H.T No: | | | | | | | | | | | **R22** **Course Code: A400001**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: MATRICES & CALCULUS

(Common for all Branches)

Date: 20.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. State Rank of a matrix. 1 M
2. Define consistence of a matrix. 1 M
3. State Cayley-Hamilton theorem. 1 M
4. Write briefly about Orthogonal transformation. 1 M
5. The value of Rolle 's mean value theorem for $f(x) = \frac{sinx}{e^x}$ in $(0,\pi)$. 1 M
6. The value of c of Cauchy's mean value theorem for the function $f(x) = \sqrt{x}\ and\ g(x) = \frac{1}{\sqrt{x}}$ in [a,b] is. 1 M
7. If $u = \log(x^2 + y^2)$, then $\frac{\partial u}{\partial x} =$ 1 M
8. If $u = \frac{y}{x}, v = xy, then\ J\left(\frac{u,v}{x,y}\right) =$ 1 M
9. Solve $\int_0^1 \int_1^2 xy\ dx\ dy =$ 1 M
10. Solve $\int_0^1 \int_0^2 \int_0^3 xyz\ dz\ dy\ dx =$ 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Find the rank of the matrix by reducing it to normal form $\begin{bmatrix} 1 & 7 & 8 & 1 \\ 1 & 3 & 4 & 2 \\ 3 & 5 & 6 & 10 \\ -1 & 1 & -2 & 2 \end{bmatrix}$. 10M

OR

11. B). Solve the equations $x + y + z - w = 2, 7x + y + 3z + w = 12, 8x - y + z - 3w = 5, 10x + 5y - 3z + 2w = 20$ by Gauss-Elimination method. 10M

12. A). i) Prove that for any real symmetric matrix Eigen vectors corresponding to two distinct eigen values are orthogonal. 5M

ii) Test for consistency and solve $2x + 3y + 4z = 0, 3x + 4y + 2z = 0, 4x + 2y + 3z = 0$ 5M

OR

12. B). Verify Cayley -Hamilton theorem for the matrix A=$\begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 2 & -1 & 1 \end{bmatrix}$ also find A^{-1} and A^4. 10M

(P.T.O..)

13. A). i) State Geometrical interpretation of Lagarange's mean value theorem. 5M

ii) Obtain the Taylor's series expansion of $cosx\ about\ x = \pi/4$. 5M

OR

13. B). i) Prove that $\Gamma(1/2) = \sqrt{\pi}$. 5M

ii) Evaluate $\int_0^1 \frac{dx}{\sqrt{1-x^4}}$. 5M

14. A). Verify Euler's theorem for $xy + yz + zx$. 10M

OR

14. B). Investigate the maxima and minima, if any, of the function $f(x) = x^3y^2(1 - x - y)$. 10M

15. A). Change the order of integration and evaluate $\int_0^{4a} \int_{x^2/4a}^{2\sqrt{ax}} dy\ dx$. 10M

OR

15. B). Evaluate $\int\int\int xyz\ dx\ dy\ dz$ over the positive octant of the sphere $x^2 + y^2 + z^2 = a^2$ 10M

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H.T No: | | | | | | | | | | | R22 | Course Code: A400008

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: APPLIED PHYSICS

(Common for CE, ME, CSC, CSM, CSD & AIM)

Date: 23.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. State Heisenberg's Uncertainty principle. 1 M
2. Define effective mass of an electron. 1 M
3. What are intrinsic semiconductors? 1 M
4. Distinguish direct and indirect band gap semiconductors. 1 M
5. List any two characteristics of laser beam. 1 M
6. What is working principle of optical fibers? 1 M
7. What do you mean by piezo-electricity? 1 M
8. What are multiferroics? 1 M
9. Write an example for solid electrolyte. 1 M
10. Define quantum confinement. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Describe Davisson-Germer's experiment to verify the existence of matter waves with neat diagrams. 10M

OR

11. B). Using Kronig-Penney model show that the energy spectrum of an electron contains a number of allowed energy bands separated by forbidden gaps. 10M

12. A). Describe construction, operation and V-I characteristics of Zener diode with relevant diagrams. 10M

OR

12. B). Describe construction, operation and V-I characteristics of solar cell with relevant diagrams. 10M

13. A). Describe construction and working of Ruby laser with suitable diagrams. 10M

OR

13. B). i) Derive an expression for acceptance angle and numerical aperture of an optical fiber. 6M

ii) Calculate acceptance angle of an optical fiber in air, if refractive indices of core and cladding are 1.592 and 1.496 respectively. 4M

(P.T.O..)

