H.T No: | | | | | | | | | | | **R18** | **Course Code: A30006**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March -2023

Course Name: NUMERICAL METHODS & COMPLEX VARIABLES

(Common for EEE & ECE)

Date: 20.02.2023 AN | **Time: 3 hours** | **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. Find the Laplace transform of e^t Sin(t). 2 M
2. Find the inverse Laplace transform of the function $F(s)=\frac{1}{s(s+1)}$. 2 M
3. If first two approximations of root of $x^3-x^2-2=0$ are 1.5 and 2 then find x_2 by Regula-Falsi method. 2 M
4. State the Gauss forward interpolation formula. 2 M
5. If $\frac{dy}{dx}$ = -y, y(0) = 1, h = 0.01 then applying Euler's method, compute the value of y_1 2 M
6. State the formula for Simpson's $3/8^{th}$ rule. 2 M
7. Find where the function (i) $w=\frac{1}{z}(ii)\frac{z}{z-1}$ fails to be analytic. 2 M
8. Find the value of K so thet $x^2+2x+ky^2$ may be harmonic. 2 M
9. Obtain the Taylors series expansion of $\frac{1}{z-1}$ in |Z|=2 2 M
10. Find the poles of $\frac{(z-1)^2}{z(z-2)^2}$ 2 M

PART-B

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

11.A). Find the Laplace transform of $te^{2t}\sin 3t$. 10M

OR

11. B). Applying Laplace transforms Solve the differential equation. 10M
$(D^2+9)y=\sin t, y(0)=1, y^1(0)=0$

12. A). Find the root of $e^x x-\cos x=0$ in the interval [0,1] correct up to two decimal places by Newton-Raphson method. 10M

OR

12. B). Using Newton's forward formula, find the value of f(1.6) if 10M

X	1.4	1.8	2.2	2.6	3
Y	4.82	5.96	6.5	7.2	8.4

(P.T.O..)

13. A). A river is 80 meters wide. The depth d in meters at a distance x from the bank is given by the following table. Calculate the cross section of the river using Trapizoidal rule and SIMPSON'S one third rules 10M

x	10	20	30	40	50	60	70	80
d(x)	4	7	9	12	15	14	8	3

OR

13. B). Using R-K method, find y(0.2) for the equation dy/dx=y-x , y(0)=1,take h=0.1. given that y=1 when x=0 10M

14. A). Show that the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin, although Cauchy-Riemann equations are satisfied at that point. 10M

OR

14. B). Prove that $u= x^2-y^2-2xy-2x+3y$ is harmonic. Find f(z)=u+iv By using Milne-Thomson method. 10M

15. A). Evaluate $\int_c \frac{z^3}{(z-1)^2(z-3)}dz$ where c is |Z|=2 by Residue theorem. 10M

OR

15. B). Evaluate $\int_c \frac{z-3}{(z^2+2z+5)}$ where C is the circle 10M

(i) |Z|=1, (ii) |Z+1-i|=2

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30201**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: NETWORK THEORY-I

(Electrical & Electronics Engineering)

Date: 22.02.2023 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. Write an expression for energy stored by inductor. 2 M
2. Distinguish Independent and Dependent sources. 2 M
3. Define Real and Reactive power in single phase AC circuit. 2 M
4. List the applications of Resonance. 2 M
5. State Faraday's laws of electromagnetic induction. 2 M
6. Two inductively coupled coils have self-inductance L1 = 50mH, L2 = 200mH. Given k = 0.5. Find the mutual inductance between the coils. 2 M
7. Define Graph and Co-tree. 2 M
8. Distinguish Cutset and Tieset. 2 M
9. State Reciprocity theorem. 2 M
10. State Maximum Power Transfer theorem for DC and AC excitations. 2 M

PART-B

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

11.A). Evaluate the voltage across 10 Ω resistor in the following network Figure 1. 10M

