

1. a) What is desalination? What are the various methods available for desalination? Discuss reverse osmosis process in detail.
   b) Write short note on priming and foaming.

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 mlof the same EDTA after boiling. Calculate the degree of total hardness, permanent hardness and temporary hardness.

3. a) Explain the construction & working of calomel electrode.
   b) Write the differences between primary and secondary cells.

OR

4 a) What is Ion Selective Electrode?   Give the construction and working of glass   electrode.
   b) how the PH of solution is determined by using glass electrode.

5. a) differentiate Addition & Condensation polymerization with examples.
   b)Explain free radial polymerization mechanism of addition polymer.

OR

6. a) What are bio-degradable polymers? Give two examples. What is their importance?
   b) what is latex? How natural rubber is . . isolated?

7. a) what is natural gas. Give characteristics & applications of natural gas.
   b) Define fuel. How are fuels classified?

OR

8. Define Calorific Value? How to determine the calorific value of gaseous fuel by Junker's calorimeter?

9. a) Explain ultrasonic and microwave assisted reactions with suitable examples.
   b) Discuss the concept of R_4M_4 with special reference to Ecnoburette and survismeter.

OR

10. Write a short note on i) Bio-fuels ii) Bio-sensors iii) Bio-Surfactants.

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Computational Mathematics**

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

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

PART-A

Answer ALL questions of the following   **5 x 2 M=10 M**

1. Find the first approximation of a real root of the equation $x\log_{10} x = 1.2$ by using Newton- Raphson method

2. Define interpolation and extrapolation

3. Write the normal equations to fit a curve of the form $y = ax^b$ from the given data points (x_i, y_i)

4. Write the formula for finding the Picard's method of successive approximate solution of the initial value problem $\dfrac{dy}{dx} = f(x, y); y(x_o) = y_o$

5. Determine whether the following equation is elliptic or hyperbolic?

$$(x+1)u_{xx} - 2(x+2)u_{xy} + (x+3)u_{yy} = 0$$

PART-B

Answer   ALL questions of the following   **5 x 10 M=50 M**

1. (a) Using RumanjanMethod, find a real root $x^3+x=1$

   (b) Solve the system of equations 8x-3y+2z = 20; 4x+11y-z = 33; 6x+3y+12z = 36 by using Gauss –Seidal iterative method (Give the solution correct to 3 decimal places)

OR

2. a) Find a real root of the equation $xe^x - \cos x = 0$ using Newton Raphson method correct to four decimal places.

   b) Solve the equations 5x – y + 3z = 10 , 3x + 6y =18 , x + y + 5z = -10 by   Jacobi's method with (3, 0, -2) as the initial approximation to the solution.

3. (a) Prove that $\Delta + \nabla = \dfrac{\Delta}{\nabla} - \dfrac{\nabla}{\Delta}$

   (b) From the following table of values of x and f(x) determine f(0.29)

x	0.20	0.22	0.24	0.26	0.28	0.30
f(x)	1.6596	1.6698	1.6804	1.6912	1.7024	1.7139

OR

4. (a) For the data using the Lagrange's Interpolation polynomial f(1.5) is

x	1	2	3
y	0	1	2

   (b) Find the value of tan16° from the following table:

Θ:	0°	5°	10°	15°	20°	25°	30°
Tan Θ	0	0.0875	0.1763	0.2679	0.3640	0.4663	0.5774

5. (a) Evaluate $\int_0^6 \dfrac{dx}{(1+x^2)}$ by using (i) Trapezoidal rule(ii) Simpson's one –third rule(iii) Simpson's 3/8 rule by dividing the interval [0,6] in to K subintervals . Take the value K such that all these three methods can be applied with such division. The approximate definite integral value obtained by which method is nearer to the actual value?

(b) Derive the normal equations to fit a line by the method of least squares for the n data points.

