

H.T No:

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**R18**

Course Code: A30006



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

B.Tech III Semester Supplementary Examinations August-2023

**Course Name: NUMERICAL METHODS & COMPLEX VARIABLES**

(Common for EEE & ECE)

Date: 08.08.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Find  $L[\cos(at+b)]$  2 M
2. As per the convolution theorem,  $L^{-1}\{\bar{f}(s)\bar{g}(s)\} =$  2 M
3. Show that  $\mu = \sqrt{1 + \frac{\delta^2}{4}}$  2 M
4. State the Gauss backward interpolation formula. 2 M
5. State the formula for fourth order Runge – Kutta method. 2 M
6. Find  $y(0.5)$  by applying Euler method to solve  $\frac{dy}{dx} = x+y, y(0)=0$  with  $h=0.5$  2 M
7. Find the real part of  $f(z) = z^2$  2 M
8. Find the value of K so that  $x^2 + 2x + ky^2$  may be harmonic 2 M
9. Compute the singular point of  $\frac{z}{(z-2)^3}$  2 M
10. Determine the residue of  $\frac{z^2}{(z-1)(z-2)}$  at  $z=1$  2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Find the Laplace transform of  $\frac{(\cos 2t - \cos 3t)}{t}$  10M
- OR**
11. B). Applying the Laplace Transforms solve  $\frac{d^2y}{dt^2} - 4\frac{dy}{dt} - 12y = e^{3t}, y(0) = 1, y'(0) = -2$  10M
  12. A). Find a real root of  $f(x) = x \sin x - 1$  correct up to three decimal places starting with  $x = 1$  by Newton Raphson method. 10M
- OR**
12. B). Using Lagrange's interpolation formula find the viscosity of oil at a temperature of  $140^\circ\text{C}$  10M

Temp	110	130	160	190
Viscosity	10.8	8.1	5.5	4.8

(P.T.O..)

13. A). Evaluate  $\int_0^6 \frac{dx}{1+x^2}$  by using Trapezoidal rule 10M

**OR**

13. B). Find  $y(0.1)$  &  $y(0.2)$  using Euler's modified formula given that  $\frac{dy}{dx} = x^2 - y, y(0) = 1$  10M

14. A). Find all the values of  $k$ , such that  $f(z) = e^x(\cos ky + i \sin ky)$  is analytic. 10M

**OR**

14. B). Find the analytic function whose real part is  $\frac{\sin 2x}{\cosh 2y - \cos 2x}$  10M

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

**OR**

15. B). Find the Residue of  $\frac{z^2}{(z^4-1)}$  at those singular points which lie inside the circle  $|z|=2$  10M

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R18

Course Code: A30224



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

B.Tech III Semester Supplementary Examinations August-2023

Course Name: **ELECTRICAL ENGINEERING**

**(Electronics & Communication Engineering)**

Date: 10.08.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

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|--|-----|
| 1. State the superposition theorem.  | 2 M |
| 2. List out the difference between Mesh and Nodal Analysis.                    | 2 M |
| 3. Define the RMS value.   | 2 M |
| 4. Define power factor.  | 2 M |
| 5. What is a resonance in RLC circuit?   | 2 M |
| 6. Explain the concept of complex frequency.                                   | 2 M |
| 7. Explain why the transformer ratings are in KVA.                             | 2 M |
| 8. Explain the principle of operation of 1-phase transformer.                  | 2 M |
| 9. What is the value of slip of an induction motor at the instant of starting? | 2 M |
| 10. What is the significance of brushes in DC Machines?                        | 2 M |

**PART-B**

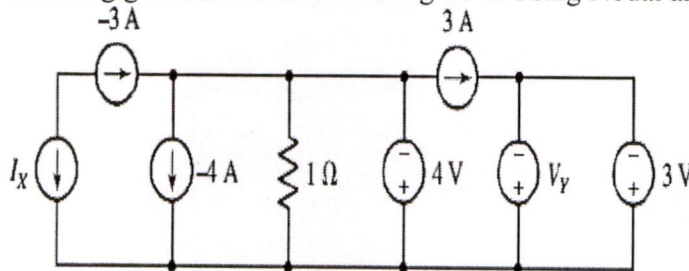
Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Two resistors  $12\ \Omega$  and  $6\ \Omega$  are connected in parallel and this combination is connected in series with a  $25\ \Omega$  resistance and a battery which has an internal resistance of  $0.25\ \Omega$ . Determine the emf of the battery if potential difference across  $6\ \Omega$  resistance is 6 Volts. 10M

OR

11. B). State Kirchhoff Current Law and Voltage law, determine the values for  $I_X$  and  $V_Y$  in the following given circuit shown in figure 1. Using Nodal analysis. 10M



12. A). Derive the relation between line and phase voltage also relation between line and phase current in a three phase Delta connected system. 10M

OR

12. B). A Delta connected load  $(8+j6)\ \Omega$  per phase is supplied from three phase 440V source. Find the line voltage, Line current, Power factor, Total Power and Power per phase. 10M

(P.T.O.)