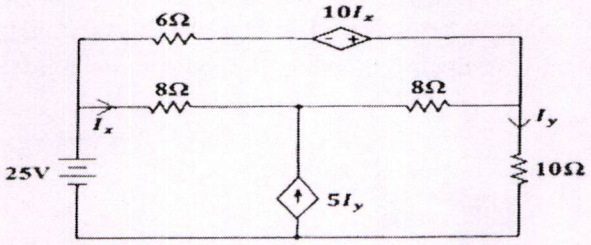


Figure 1

OR

11. B). Calculate current I using node analysis for the circuit in Figure 2. 10M

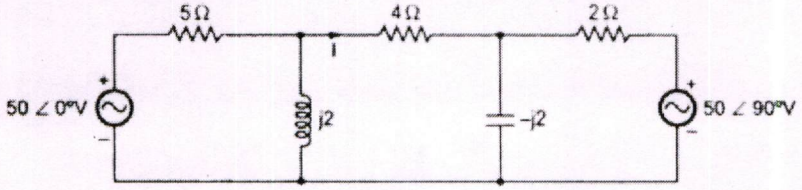


Figure 2

(P.T.O..)

12. A). A 50Ω resistance is connected in series with a 25μF Capacitance across a 230 V,50 Hz AC supply Find (i) capacitive reactance (ii) Impedance (iii) current (iv) phase angle (v) Voltage drop across resistance (vi) voltage drop across capacitance. And also draw the phasor diagram. 10M

OR

12. B). Find the average value, RMS value and Form factor of full wave rectified sine wave shown in figure 3. 10M

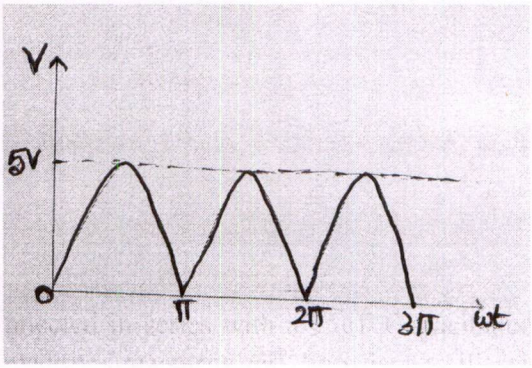


figure 3

13. A). Determine the voltage drop across the capacitor for the circuit in Figure 4 10M

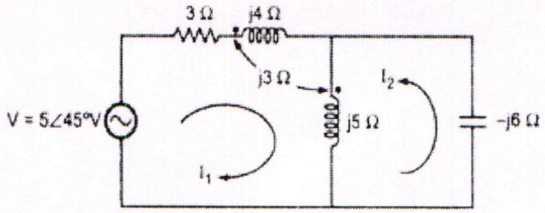
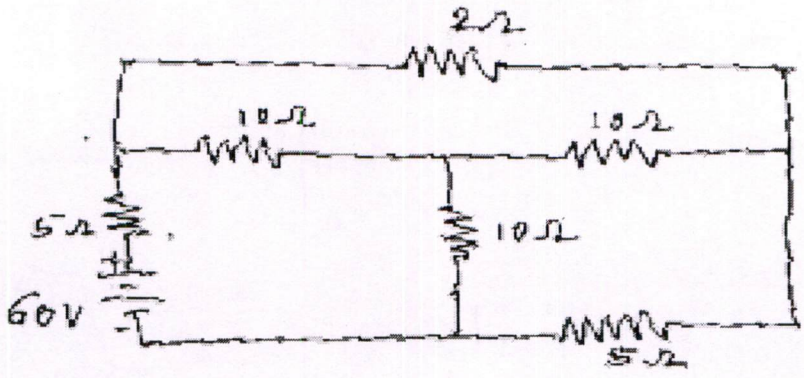


Figure 4.

OR

13. B). A series RLC circuit resonates at a frequency of 1500Hz and consumes 75W power for 50V ac source at resonant frequency. The bandwidth is 0.75kHz. Calculate R, L and C. Also calculate the maximum current and half power frequencies. 10M

14. A). i) Obtain tie-set schedule for the network shown in Figure 5. 7M



3M

Figure 5

ii) What is Duality and illustrate with an example?

(P.T.O..)

