

H.T No:

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**R18**

Course Code: A30506



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations February-2024

Course Name: **DISCRETE MATHEMATICS**

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

Date: 05.02.2024 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. Draw the hasse diagram for the poset  $(P(x), \leq)$  where  $x=\{1,2,3,4\}$  and  $\leq = \{(x,y) / x \text{ is subset to } y\}$  2 M
2. How do you prove Schroeder Bernstein Theorem? 2 M
3. State the pigeonhole principle. 2 M
4. Given the polynomial  $p(x) = x^2 + x + 5$  and  $g(x) = x + 2$ . Find the value of  $q(x)$  and  $r(x)$ . 2 M
5. Show that  $p \rightarrow q \equiv \sim p \vee q$  using truth table. 2 M
6. Write the existential quantifier in terms of universal quantifier. 2 M
7. What is permutation group? Give an example. 2 M
8. Differentiate disjunctive and conjunctive Normal forms. 2 M
9. What is Hamiltonian Graph? 2 M
10. What is meant by articulation point? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Define an equivalence relation and show that the relation R defined as  $aRb$  iff 4 divides  $(a-b)$  over set of integers is an equivalence relation. 10M
- OR
11. B). Show that  $(D_{30}, R)$ , where  $a R b$  If and only if a divides b, is a complemented lattice.  $D_{30}$  is set of positive divisors of 30. 10M
12. A). Explain the Euclidian algorithm with an example. 10M
- OR
12. B). Suppose that the license plates of certain state require 3 English letters followed by 4 digits:
  - a) How many different plates can be manufactured if repetition of letters and digits allowed.
  - b) How many plates are possible if only letters can be repeated.
  - c) How many are possible if no repetitions are allowed at all.10M
13. A). By using logic equivalence prove or disprove  $(\sim p(p \vee q)) \rightarrow q \equiv T$ . 10M
- OR
13. B). Obtain the principal disjunctive normal form of  $(P \wedge Q) \vee (\sim P \wedge R) \vee (Q \wedge R)$ . 10M

(P.T.O.)

14. A). What is a group show that addition modulo 5 is a group? 10M

**OR**

14. B). List out the identities of Boolean algebra. 10M

15. A). Show that  $K_5$  is non-planar. 10M

**OR**

15. B). Define isomorphism of graph. Justify that the graph  $K_{2,3}$  is a planar graph. 10M

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**R18**

Course Code: A30007



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

**B.Tech III Semester Supplementary Examinations February-2024**

**Course Name: NUMERICAL TECHNIQUES & PROBABILITY DISTRIBUTIONS**  
(Common for CSM, AID & AIM)

Date: 07.02.2024 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 an iterative formula for  $\sqrt{N}$ ,  $N > 0$  by Newton-Raphson method. 2 M
2. Show that  $\mu = \frac{2 + \Delta}{2\sqrt{1 + \Delta}}$ . 2 M
3. What is the order and error of Simpson's rule? 2 M
4. Find  $y(0.2)$  if  $\frac{dy}{dx} = \log(x + y)$ ,  $y(0) = 2$  with  $h = 0.2$  use Euler's method. 2 M
5. Find the value of  $L \left[ \frac{\sin at}{t} \right]$ . 2 M
6. Find the inverse Laplace transform of  $\frac{2s-1}{s^2+4s+5}$ . 2 M
7. A continuous random variable  $X$  has the probability density function  $f(x) = kx^2e^{-x}$ ,  $x > 0$ , find the value of  $k$ . 2 M
8. If the random variable  $X$  which is normally distributed with mean 68 and standard deviation 2.5, then find  $P(66 \leq X \leq 71)$ . 2 M
9. Define Type-I error and Type – II error. 2 M
10. List any two uses of  $t$  –test. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Determine the positive root of  $x \log_{10} x = 1.2$  lies between 0 and 1, by regula-falsi method into four decimal places. 10M

**OR**

11. B). Estimate the polynomial  $f(x)$  to fix the following data and the value of  $y$  at  $x = 5$  by using Lagrange's interpolation 10M

$x$	4	6	10	8
$y$	1	3	8	16

12. A). Divide the range in to 6 equal parts, to find  $\int_4^{5.2} \log_e x \, dx$  using Trapezoidal and Simpson's rule. 10M

**OR**

12. B). Use Fourth order Runge-Kutta method to find  $y(0.2)$ ,  $y(0.4)$  if  $\frac{dy}{dx} = x^3 + y$ ,  $y(0) = 2$  (assume that  $h = 0.2$ ). 10M

(P.T.O.)