14. A). i) State and derive an expression for local filed in dielectrics. 7M

ii) Deduce Claussius-Mossotti equation in dielectrics. 3M

OR

14. B). What is hysteresis of a magnetic material? Hence, describe soft and hard magnetic materials with examples. 10M

15. A). Explain construction and operation of a rechargeable ion battery with a schematic diagram. 10M

OR

15. B). i) Explain preparation of nanomaterials by ball milling method. 3M

ii) Explain preparation of nanomaterials by sol-gel process. 5M

iii) Outline any four applications of nanomaterials. 2M

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H.T No: | | | | | | | | | | | R22 | Course Code: A400009

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: ENGINEERING CHEMISTRY

(Common for EEE, ECE, CSE & IT)

Date: 23.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. What is a battery and write its classification? 1 M
2. Write any two applications of Solar cells. 1 M
3. What are the monomers involved in the preparation of Thiokol Rubber? 1 M
4. Define conducting polymers. 1 M
5. What is the significance of Octane number? 1 M
6. What are the advantages of biodiesel? 1 M
7. Compare Calgon conditioning and Phosphate conditioning. 1 M
8. What are the specification of potable water? 1 M
9. What are the advantages of glasses technology? 1 M
10. Write any two engineering applications of smart materials. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Describe the construction of lead-acid battery with reactions occurring during discharge and recharge. 10M

OR

11. B). Explain the electrochemical theory of wet corrosion, give its mechanism. 10M

12. A). Analyze the doping mechanism of conduction in poly acetylene (p-doping & n-doping). 10M

OR

12. B). Discuss the preparation, properties and applications of Bakelite and Buna-S. 10M

13. A). Describe the manufacture of gasoline by Fisher-Tropsch's method. 10M

OR

13. B). What is meant by cracking of petroleum? Explain moving bed catalytic method of obtaining gasoline. Give its mechanism. 10M

(P.T.O..)

14. A). Calculate the amount of Lime-Soda required for softening 10,000 liters of water containing the following salts per liter $Ca(HCO_3)_2$= 162 mg, $CaSO_4$=136 mg, $MgCl_2$=95 mg & Na Cl =56.1 mg. Purity of Lime is 93% & Soda is 99% . 10M

OR

14. B). What are ion-exchange resins? Discuss their application in water softening. How are spent resins regenerated? 10M

15. A). Define lubricant. Explain the mechanism of thick film lubrication? Give brief account on properties of lubricant. 10M

OR

15. B). Explain the process of Portland cement with neat diagram. 10M

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H.T No: | | | | | | | | | | | R22 | Course Code: A403201

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: ENGINEERING MECHANICS

(Common for CIVIL & MECH)

Date: 25.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

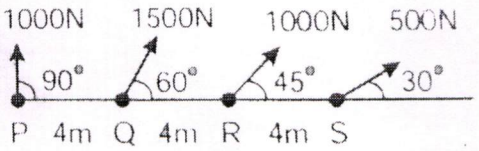
Each question carries ONE mark. **10x1=10M**

1. Define Lami's theorem. 1 M
2. State the necessary and sufficient conditions for equilibrium of rigid bodies in two dimensions. 1 M
3. Define the term angle of friction. 1 M
4. State the laws of dry friction. 1 M
5. State and pappus theorem II. 1 M
6. Write an expression for a centroid of a triangle having base "b" and height "h". 1 M
7. What is parallel axis theorem? 1 M
8. What is the moment of inertia of a sphere? 1 M
9. What is work-energy principle for rotation bodies? 1 M
10. Explain D'Alembert's principle in plane motion. 1 M