13. A). Derive 'Z' parameter's for two port network with the equivalent circuit diagram. 10M

**OR**

13. B). Given a series RLC circuit with  $R = 10$  Ohms,  $L = 1$  mH and  $C = 1$   $\mu$ F is connected across a sinusoidal source of 20 V with variable frequency. Find 10M

- i) The resonant frequency
- ii) Q factor of the circuit at resonant frequency
- iii) Half power frequencies

14. A). Explain the procedure to conduct OC and SC tests on a single phase transformer to pre determine the efficiency of the transformer. 10M

**OR**

14. B). Consider a 20 kVA, 2200/220 V, 50 Hz transformer. The O.C./S.C. test results are as follows : 10M

O.C. test : 220 V, 4.2 A, 148 W (l.v. side)

S.C. test : 86 V, 10.5 A, 360 W (h.v. side)

Determine regulation at 0.8 p.f. lagging and at full load. What is the p.f. on short-circuit?

15. A). Classify different types of DC generators with neat circuit diagrams. 10M

**OR**

15. B). Explain the construction and principle of operation of 3-Phase Induction Motor. Give the difference between DC and AC Motor. 10M

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R18

Course Code: A30402



## CMR COLLEGE OF ENGINEERING & TECHNOLOGY

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations August-2023

Course Name: PROBABILITY & STOCHASTIC PROCESSES

(Electronics & Communication Engineering)

Date: 12.08.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

### PART-A

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Define probability as a relative frequency. 2 M
2. A pair of fair dice is thrown. If the two numbers appearing are different, find the probability that the sum is seven. 2 M
3. If  $Y = 5X + 10$  and  $X$  is a uniformly distributed random variable between 0 and 10, Find  $E[Y]$ . 2 M
4. Contrast between continuous and discrete random variables. 2 M
5. State the properties of joint distribution function. 2 M
6. If  $E[X+2Y] = 0$  and  $E[2X+Y] = 33$ , find  $E[X]$  and  $E[Y]$ . 2 M
7. Give the classification of Random processes. 2 M
8. State the Conditions for a random process to be wide sense stationary. 2 M
9. If  $X(t)$  and  $Y(t)$  are input and output random processes of a linear system, Relate their power density spectrums. 2 M
10. Distinguish between White and Coloured Noise Processes. 2 M

### PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) A class contains 10 men and 20 women of which half the men and half the women have brown eyes. Find the probability 'p' that a person chosen at random is a man or has brown eyes. 5M  
 ii) Give the definitions of joint and conditional probabilities with examples. What is the joint probability if events A and B are i) Mutually exclusive ii) Statistically independent. 5M
- OR**
11. B). i) State and prove Baye's theorem. 5M  
 ii) In a factory there are 4 machines produce 10%,20%,30%,40% of an items respectively. The defective items produced by each machine are 5%,4%,3% and 2% respectively. Now an item is selected which is to be defective, what is the probability it being from the 2<sup>nd</sup> machine. 5M
12. A). What is the probability density function of Gaussian distribution? Find its Cumulative distribution function  $F_X(x)$ , mean, mean square value and variance. 10M
- OR**
12. B). Derive the Binomial density function and find mean & variance. 10M

(P.T.O..)

13. A). i) Define joint moments about the origin, joint central moment and joint characteristic function. 6M  
 ii) Two random variables X and Y have a joint probability density function 4M  
 $f_{XY}(x,y) = (5/16)x^2y$   $0 < y < x < 2$   
 $= 0$  elsewhere  
 Find the marginal density functions of X and Y. Are X and Y statistically independent?

OR

13. B). i) State the properties of joint probability density function. 5M  
 ii) The Joint probability density function of two random variables X and Y is 5M  
 $f_{xy}(x,y) = C(2X+Y)$   $0 \leq X \leq 1, 0 \leq Y \leq 2$   
 Find (a) the value of 'C' (b) marginal distribution functions of X and Y

14. A). i) State the properties of Auto correlation function. 5M  
 ii) The input to an LTI system with impulse response  $h(t) = \delta(t) + t^2 e^{-at} u(t)$  is a WSS 5M  
 process with mean of 3. Find the mean of the output of the system.