13. A). Identify the Laplace transform of “triangular wave” function  $f(t)$  defined by 10M

$$f(t) = \begin{cases} t & , \text{ if } 0 \leq t \leq a \\ 2a - t & , \text{ if } a \leq t \leq 2a \end{cases} \text{ and } f(t + 2a) = f(t) \text{ for all } t.$$

**OR**

13. B). Solve  $y'' + 2y' - 3y = \sin t$ , given  $y = y' = 0$  at  $t = 0$  using Laplace transform. 10M

14. A). A random variable  $X$  has the following probability function: 10M

$X = x_i$	0	1	2	3	4
$P(X = x_i)$	$k$	$3k$	$5k$	$7k$	$9k$

determine (i) the value of  $k$  and (ii)  $P[0 < X < 4]$  and (iii)  $P[X \geq 3]$ .

**OR**

14. B). If  $X$  is normally distributed with mean 8 and variance 16, estimate the value of 10M  
 (i)  $P(5 \leq X \leq 10)$       (ii)  $P(10 \leq X \leq 15)$       (iii)  $P(X \geq 15)$ .

15. A). Before an increase in excise duty on tea, 800 people out of a sample of 1000 were consumers of tea. After the increase in duty, 800 people were consumers of tea in a sample of 1200 persons. Test whether there is significant decrease in the consumptions of tea after the increase in duty. 10M

**OR**

15. B). Two samples of size 9 and 8 gave the sums of squares of deviations from their respective means equal to 160 and 91 respectively. Can they be regarded as drawn from the same normal population? 10M

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**R18**

Course Code: A30513



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

**B.Tech III Semester Supplementary Examinations February-2024**

**Course Name: COMPUTER ORGANIZATION & ARCHITECTURE**  
(Common for CSE, IT, CSC, CSM, AID & AIM)

Date: 09.02.2024 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 computer organization of a digital computer.  | 2 M |
| 2. Write Basic symbols for register transfer.   | 2 M |
| 3. Differentiate between restoring and non-restoring division algorithm.  | 2 M |
| 4. Represent the number $(+37.8)_{10}$ as a floating point binary number with normalized fraction mantissa 16 bits and exponent 8 bits. | 2 M |
| 5. What is the need of I/O interface?   | 2 M |
| 6. Why does DMA have priority over the CPU when both request a memory transfer?   | 2 M |
| 7. Define pipelining.   | 2 M |
| 8. List the pipeline hazards.   | 2 M |
| 9. What is cache memory?  | 2 M |
| 10. What is meant by memory interleaving?   | 2 M |

**PART-B**

**Answer the following. Each question carries TEN Marks.**

**5x10=50M**

- |  |    |
|--|----|
| 11.A). i) Explain about Bus and Memory Transfer. | 5M |
| ii) Explain about Computer instructions.         | 5M |

**OR**

- |  |    |
|--|----|
| 11. B). i) Describe Instruction cycle in computer system.  | 5M |
| ii) A Computer uses a memory unit with 256 K words of 32 bits each. A binary instruction code is stored in one word of memory. The instruction has four parts: an indirect bit, an operation code, a register code part to specify one of 64 registers, and an address part. | 5M |
| (a) How many bits are there in the operation code, the register code part, and the address part?   |    |
| (b) Draw the instruction word format and indicate the number of bits in each part.   |    |
| (c) How many bits are there in the data and address inputs of the memory?  |    |

- |   |    |
|---|----|
| 12. A). i) Explain the process of floating point number multiplication with flow chart. | 5M |
| ii) Show the hardware for a 2 bit-by-2 bit array multiplier and explain its working.    | 5M |

**OR**

- |   |    |
|---|----|
| 12. B). i) Using booth's multiplication algorithm, multiply the 3 X -4, show all the steps. | 7M |
| ii) What is the principle of carry look-ahead adder?  | 3M |

**(P.T.O.)**

13. A). With a neat block diagram, explain the architecture of 8086 Microprocessor. 10M

**OR**

13. B). i) What is interrupt? Why priority of interrupt is required? How it is restored? 5M

ii) Give the comparison between programmed I/O and interrupt driven I/O. 5M

14. A). Name the two pipeline organizations. Explain about the arithmetic pipeline with the help of an example. 10M

**OR**

14. B). Explain instruction pipeline with neat timing diagram. 10M

15. A). Draw and explain fully associative cache organization. 10M

**OR**

15. B). Explain various page replacement algorithms. 10M

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**R18**

Course Code: A36201



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations February-2024

Course Name: **OBJECT ORIENTED PROGRAMMING THROUGH JAVA**  
(Common for CSC, CSM, AID & AIM)