OR

14. B). Explain tie set matrix, cut set matrix and fundamental cut set matrix with an example. 10M

15. A). State Norton's theorem. Determine the current through the 10 Ω resistor for the circuit shown in Figure 6 by Norton's theorem. 10M

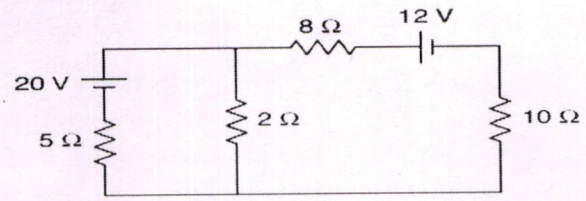


Figure 6

OR

15. B). Calculate the power loss in 1 Ω resistor by Thevenin's theorem for the circuit in Figure 7. 10M

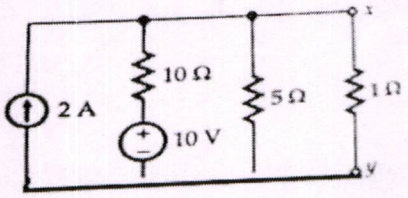


Figure 7

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30202**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: ELECTRO MAGNETIC FIELDS

(Electrical & Electronics Engineering)

Date: 24.02.2023 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. What is a scalar quantity and vector quantity? 2 M
2. Write down expression for x, y, z in terms of spherical co-ordinates r, θ and Φ. 2 M
3. Obtain Poisson's equation from Gauss's law. 2 M
4. Distinguish electric potential and potential difference. 2 M
5. State point form of ohms law. 2 M
6. What is the relation between relative permeability and susceptibility? 2 M
7. What is the difference between scalar and vector magnetic potential? 2 M
8. Define Mutual Inductance. 2 M
9. Write Maxwell's equation in point and integral form. 2 M
10. Write the Maxwell's equation from faradays law? 2 M

PART-B

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

11.A). State and explain Curl, Gradient and Divergence. 10M

OR

11. B). i) Find the gradient of A if $A = \rho^2 + z^3 + \cos(\phi) + z$ and A is in cylindrical coordinates. 5M

ii) What is the divergence of the vector field 5M

$\vec{f} = 3x^2\bar{\imath} + 5xy^2\bar{\jmath} + xyz^3\bar{k}$ at the point (1, 2, 3)

12. A). Derive an expression for potential due to infinite uniformly charged line and also derive potential due to electric dipole. 10M

OR

12. B). Find the electric field due to n-point charges. Establish the relation between potential and electric field. 10M

13. A). Using the concept of magnetic vector potential, derive Biot Savart's law and amperes law. 10M

OR

13. B). Derive the Boundary conditions between conductor and dielectrics and between two dielectrics. 10M

(P.T.O..)

14. A). Derive the expression for magnetic field intensity and magnetic flux density due to infinite line conductor carrying current using Amperes circuital law. 10M

OR

14. B). i) Derive the expression for curl H=J. 5M

ii) Explain the concepts of scalar magnetic potential and vector magnetic potential. 5M

15. A). Derive general field relations for time varying electric and magnetic fields using Maxwell's equation. 10M

OR

15. B). Explain briefly about the motional emf and derive an expression for it. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30182**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: FLUID MECHANICS & HYDRAULIC MACHINERY

(Electrical & Electronics Engineering)

Date: 27.02.2023 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1.	Define the term vaccum pressure.	2 M
2.	Name some important mechanical pressure gauges.	2 M
3.	Distinguish between stream lines and streak lines.	2 M
4.	State Bernoulli's equation.	2 M
5.	Define Reynold's number.	2 M
6.	Explain boundary layer theory.	2 M
7.	How hydraulic turbines are are classified.	2 M
8.	Define slip, percentage of slip and negative slip of reciprocating pump.	2 M
9.	What is cavitation?	2 M
10.	Define and classify the centrifugal pumps.	2 M

PART-B

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

11.A). Define (i) Specific gravity, (ii) Viscosity, (iii) Specific weight, (iv) Vapour pressure and (v) Surface tension. 10M

OR

11. B). A simple U-tube manometer containing mercury is used to measure the pressure of an oil of specific gravity 0.8 flowing in a pipe. Its right limb is open to atmosphere and left limb is connected to the pipe. The centre of the pipe is 9 cm below the level of mercury in the right limb. If the difference of mercury level in the two limbs is 15 cm, determine the absolute pressure of the oil in the pipe. 10M

12. A). The velocity component in a fluid flow are given by $u=2xy$, $v=a^2+x^2-y^2$ 10M

i) Show that the flow is possible.

ii) Derive the relative stream function.