OR

6. (a) Find the first two derivatives at x=1.4 from the following data

X	1.0	1.2	1.4	1.6	1.8	2.0
Y	0	0.128	0.544	1.296	2.432	4.0

(b) Evaluate $\int_0^1 \dfrac{1}{1+x}dx$ using Simpson's 3/8 rule by taking 10 points in the interval [0, 1]. What is the error?

7. (a) Use Runge-Kutta method to find the value of y at x= 0.2 .Given that $\dfrac{dy}{dx}=x+y$; $y(0)=1$.

(b) Solve $\dfrac{dy}{dx}=(x^2-y), y(0)=2$, Find y at x=0.1 and x= 0.2 using modified Euler's method

OR

8. a) Use Taylor's Series method to solve the differential $\dfrac{dy}{dx}=x^2+y, y(4)=4$ and compute $y(4.2)$ and $y(4.4)$

b) Given that $\dfrac{dy}{dx}=3x^2+y, y(0)=4$ compute $y(0.25)$ and $y(0.5)$ using Euler's method.

9. Solve the elliptic equation $\dfrac{\partial^2 u}{\partial x^2}+\dfrac{\partial^2 u}{\partial y^2}=0$ for the square mesh given below in which boundary values are shown.
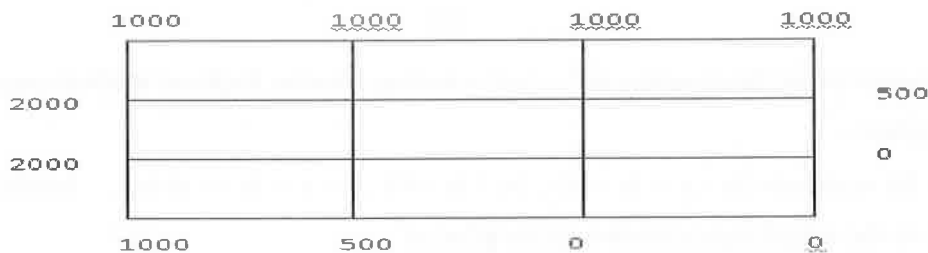
OR

10. Use Gauss Seidel's method to solve $u_{xx}+u_{yy}=0$, for the following mesh

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Data Structures**
Branch: **Common to EEE, ECE, CSE & IT**
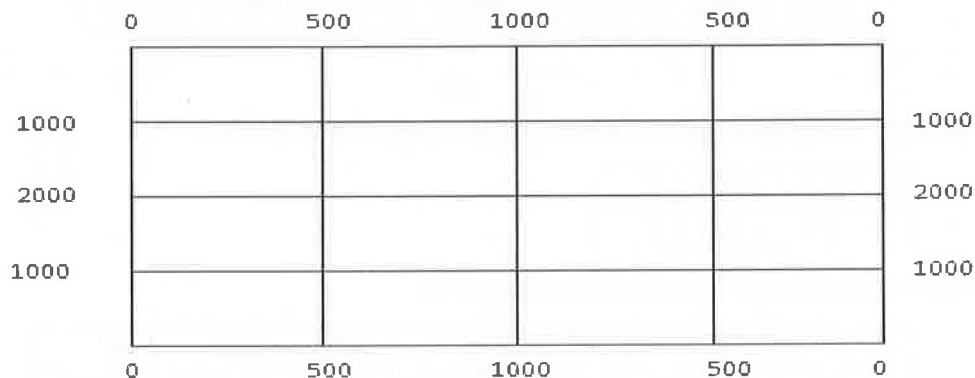
Time: 3 hours

Max. Marks: 60

PART-A

Answer ALL questions of the following

5 x 2 M=10 M

1. What are the different types of recursion?
2. What is Linked List? Give an example.
3. What are the applications of stack?
4. Define full binary tree.
5. Define binary search tree with an example.

PART-B

Answer ALL questions of the following

5 x 10 M=50 M

1. a) Differentiate best case and worst case time complexity.
   b) How array is differ from linked list?

OR

2. Write c program to implement towers of Hanoi?

3. a) Write an algorithm to traverse a singly linked list
   b) Write an algorithm to search an element in a linked list.