PART-B

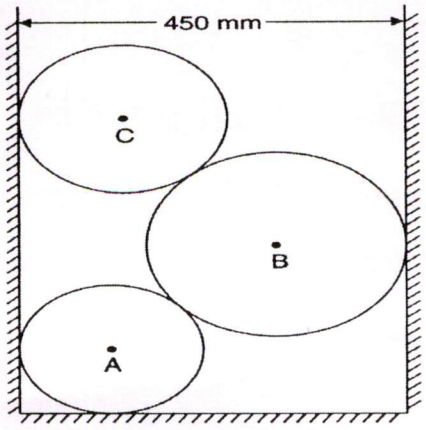
Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Find the magnitude and direction of the resultant force. Also find the position of the resultant force from point P of the bar PS 10M



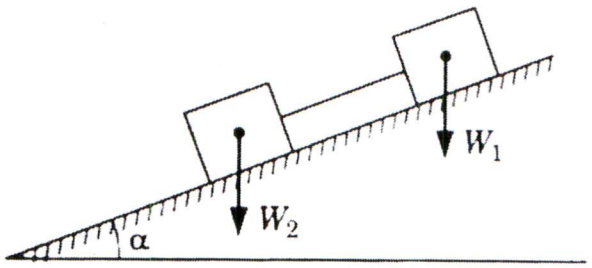
OR

11. B). Three cylinders are placed in a rectangular ditch as shown in figure. Neglecting friction, determine the reaction between cylinder A and the vertical wall. Weights of cylinders A, B, C are 75 N, 200 N 100N and Radius is 100 mm, 150 mm, 125 mm respectively. 10M



(P.T.O..)

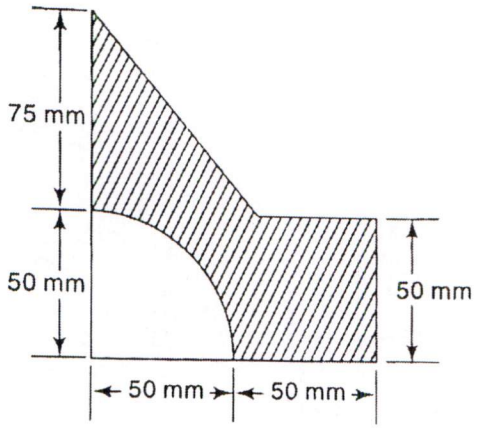
12. A). Two block of weight W1 = 50 N and W2 = 50 N are resting on a rough inclined plane as shown in the figure. If $\mu = 0.3$ for W1 and plane and $\mu = 0.2$ for W2 and plane, find the inclination of the plane for which slipping will impend. 10M



OR

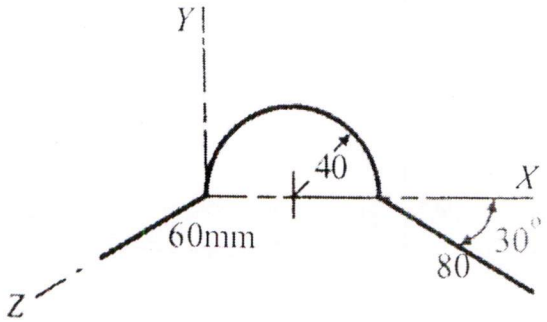
12. B). What is a screw jack? Explain the principle of operation of a screw jack with a neat sketch. 10M

13. A). With respect to the coordinate axes x and y, locate the centroid of the shaded area shown in the figure 10M



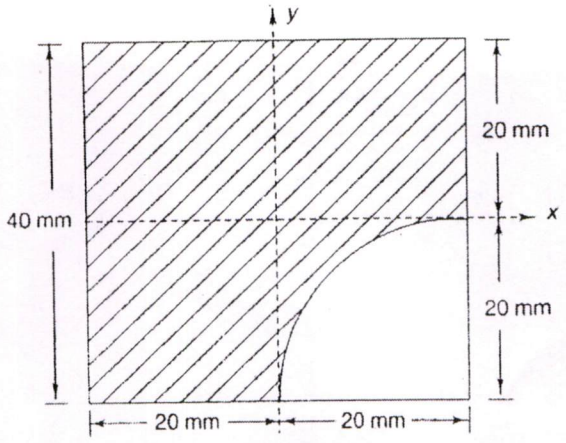
OR

13. B). A uniform wire is bent into the shape as shown in the figure. The straight segments lie in the X-Z plane and the line of 80 mm length makes an angle of 300 with the X-axis. The semi-circular segment is in the X-Y plane. Locate the centroid of the wire. 10M