OR

12. B). In a smooth inclined pipe of uniform diameter 250 mm, a pressure of 50 kPa was observed at section 1 which was at elevation 10 m. At another section 2 at elevation 12 m, the pressure was 20 kPa and the velocity was 1.25 m/s. Determine the direction of flow and head loss between these two sections. The fluid in the pipe is water. The density of water at 20^0 and 760 mm of Hg is $998kg/m^3$. 10M

(P.T.O..)

13. A). At a sudden enlargement of a water main from 240 mm to 480 mm diameter, the hydraulic gradient rises by 10 mm. Calculate the rate of flow. 10M

OR

13. B). The velocity distribution in the boundary layer is given by $u/U = (y/\delta)^{1/7}$ 10M
Calculate the following
(i) Displacement thickness
(ii) Momentum thickness.

14. A). A jet of water moving at 12m/s impinges on vane, shaped to deflect the jet through 120^0 when stationary. If the vane is moving at 5 m/s, find the angle of the jet so that there is no shock at inlet. What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second? Assume that the vane is smooth. 10M

OR

14. B). A Pelton wheel is receiving water from a penstock with a gross head of 510 m. one third of gross head is lost in friction in the penstock. The rate of flow through the nozzle fitted at the end of the penstock is $2.2m^3/s$. The angle of deflection of the jet is 165^0. Determine: 10M
(i) The power given by water to the runner and
(ii) Hydraulic efficiency of the Pelton wheel.
Take $C_V = 1.0$ and speed ratio $= 0.45$

15. A). The impeller of a centrifugal pump is of 300 mm diameter and 50 mm width at the periphery and has blades whose tip angle inclines backwards 60^0 from the radius. The pump delivers $17m^3/min$.of water and the impeller rotates at 1000 r.p.m. Assuming that the pump is designed to admit radially. Calculate 10M
(i) speed and direction of water as it leaves the impeller
(ii) Torque exerted by the impeller on water.

OR

15. B). Describe the principle and working of a reciprocating pump. How are pumps classified? 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30401**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: ELECTRONIC DEVICES & CIRCUITS

(Common for EEE & ECE)

Date: 01.03.2023 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. Write the effect of temperature on diode characteristics. 2 M
2. Define the operating principle of Photo diode. Write two of its applications. 2 M
3. Define and why is peak inverse voltage important? 2 M
4. Write different types of filters and mention its purpose. 2 M
5. Explain the base width modulation in BJT. 2 M
6. Which of the BJT configurations are suitable for impedance matching applications. Why? 2 M
7. Explain the DC and AC load Line analysis. 2 M
8. Describe the thermal runaway, why does it occur. 2 M
9. For a p-channel Silicon FET, with effective width 'a'=$2X10^{-4}$ cm and channel resistivity ρ =10 Ω. Solve for the pinch off voltage. 2 M
10. Plot drain and transfer characteristic of JFET. 2 M

PART-B

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

11.A). i) Illustrate the current components of a PN Junction diode and derive the diode current equation. 6M

ii) Explain the static characteristics of SCR. Mention SCR applications. 4M

OR

11. B). i) Define tunneling phenomena and explain the V-I characteristics of a Tunnel diode with the help of energy band diagrams and list its applications. 6M

ii) Zener diode can be used as a voltage regulator. Justify it. 4M

12. A). i) Explain and derive the expressions for average DC current, RMS value of current, DC Power output and AC Power input for a Full wave rectifier. List the advantages. 6M

ii) A full-wave single phase rectifier employs a pi- section filter consisting of two 4 μF capacitances and a 20 H choke. The transformer voltage to the center tap is 300 V rms. The load current is 500 mA. Measure the dc output voltage and the ripple voltage. The resistance of the choke is 200Ω 4M

OR

12. B). i) Define and highlight the operation of half wave rectifier with a circuit diagram and necessary wave forms. 4M

ii) Demonstrate the working principle of C filter with a circuit diagram and derive the expression for its ripple factor. List the advantages and disadvantages. 6M

(P.T.O..)