OR

4. a) How to represent single linked list? Discuss.
   b) Explain the steps to insert an element in the beginning of a circular linked list.

5. a) Discuss about the stack with examples
   b) Write a C program to implement stack operations using an array.

OR

6. a) How to represent Queues? Discuss.
   b) Write an algorithm for infix to postfix conversion.

7. a) Write an algorithm for the creation of binary tree using pre-order traversal and In-order traversal.
   b) Write a procedure for non recursive inorder traversal of a binary tree

OR

8. a) Write a short note on Threaded Binary trees.
   b) What is a graph? Explain various representations of graphs.

9. Construct a binary search tree with the following values
   45, 29, 35, 50, 25, 63, 15, 59, 10, 7, 57, 60

OR

10. a) Construct a binary search tree for the following 80, 40, 75, 30, 20, 90, 50
    b) Explain the procedure for B-tree insertion operations.

Code No.: 70H01

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **English**

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

Time: 3 hours

Max. Marks: 60

PART-A

Answer ALL questions of the following

5 x 2 M=10 M

1. a) Few students in the class are _____ (regular) (write appropriate **prefix** to form the antonym of the word given)
    b) The _____(maintain) in this office is taken care by Mr.Rajesh.   (write appropriate **suffix** to form the noun form of the word)

2. a) Please **wait** for the doctor here. (Write 'Homophone' of the word in bold)
    b) Who wrote the letter? (Change to 'Passive Voice')

3. a) Rs. 20,000 a month ------- (be) a good salary for a beginner. (Fill with appropriate verb form)
    b) Give meaning to the following idiom and use in your own sentence: *Achilles'heel*

4. a) Write one word substitute to the following and make sentence :
       One who is all powerful
    b) She dances well, isn't it? (Correct the sentence)

5. a) He said, "I will be late". (change into indirect speech)
    b) He said, "These buildings will be demolished next year." (Change into Indirect Speech)

PART-B

Answer ALL questions of the following

5 x 10 M=50 M

1. Why does the poet prefer non conventional thinking? What difference does it make?
                                OR
2. What are the differences between the skills such as skimming and scanning as far as Reading is concerned.

3. a) What is life like for the children according to Sarojini Naidu?
    b) Develop a paragraph on "Teen drug usage".
                                OR
4. How does a knowledge society impact the various sectors?

5. What values does the father teach his son in the poem *If?*
                                OR
6. Sketch the character of Subbiah in "Half a Rupee Worth".

7. Write a letter to your friend describing the Technical Fest organized in your college.
                                OR
8. Write a Letter to the editor of the news paper about the "Swaccha Bharath".

9. Do you think the title of the poem Human Family is apt? Write your views.
                                OR
10. What are Barnum's suggestions for practising economy? How can one achieve pecuniary independence? Elucidate.

Code No.: **70B09**

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-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   5x2M=10M

1. Write the expression and value of Bohr magneton?
2. The dielectric constant of mica is 5, then what is the value of its susceptibility?
3. Define Acceptance angle and Numerical aperture of an optical fiber.
4. What are the various methods of producing ultrasonic waves?
5. What is staining defect in NDT?

PART-B

Answer ALL Questions of the following   5x10M=50M

Q1. a) Distinguish between type I and Type II superconductors?   [5 M]
        b) Explain SQUIDS?   [5 M]

OR

Q2. (a) Define magnetic moment. Explain the origin of magnetic moment at atomic level.   [6M]
        (b) Discuss the properties of ferri magnetic materials.   [4M]

Q3. a) A solid elemental dielectric with a density 3×10^{28} atoms/m^3 shows an electronic polarization of 10^{-40} farad.m^2 . Assuming that the internal field to Lorenz field, calculate the dielectric constant.($\varepsilon_0 = 8.854 \times 10^{-12}$ F/m)   [4M]
        b) Define electric susceptibility and displacement vector   [6M]