(P.T.O..)

14. A). A corner of radius 20 mm is cut off from a square plate of 40 mm side as shown in the figure. Find the moment of inertia of the remaining plate about its axes of symmetry. 10M

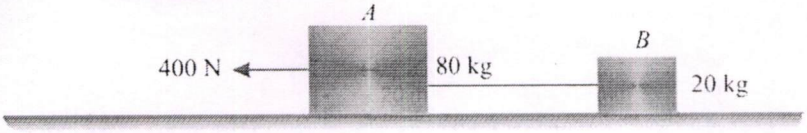


Square plate

OR

14. B). A brass cone with base diameter of 400 mm and height of 225 mm is placed on a vertical aluminum cylinder of height 300 mm and diameter 400 mm. Density of brass = 85kN/m3 and density of aluminium =25.6kN/m3. Determine the mass moment of inertia of the composite body about the vertical geometrical axis. 10M

15. A). Two bodies A and B of mass 80 kg and 20 kg are connected by a thread and move along a rough horizontal plane under the action of a force 400 N applied to the first body of mass 80 kg as shown in Figure. The coefficient of friction between the sliding surfaces of the bodies and the plane is 0.3. Determine the acceleration of the two bodies and the tension in the thread, using work energy method. 10M



OR

15. B). A block of weight 2500N rests on a level horizontal plane for which coefficient of friction is 0.2. This block is pulled by a force of 1000N acting at an angle 30^0 to the horizontal. Find the velocity of the block after it moves 30m starting from rest. If the force of 1000N is then removed, how much further will it move? Use work energy method. 10M

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H.T No: | | | | | | | | | | | R22 | Course Code: A405202

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: C PROGRAMMING & DATA STRUCTURES

(Common for EEE & ECE)

Date: 25.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. Name any five features of C programming Language. 1 M
2. Write any two bitwise operators with examples. 1 M
3. Write syntax of ternary operator (Conditional Operator). 1 M
4. In what way array is different from an ordinary variable? 1 M
5. Write about call by reference. 1 M
6. What are recursive functions? 1 M
7. What are the Applications of Data Structures? 1 M
8. What are the types of linked lists? 1 M
9. What are the various factors to be considered in deciding a sorting algorithm? 1 M
10. Explain about searching. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Explain the working of Binary Operators with example. 10M

OR

11. B). What is the importance of precedence and associativity in evaluating an expression? 10M

12. A). Discuss about arrays. And write a program to find sum of array elements. 10M

OR

12. B). Write a program to display transpose of a given matrix. 10M

13. A). How to pass an array to a function? Explain. 10M

OR

13. B). Write a C program to find factorial of a given number using pointers. 10M

14. A). How is the stack implemented by linked list? 10M

OR

14. B). What are the operations of a queue? explain them with a program? 10M

15. A). Write a C program to sort the elements using bubble sort. 10M

OR

15. B). Write a C program to perform searching operations using linear and binary search. 10M

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H.T No: | | | | | | | | | | | **R22** **Course Code: A405201**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: PROGRAMMING FOR PROBLEM SOLVING

(Common for CSE, IT, CSC, CSM, CSD & AIM)

Date: 25.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. Solve x>>2 and y<<1 when x=10 and y=12 — 1 M
2. Define flowchart. — 1 M
3. What is ternary operator with syntax? — 1 M
4. How do we initialize 2-D array? — 1 M
5. Define function. — 1 M
6. What is a string? — 1 M
7. Define pointer. — 1 M
8. What are command line arguments? — 1 M
9. Define file. — 1 M
10. What are the different types of Searching Techniques? — 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). i) Explain the Structure of C program — 5M

ii) Explain the properties of an algorithm, write an algorithm to find the largest of three numbers. — 5M