13. A). i) Define three regions of BJT operation. Explain the operation of an NPN transistor. 4M

ii) Explain neatly the CB configuration of BJT transistor along with its VI characteristics. 6M

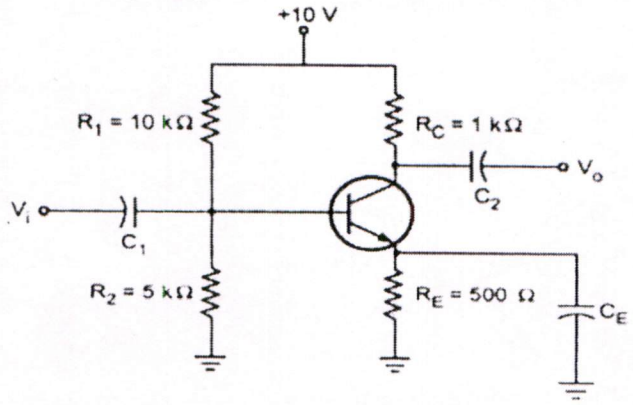
OR

13. B). i) Discuss, how the h-parameters are determined from transistor Characteristics. 6M

ii) With a diagram, describe how BJT transistor acts as an amplifier. 4M

14. A). i) Explain Collector to Base bias of a transistor with a circuit diagram and determine Q-point. 6M

ii) For the circuit shown in Figure, $\beta = 100$ for the silicon transistor. Calculate V_{CE} and I_C 4M



OR

14. B). i) Draw the circuit diagram of voltage divider bias of a Transistor and determine its Q-point. 6M

ii) Explain diode compensation technique for the parameters of V_{BE} and I_{CO}. 4M

15. A). i) Write the construction, operation and characteristic behavior of JFET under various biasing conditions. 4M

ii) Draw the circuit diagram of Common Source amplifier with voltage divider bias and compare BJT transistor with FET. 6M

OR

15. B). i) Describe the operation of common drain FET amplifier and derive the equation for voltage gain. 6M

ii) Explain the operation of Enhancement mode MOSFET in detail. 4M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30531**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: PYTHON PROGRAMMING

(Common for CE, EEE, ME, ECE, CSE, IT, CSC & CSM)

Date: 03.03.2023 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. Mention any two features of Python. 2 M
2. What is implicit conversion? Give an example. 2 M
3. Python strings are immutable. Justify. 2 M
4. Do Loop statements have else clause? When will it be executed? 2 M
5. How will you update list items? Give one example. 2 M
6. What is difference between list and tuple in python? 2 M
7. Explain what a constructor does. 2 M
8. How is the lifetime of an object determined? What happens to an object when it dies? 2 M
9. Explain what happens when a program receives a non-numeric string when a number is expected as input. 2 M
10. When would you make a data field read-only, and how would you do this? 2 M

PART-B

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

11.A). Write Python Program to reverse a number and also find the Sum of digits in the reversed number. Prompt the user for input. 10M

OR

11. B). Explain the basic data types available in Python with examples. 10M

12. A). Write a function to determine whether a given natural number is a perfect number. A natural number is said to be a perfect number if it is the sum of its divisors. 10M

OR

12. B). List the three types of conditional statements and explain them. 10M

13. A). Write a Python program to add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly'. instead. If the string length of the given string is less than 3, leave it unchanged. 10M

OR

13. B). Compare and contrast different functions and methods used in dictionaries and set. 10M

(P.T.O..)

14. A). i) Write a short notes on different built in attributes associated with a class. 5M
ii) With the help of examples explain the concept of class methods and static methods. 5M

OR

14. B). Write a program that uses datetime module within a class. Enter manufacturing date and expiry date of the product. The program must display the years, months, and days that are left for expiry. 10M

15. A). Write a line of code that adds a Float Field to a window, at position (1, 1) in the grid, with an initial value of 0.0, a width of 15, and a precision of 2. 10M

OR

15. B). Describe the Graphical user interface using the tkinter module and widgets. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30554**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations Feb/March-2023

Course Name: JAVA PROGRAMMING

(Common for EEE & ECE)