OR

14. B). i) Define Wide Sense Stationary Process and write it's conditions. 5M  
 ii) A random process is given as  $X(t) = At$ , where A is a uniformly distributed random 5M  
 variable on (0,2). Find whether X(t) is wide sense stationary or not.

15. A). Prove that the PSD and time average of auto correlation function form a Fourier transform 10M  
 pair.

OR

15. B). The auto correlation function of a random process is given by  $R_{XX}(\tau) = (A^2/2) \text{Cos } \omega_0\tau$ . 10M  
 Find the power spectral density of the random process and sketch it.

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Course Code: A30403



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations August-2023

Course Name: SWITCHING THEORY & LOGIC DESIGN

(Electronics & Communication Engineering)

Date: 17.08.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Convert  $(479)_{10}$  to binary system. 2 M
2. Draw AND gate using universal NOR gate. 2 M
3. What are don't cares? What is the use of these? 2 M
4. Compare decoder with demultiplexer. 2 M
5. What is meant by race around condition in flip flops? 2 M
6. What are the applications of flip-flops? 2 M
7. What is the importance of state reduction technique in sequential circuit design? 2 M
8. What is the difference between ring counter and ripple counter? 2 M
9. What is finite state machine? 2 M
10. What are the features of ASM chart? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Identify the original transmitted hamming code, by detecting if any error occurred in the received hamming code 10110111 odd parity is used. 10M
- OR**
11. B). Make use of boolean theorems and properties to reduce the following boolean expression. 10M  
i)  $(A+B+C)(B'+C)(A+D)(A'+C)$       ii)  $(A+B)(A+B')(A'+B)$
12. A). Minimize using K-map and realize by NAND gates 10M  
 $F(A,B,C,D) = \Sigma(0,1,2,3,12,13,14,15)$
- OR**
12. B). Develop gray to binary code converter circuit. 10M
13. A). Construct excitation table for S-R flipflop, J-K flipflop, D-flipflop and T-flipflop and Master Slave JK- flipflop. 10M
- OR**
13. B). Convert the following flip-flops: 10M  
i) JK flip flop to T-flip flop      ii) RS flip flop to D flip flop

(P.T.O..)

14. A). Compare synchronous and asynchronous sequential circuits. 10M

**OR**

14. B). Construct mod-10 synchronous counter using T flip flops. 10M

15. A). Explain the concept of partition technique and merger graph method. 10M

**OR**

15. B). i) Write short notes on Mealy and Moore models, 4M

ii) Explain binary multiplier using ASM chart. 6M

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**R18**

Course Code: A30401

**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations August-2023

Course Name: **ELECTRONIC DEVICES & CIRCUITS**

(Common for EEE &amp; ECE)

Date: 19.08.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. What do you mean by transition capacitance? 2 M
2. List the application of varactor diodes. 2 M
3. What is the importance of peak inverse voltage? 2 M
4. What is transformer utilization factor? 2 M
5. Discuss the need for biasing the transistor. 2 M
6. How  $\alpha$  and  $\beta$  are related to each other? 2 M
7. What is d.c load line? 2 M
8. What is stability factor? 2 M
9. Why FET is called as a voltage-controlled device? 2 M
10. List the applications of MOSFET. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). With help of a energy band diagram explain the operation of tunnel diode. How tunneling occurs? 10M

**OR**

- 11.B). i) The diode current is 0.6 mA when applied voltage is 400 mV and 20 mA when the applied voltage is 500 mV. Find  $\eta$  5M  
ii) Explain the operation of photodiode. 5M

- 12.A). Explain the operation of Half wave rectifier and derive the expression for dc output current, dc output voltage, rectification efficiency and ripple factor, TUF. 10M

**OR**

- 12.B). i) Explain the operation of half wave rectifier with capacitive filter 5M  
ii) A sinusoidal voltage of 40 V and frequency 50 Hz is applied to a half wave rectifier.  $R_L = 200 \Omega$ ,  $R_r = \infty$ . Find  $V_{dc}$ ,  $I_{dc}$ ,  $I_m$ ,  $I_{rms}$ ,  $P_{dc}$ ,  $\eta$  5M

- 13.A). i) Explain in detail the characteristics of a transistor in common collector configuration. 6M  
ii) The following measurements were made in a particular transistor when connected in CB mode.  $I_C = 10.525$  mA,  $I_B = 100$   $\mu$ A and  $I_{CBO} = 5$   $\mu$ A. Determine  $\alpha$ ,  $\beta$ , and  $I_E$ . Also determine the new level of  $I_B$  to make  $I_C = 15$  mA. 4M

**OR**

- 13.B). Explain the characteristics of UJT and how its works as a relaxation oscillator. 10M

(P.T.O..)