OR

Q4. (a) Write a brief notes on piezo electricity and ferro electricity.   [6M]
        (b) Give some applications of ferro electric materials.   [4M]

Q5. a) Distinguish between step index and graded index optical fibers.   [5 M]
        b) Write a short note on optical fiber materials.   [5 M]

OR

Q6. a). Explain the spontaneous emission of radiation.   [3M]
        b). Explain the working of He-Ne gas laser with necessary theory and energy level diagram. [7M]

Q7. a) Explain production of ultrasonics by Magnetostriction method   [5M]
        b) Detection of ultrasonics by sensitive flame and Kundt's method   [5 M]

OR

Q8. (a) Explain Piezo electric method to produce ultrasonic waves.   [8M]
        (b) Give two industrial applications of ultrasonic waves.   [2M]

Q9. a) Mention different types of defects and explain them.   [5 M]
        b) What is a non-destructive testing (NDT) and mention different methods.   [5 M]

OR

Q10. a) Write a short note on visual inspection method   [5M]
         b) Explain X-ray radiography.   [5M]

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Code No.: **70B08**

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I B.TECH II SEMESTER REGULAR END EXAMINATIONS, MAY-2018

Subject: **Applied Physics**

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

Time: 3 hours   Max. Marks: 60

PART-A

Answer ALL Questions of the following   **5x2M=10M**

1. State Gauss law in magnetostatics and write any two applications of Gauss law?
2. Write any two applications of $BaTiO_3$?
3. Mention the relation among the Einstein coefficients
4. Plot the graph of effective mass (m^*) of an electron with wave vector (k)?
5. Define Fermi energy level, conduction band and valance band

PART-B

Answer ALL Questions of the following   **5x10M=50M**

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) Mention different types of vector fields.   [3 M]

   b) Discuss the modification of the Ampere's law in terms of displacement current   [7 M]

3. a) Derive Clausius-Mosotti equation which relates microscopic to macroscopic parameters for non-polar molecules   [4 M]

   b) Write a short note on structure of Barium Titanate   [3 M]

   c) A parallel plate capacitor with dimension of 38 mm by 65 mm and a plate separation of 1.3 mm must have a minimum capacitance of 70 pF when an ac potential of 1000V is applied at a frequency of 1 MHz. Calculate ε_r.   [3 M]

OR

4. **a)** Derive the relation between dielectric constant and susceptibility.   (5)

   b) A parallel plate condenser has capacitance of $2\mu F$. The dielectric has permittivity $\varepsilon_r = 100$ for an applied voltage of 1000V. Find the energy stored in the condenser as well as the energy stored in polarizing the dielectric.   (5)

5. a) Define acceptance angle. [2 M]

   b) Discuss about light propagation in Step index and Graded index optical fibers. [5 M]

   c) Calculate the angle of acceptance of a given optical fiber, if the refractive indices of the core and cladding are 1.563 and 1.498, respectively. [3 M]

<div align="center">OR</div>

6. a) Explain three level and Four level pumping schemes [5 M]

   b) Distinguish Step index and graded index optical fibres [5 M]

7. **a)** Explain the behavior of electron in periodic potential [8M]

   b) Distinguish solids based on band theory. [2 M]

<div align="center">OR</div>

8. a) Write a note on classical free electron theory? [4 M]

   b) Define the terms: i) Drift velocity   ii) Mean free path   iii) Relaxation time. [6 M]

9. a) Define direct and indirect band gap semiconductors [2 M]

   b) Define Hall Effect. Derive an expression for Hall voltage, Hall coefficient and carrier concentration and give relation between them. Mention some important applications of Hall Effect. [8 M]

<div align="center">OR</div>

10. **a)** Differentiate drift and diffusion currents [5 M]

    b) Mobilities of electrons and holes in a sample intrinsic Ge at 300K are 0.36 m^2/VS and 0.17 m^2/VS respectively. If the resistivity of the specimen is 2.12ohm-m. Compute the forbidden energy gap. [5 M]