Date: 12.02.2024 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 basic characteristics of OOP. 2 M
2. Define package? Write syntax to create a package. 2 M
3. What is an Inner class? 2 M
4. What are the benefits of Exception Handling? 2 M
5. List out the states of Thread. 2 M
6. What is the use of PrintStream class? 2 M
7. What is JDBC? 2 M
8. What is the use of enum keyword. 2 M
9. Define the scala. 2 M
10. Differentiate between the Event sources and Event Listeners. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). What is polymorphism? Explain how polymorphism is implemented in java with suitable example. 10M
- OR**
11. B). Define Interface? Illustrate the implementation of interface with example. 10M
12. A). Define Exception? Create a java program using try, catch and finally blocks. 10M
- OR**
12. B). Distinguish static Inner Class and Local Inner class with examples. 10M
13. A). Explain the different ways of creating Threads with example. 10M
- OR**
13. B). i) Classify the stream classes in java? 5M  
ii) Develop a java program to read input from the user using Scanner class? 5M
14. A). i) Outline significance of collection interface. 5M  
ii) List and explain the various methods defined in collection interface. 5M
- OR**
14. B). Explain the steps involved in building JDBC application. 10M
15. A). What is a Layout manager? Explain the different types of Layout manager. 10M
- OR**
15. B). Develop a java program to handle mouse events. 10M

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**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**  
(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations February-2024

Course Name: **BASIC ELECTRICAL ENGINEERING**

(Common for CSM & AIM)

Date: 14.02.2024 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 Ohm's Law and its limitations. 2 M
2. Explain Kirchhoff's Current Law. 2 M
3. Define Form factor and peak factor of an alternating quantity. 2 M
4. An alternating voltage is given by  $v = 300 \sin(377t+30^\circ)$  V find i) maximum voltage ii) Frequency. 2 M
5. Classify the Generators based on Excitation. 2 M
6. List out the Essential parts of DC machine. 2 M
7. List the properties of an Ideal Transformer. 2 M
8. The primary winding of transformer has 400 turns and secondary winding has 50 turns .If the primary voltage is 120V(RMS) find the secondary voltage. 2 M
9. Define Slip. 2 M
10. Classify the Single phase Induction motors. 2 M

**PART-B**

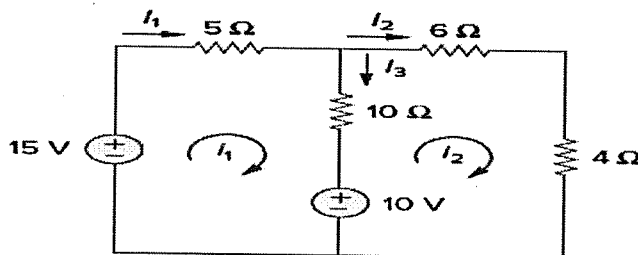
Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). State and Explain Thevenin's theorem with an example. 10M

OR

11. B). For the circuit shown in fig. solve for the branch currents  $i_1, i_2$  &  $i_3$  using Mesh Analysis. 10M



12. A). A 220 V, 1- $\phi$ , 50 Hz AC supply is applied across series connection of  $R = 10 \Omega$ ,  $L = 0.1$  H. Determine impedance, current, voltage across R, voltage across L, power factor, active power, reactive power and apparent power. Also draw the phasor diagram. 10M

OR

12. B). Develop the relation between phase and line values of a 3-phase balanced star connected and delta connected system. 10M

(P.T.O..)



13. A). Explain the construction and principle and operation of DC generator. 10M

**OR**

13. B). A 10 KW, 250 V D.C shunt machine has an armature resistance as  $0.1 \Omega$  and field resistance of  $100 \Omega$ . Determine the armature power developed when i) it runs as a generator delivering 10 KW, ii) it runs as a motor taking an input of 10 KW. 10M

14. A). Draw and explain the phasor diagram of a transformer, on no load. 10M

**OR**

14. B). A 25KVA, 2200/220 V, 50Hz transformer, has the following test data: 10M  
OC test: 220 V, 4 A, 150 W  
SC test : 90 V, 10 A, 350 W

Determine:

i) the efficiency at full load, unity power factor

ii) the efficiency at half full load, 0.8 p.f. lag

iii) the efficiency at half full load, 0.8 p.f. lead.

iv) find the regulation at full load, unity p.f

15. A). Explain the production of rotating magnetic field in a three phase induction motor. 10M

**OR**

15. B). Explain briefly about single phase induction motors with the help of neat circuit diagrams. 10M

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