OR

11. B). i) Explain different Input and Output functions in C with an examples. — 5M

ii) Explain about Logical operators and Assignment operator in C language with a suitable example. — 5M

12. A). i) Explain different unconditional statements in C language. — 5M

ii) Write a C program to display the colors of a rainbow using switch statement. — 5M

OR

12. B). i) Explain about nested if statement with syntax and example. — 5M

ii) Write a c program to check whether the given year is leap year or not using nested-if statement. — 5M

13. A). i) Explain any five string Handling functions. — 5M

ii) Write a program to find the length of the given string without using string functions. — 5M

OR

13. B). i) What are the different categories of a function. — 5M

ii) Write a C program to calculate GCD of two numbers using recursive function. — 5M

(P.T.O..)

14. A). i) Define structure. Write a C program to create a structure student with roll no, name and grade as members. Display the details of the student. 5M

ii) Write a C program to check whether the string is palindrome or not. 5M

OR

14. B). i) Explain about Array of structures. Write a c program to create a structure book with name, author and pages of n books. 5M

ii) Write a C program to implement pointer arithmetic. 5M

15. A). i) What are the different modes of opening a file? 5M

ii) Write a C program to reverse the content of a given file. 5M

OR

15. B). i) Arrange the following elements 39,9,81,45,90,27,72,18 using Selection sort technique. 5M

ii) Write a c program to implement Binary Search. 5M

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H.T No: | | | | | | | | | | | **R22** **Course Code: A400101**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: ENGLISH FOR SKILL ENHANCEMENT

(Common for CIVIL, MECH, CSC, CSM, CSD & AIM)

Date: 27.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. Punctuate the given sentence 1 M
have you met our handsome new financial director
2. Choose the word closest in meaning to the underlined part from the given options 1 M
1. I gave you explicit instructions not to touch anything.
a. clear b. implicit c. ambiguous d. vague
3. Choose the appropriate homophones given in the brackets to fill in the blank and make it meaningful 1 M
We had a quick _____ (break/brake)for lunch.
4. Choose the appropriate homophones given in the brackets to fill in the blank and make it meaningful 1 M
Everyone likes to receive (complements, compliments) about their appearance.
5. Differentiate the following confusing words and use them in your sentences. 1 M
Bought -Brought
6. Complete the sentences with suitable tense forms of the given verbs. 1 M
He _____ (take) the final exam next month.
7. Identify the redundancy in the given sentence and write the correct form of it 1 M
The final conclusion was to close the bakery.
8. Give the full form of UNO 1 M
9. Choose the correct pronoun in the given sentence 1 M
The committee members put_____ (it's/their) signatures on the document.
10. What is extensive reading? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). How have the Americans simplified English compared to their Western counterparts? Write in detail. 10M

OR

11. B). i) Write a Paragraph on 'Practice makes perfect'. 5M
ii) Complete the paragraph using appropriate prepositions 5M
The symptoms ____ the novel corona virus include a runny nose, sore throat, fever, shortness ___ breath and coughing. If left untreated these symptoms could progress _____ severe pneumonia, kidney failure and breathing difficulties. The flu and the covid-19 share a lot of common symptoms meaning that it is difficult ____ differentiate _____ the two without a test.

(P.T.O..)