14. A). Explain how compensation for  $V_{BE}$  and  $I_{CO}$  is accomplished using diodes. 10M

**OR**

14. B). Consider a germanium transistor connected in self bias. The various parameters are  $V_{CC}=16V$ ,  $R_C=3k\Omega$ ,  $R_E=2k\Omega$ ,  $R_1=56k\Omega$ ,  $R_2=20k\Omega$  and  $\alpha=0.985$ . Determine: i) the coordinates of the operating point and ii) stability factor S. 10M

15. A). Explain the operation of FET with the help and a neat diagram. Also explain its characteristics. 10M

**OR**

15. B). i) Explain how FET works as a voltage variable resistor. 4M

ii) Explain the operation of depletion type of MOSFET. 6M

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**R18**

Course Code: A30531



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

B.Tech III Semester Supplementary Examinations August-2023

Course Name: PYTHON PROGRAMMING

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

Date: 22.08.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. Interpret the process of Reading input from the key board. 2 M
2. Distinguish between while and for loop. 2 M
3. Outline the idea of Definite Iteration. 2 M
4. What are Global Values and Global Constants? 2 M
5. Determine the need of Lists. 2 M
6. Classify the String Methods 2 M
7. Show the difference between Classes and Functions. 2 M
8. Discuss the Importance of Object Oriented programming. 2 M
9. Summarize the tkinter module. 2 M
10. Identify the need of widgets. 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) Discuss various operators available in python with example. 5M  
ii) Compare different repetition Structures with examples 5M

**OR**

11. B). i) Illustrate the Principle of Types Conversion with an example. 5M  
ii) Discuss about Nested Decision Structures with an example. 5M

12. A). i) Classify Process of Defining and calling of Void Function. 5M  
ii) Outline the features of Value-Returning Functions. 5M

**OR**

12. B). i) Develop the steps to write a Python function that prints all factors of a given number. 5M  
ii) What is the purpose to use Math Module? 5M

13. A). i) Demonstrate the comparison between lists, tuples, dictionaries and sets. 5M  
ii) Illustrate a Python program that interchanges the first and last characters of a given string. 5M

**OR**

13. B). i) Discuss about recursive, and the Python function that recursively computes sum of elements in a list of lists. Sample Input: [1, 2, [3,4], [5,6]] Expected Result: 21 5M  
ii) Show a Python program read a word and print the number of letters, vowels and percentage of vowels in the word using a dictionaries. 5M

(P.T.O..)

14. A). i) Evaluate the implementation of Object Oriented Programming. 5M  
ii) Identify the Python program that overloads + operator, to add two objects of a class. 5M

**OR**

14. B). i) Can you Analyze inheritance class with suitable example in Python? 5M  
ii) Show the working of method overriding works in Python? Explain with an example. 5M

15. A). i) Construct the Two Dimensional Shapes in Python. 5M  
ii) Summarize the process of Display text with Label Widgets in Python. 5M

**OR**

15. B). i) Demonstrate the behavior of terminal based programs and GUI based Programs. 5M  
ii) Determine the implementation of Button Widgets and info Dialog Boxes in Python. 5M

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**R18**

Course Code: A30554



**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**

(UGC AUTONOMOUS)

B.Tech III Semester Supplementary Examinations August-2023

Course Name: **JAVA PROGRAMMING**

(Common for EEE & ECE)

Date: 22.08.2023 AN

Time: 3 hours

Max.Marks: 70

(Note: Assume suitable data if necessary)

**PART-A**

Answer all TEN questions

Each question carries TWO marks.

10x2=20M

1. What is a constant? List out different types of constant literals. 2 M
2. What is type casting? 2 M
3. How do you prevent inheritance in JAVA? 2 M
4. Define Inheritance. List of different types of its forms. 2 M
5. Define StringBuffer class. 2 M
6. What are Checked Exceptions? 2 M
7. How are threads synchronized? 2 M
8. What do you mean by Multi Threading? 2 M
9. List the methods in FileOutputStream class. 2 M
10. What is meant by File Handling in JAVA? 2 M

**PART-B**

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Discuss about the features of constructors and constructor overloading and with an example. 10M
- OR**
11. B). Explain Features of JAVA. 10M
12. A). What is Array? Explain the concept of multi-dimensional arrays with an example. 10M
- OR**
12. B). Explain interfaces with an example program. 10M
13. A). Discuss in detail about creating and importing packages with an example. 10M
- OR**
13. B). Explain about exception handling techniques. 10M
14. A). Explain about the life cycle of a thread. 10M
- OR**
14. B). Explain Thread Priorities with an example program. 10M
15. A). What is the difference between Random Access file and Sequential Access file? 10M
- OR**
15. B). Explain the FileInputStream class with an example program. 10M

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