Date: 03.03.2023 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. What is the purpose of JVM? 2 M
2. What are the integer data types of Java? 2 M
3. What are the uses of final keyword? 2 M
4. Differentiate abstract classes and interfaces. 2 M
5. Explain briefly about wrapper classes in Java. 2 M
6. List the differences between throw and throws keyword. 2 M
7. What are the different ways to create threads in Java? 2 M
8. Define thread. 2 M
9. Explain briefly about serialization in Java. 2 M
10. What is the purpose of Scanner class? 2 M

PART-B

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

11.A). Explain the various types of constructors in Java with example program. 10M

OR

11. B). i) Explain the concept of method overloading with a program. 5M
ii) Explain about classes and objects in Java. 5M

12. A). i) Demonstrate command line arguments in Java with an example program. 5M
ii) Write a Java program to demonstrate the concept of interfaces. 5M

OR

12. B). Explain the various ways of declaring arrays in Java with an example program. 10M

13. A). Write the differences between String and StringBuffer. Explain the various methods supported by StringBuffer class. 10M

OR

13. B). Write a Java program to demonstrate nested try statements. 10M

14. A). i) Explain the concept of multithreading in Java. 5M
ii) Explain the life cycle of a thread. 5M

OR

14. B). Write a multithreaded Java program by implementing Runnable interface. 10M

15. A). Explain the concept of database connectivity in java. 10M

OR

15. B). Write a Java program to demonstrate the RandomAccessFile operations. 10M

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H.T No: | | | | | | | | | | | **R18** **Course Code: A30203**

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)
B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023

Course Name: ELECTRICAL MACHINES-I

(Electrical & Electronics Engineering)

Date: 06.03.2023 AN **Time: 3 hours** **Max.Marks: 70**

(Note: Assume suitable data if necessary)

PART-A

Answer all TEN questions (Compulsory)

Each question carries TWO marks. **10x2=20M**

1. Write the equation of an electromagnetic force and name the parameters used in the equation. 2 M
2. Write briefly about leakage flux in a magnetic system. 2 M
3. Write the significance of the pole shoes in a DC machine. 2 M
4. Illustrate the airgap flux density distribution of a DC machine. 2 M
5. Analyze the benefits of back to back test of a DC machine. 2 M
6. Write the applications of DC series motor. 2 M
7. Why the transformers are rated in kVA? 2 M
8. Justify the need of parallel operation of a single phase transformer. 2 M
9. Interpret the effects of non linear B-H curve of magnetic core material. 2 M
10. Identify the applications of an auto transformer. 2 M

PART-B

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

11.A). Explain the properties of the magnetic materials with necessary examples and characteristic curves. 10M

OR

11. B). Deduce the equation for the torque developed in an electromagnetic system. 10M

12. A). i) Explain the process of commutation in a DC machine and identify the purpose of commutator in DC generator and DC motor. 7M

ii) Derive the torque equation of a DC motor 3M

OR

12. B). i) Differentiate between lap winding and wave winding in a DC machine. 6M

ii) Consider a 4 pole DC generator with 400 conductors, runs at 1500 rpm with the flux of 0.0188 Wb per pole. Determine the induced emf in the generator if it is lap wound and wave wound. 4M

13. A). Explain the various speed control methods of a DC motor and write the merits and demerits of the same. 10M

OR

13. B). i) Explain the procedure of conducting Brake test with neat circuit diagram. 6M

ii) Determine the efficiency of a DC motor for the test data given as: Load current = 49 A at 220 V; Torque = 118.6 Nm; angular velocity of the machine is 12 rps. 4M

(P.T.O..)

14. A). i) Explain how to develop a secondary voltage in a single phase transformer. 6M

ii) Determine the amount of secondary induced emf of a transformer having 400 primary turns and 1000 secondary turns with the flux density of 0.976 wb/Sq.m, area of 60 Sq.Cm. The supply frequency is 50 Hz. 4M

OR

14. B). Explain how the efficiency of a single phase transformer can be predetermined from the open circuit and short circuit test. Explain the test procedure also. 10M

15. A). Analyze the different types of cooling methods of transformer and justify the need of providing cooling to a transformer. 10M

OR

15. B). Explain about the tap changing transformers and identify their applications. 10M

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