12. A). Describe the post card incident as described by Sudha Murthy. 10M

OR

12. B). i) What is skimming? What are different types of skimming? Write in detail. 5M

ii) Select the verb form that best fits in the blank. 5M

a). Hari is the only one of those students who _____ lived up to the potential described in the yearbook. (has, have)

b). Neither the chairman nor the directors _____ present. (is, are)

c). Either he or I_____ mistaken. (is, am)

d). He — fast when the accident happened. (was driving, drove)

e). He — asleep while he was driving. (fell, has fallen)

13. A). What are the four lessons from online education that should survive the end of the pandemic? 10M

OR

13. B). Write a letter to your Bank branch Manager requesting him to block your debit card as you have lost it and ask him to issue a new debit card. 10M

14. A). 'Art elevates the mind'. Do you support? If so why? 10M

OR

14. B). Read the passage carefully and write the précis of it 10M

English education and English language have done immense goods to India, inspite of their glaring drawbacks. The notions of democracy and self-government are the born of English education. Those who fought and died for mother India's freedom were nursed in the cradle of English thought and culture. The West has made contribution to the East. The history of Europe has fired the hearts of our leaders. Our struggle for freedom has been inspired by the struggles for freedom in England, America and France. If our leaders were ignorant of English and if they had not studied this language, how could they have been inspired by these heroic struggles for freedom in other lands? English, therefore, did us great good in the past and if properly studied will do immense good in future. English is spoken throughout the world. For international contact our commerce and trade, for the development of our practical ideas, for the scientific studies, English-is indispensable "English is very rich in literature," our own literature has been made richer by this foreign language. It will really be a fatal day if we altogether forget Shakespeare, Milton, Keats and Shaw.

15. A). Some people believe that children should do organised activities in their free time while others believe that children should be free to do what they want to do in their free time. Write an essay on it giving your opinion. 10M

OR

15. B). Correct and rewrite the given sentences: 10M

i). she told to me to do it.

ii). There is plenty of jobs these days for qualified young men.

iii). My friend returned back from Chennai.

iv). Neither me nor his friend were to be found

v). The English alphabet is consisting of 26 letters.

vi). I and MrKiran work in the same office.

vii). He is junior than me.

viii). I hope to spend the summer at Kashmir.

ix). One should not give his opinion unasked.

x). Shall you join me in a game of tennis?

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H.T No: | | | | | | | | | | | **R22** **Course Code: A402202**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: ELECTRICAL CIRCUIT ANALYSIS-I

(Electrical & Electronics Engineering)

Date: 27.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

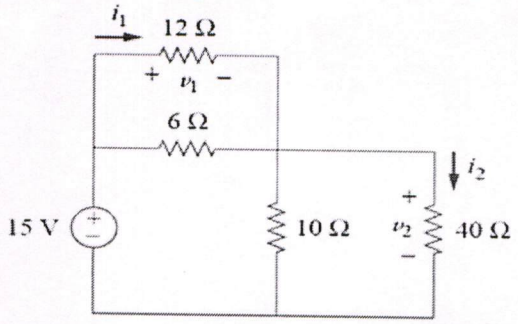
Each question carries ONE mark. **10x1=10M**

1. State Kirchhoff's current law. 1 M
2. Write the examples for passive elements. 1 M
3. Define average value. 1 M
4. Define resonance in RLC circuit. 1 M
5. State Thevenins theorem. 1 M
6. State Milliman's theorem. 1 M
7. Define unbalance load. 1 M
8. Write voltage and current relations in star network. 1 M
9. What is mutual inductance? 1 M
10. Define chord. 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). Find v_1 and v_2 in the circuit shown in Figure. Also calculate and i_1 and i_2. 10M



OR

11. B). Derive the expressions for star to delta conversion. 10M

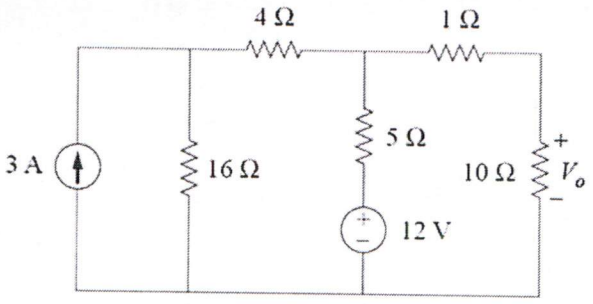
12. A). Derive the steady state response of series RL and RC circuits. 10M

OR

12. B). For a load, $V_{rms} = 110\angle 85^0$ and $I_{rms} = 0.4\angle 15^0$ Determine: (i) the complex and apparent powers, (ii) the real and reactive powers and (iii) the power factor and the load impedance. 10M

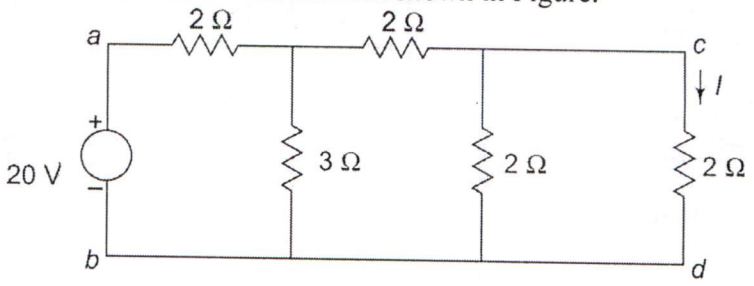
(P.T.O..)

13. A). Apply Superposition theorem to find *Vo* in the circuit of Figure. 10M



OR

13. B). Verify the Thevenin's theorem for the network shown in Figure. 10M

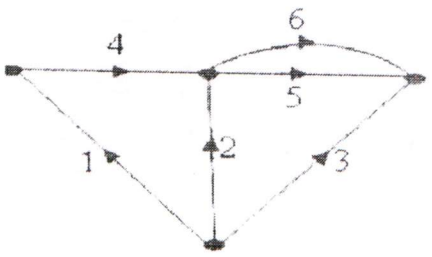


14. A). Derive the relationship between line and phase voltages and currents in a balanced delta connected system. 10M

OR

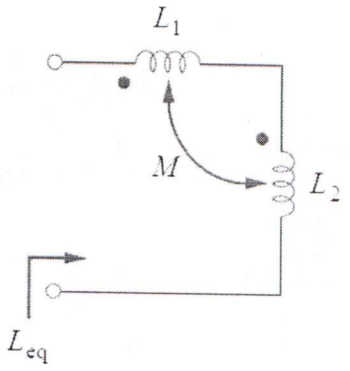
14. B). Explain the two-wattmeter method to measure the power in three phase circuits. 10M

15. A). Determine the basic cut-set matrix for the oriented graph given in figure below, where the branches 1, 2, 3 are tree branches. 10M



OR

15. B). For the series aiding coupled coils in Fig, show that $L_{eq}= L_1+L_2+2M$ 10M



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H.T No: | | | | | | | | | | | R22 | Course Code: A402201

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech I Semester Regular Examinations March-2023

Course Name: BASIC ELECTRICAL ENGINEERING

(Common for ECE, CSE & IT)

Date: 27.03.2023 AN **Time: 3 hours** **Max.Marks: 60**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries ONE mark. **10x1=10M**

1. State Kirchhoff's voltage law. 1 M
2. Compare series and parallel circuit. 1 M
3. Define form factor and peak factor. 1 M
4. Draw series RLC circuit. 1 M
5. Interpret the principle of operation of a transformer. 1 M
6. Define efficiency of a transformer. 1 M
7. List the main parts of a D.C. machine. 1 M
8. Define synchronous speed and slip. 1 M
9. Why A.C. Generator is called a synchronous generator? 1 M
10. What is a fuse and circuit breaker? 1 M

PART-B

Answer the following. Each question carries TEN Marks. **5x10=50M**

11.A). State Superposition theorem and explain with suitable example 10M

OR

11. B). Explain (i) Classification of network elements. 5M
(ii) Kirchhoff's laws. 5M

12. A). Derive the voltage and current relations of star connected three phase balanced circuit. 10M

OR

12. B). Derive Average and RMS value of sinusoidal waveform 10M

13. A). With neat sketch explain the constructional details of a transformer. 10M

OR

13. B). Explain the various losses in a transformer. 10M

14. A). Explain construction details of a D.C Machine. 10M

OR

14. B). Explain the working principle of a single-phase induction motor. 10M

15. A). Describe Fuse, SFU, MCB and MCCB with neat skech. 10M

OR

15. B). Explain the types of batteries. 10M

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