

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 3/8th 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 that $x^2 + 2x + ky^2$ may be harmonic. 2 M
9. Obtain the Taylor's 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 $t e^{2t} \sin 3t$. 10M
- OR**
11. B). Applying Laplace transforms Solve the differential equation. 10M
 $(D^2 + 9)y = \sin t$, $y(0) = 1$, $y'(0) = 0$
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 Trapezoidal 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) $|Z+1-i|=2$

H.T No:

R18

Course Code: A30224



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

B.Tech III Semester Regular & Supplementary Examinations Feb/March-2023
Course Name: ELECTRICAL ENGINEERING

(Electronics & Communication 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

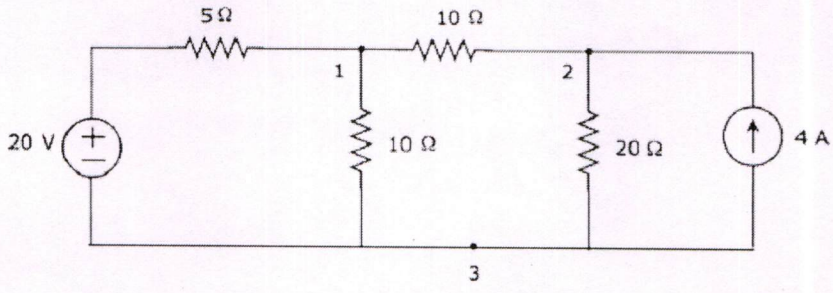
1. State Kirchoff's laws. 2 M
2. Three equal Resistors of 1ohm are connected in series and parallel to 6V source calculate the total current in both cases. 2 M
3. Define RMS and Average Value of a sinusoidal waveform. 2 M
4. Define Q factor and bandwidth. 2 M
5. List four properties of Laplace transform. 2 M
6. Determine the poles and zeros of the driving point impedance $Z(s) = \frac{s+2}{s(s-1)}$ 2 M
7. Define Efficiency and regulation of a Transformer. 2 M
8. List the differences between ideal and practical transformers. 2 M
9. List the importance of brushes and slip rings in DC machine. 2 M
10. Define slip and slip speed. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

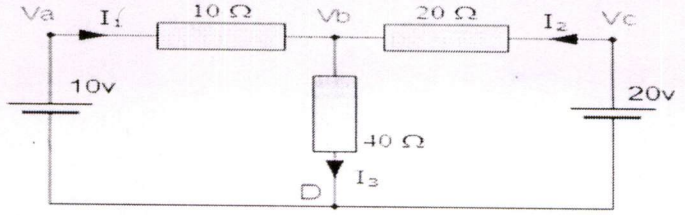
5x10=50M

- 11.A). Calculate the Nodal Voltage in the circuit shown below 10M



OR

11. B). Apply super position theorem to calculate the current I3 in the network shown below 10M



(P.T.O..)

12. A). A sinusoidal voltage of $V(t)=200\sin(314t+30^\circ)$ Volts has applied to a 10 ohms resistor, calculate the following i) Maximum voltage, ii) Frequency, iii) Form factor, iv) Current and v) Power factor. 10M

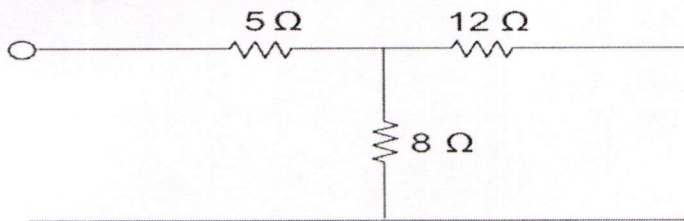
OR

12. B). A series RLC circuit under resonance contains $R=1\text{ohm}$, $L=1\text{mH}$ and $C=1\text{pF}$ connected to a function generator of 10V, calculate the following i) Resonance frequency, ii) Quality factor, iii) bandwidth and iv) half power frequencies. 10M

13. A). Derive the expression for the current in a series RL circuit excited by a DC voltage source at $t=0$ sec. Calculate the Time constant and final value for $R=1\text{ohm}$ & $L=1\text{mh}$. 10M

OR

13. B). Derive the following Two port parameters for the circuit shown below i) Impedance parameters, ii) admittance parameters 10M



14. A). Elaborate the procedure to obtain Losses in the Transformer by conducting suitable tests. 10M

OR

14. B). Explain the operation and working principle of transformer. 10M

15. A). Derive the EMF and Torque equation of a DC machine. 10M

OR

15. B). Explain the operating principle of Induction motor. 10M

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30402



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

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

Course Name: PROBABILITY & STOCHASTIC PROCESSES

(Electronics & Communication 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. State the fundamental Axioms of probability. 2 M
2. List the various conditions that events A, B and C must satisfy if they are to be statistically independent. 2 M
3. If the density function of a random variable X is $f_X(x) = x/2$ $0 \leq x \leq 2$, find $P\{x > 1.5/x > 1\}$. 2 M
4. State the properties of distribution function. 2 M
5. State Central Limit Theorem. 2 M
6. Show that $\text{var}(X+Y) = \text{var}(x) + \text{var}(Y)$, if X&Y are independent random variables. 2 M
7. Define a random process, when does it represent a random variable? 2 M
8. Contrast between auto correlation and cross correlation functions. 2 M
9. Relate Auto correlation function and power density spectrum. 2 M
10. State the properties of Cross power density spectrum. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). i) An experiment consists of observing the sum of the outcomes when two fair dice are thrown. Find the probability that the sum is 7 and find the probability that the sum is greater than 10. 5M
 ii) Three students A, B, C are given a problem. The probabilities of their solving the problem are $\frac{3}{4}$, $\frac{2}{3}$ and $\frac{1}{4}$ respectively. Find the probability that the problem is solved if all of them try it. 5M

OR

11. B). A Random Variable 'X' has Rayleigh distribution. Define its density function. Find Cumulative Distribution Function ($F_X(x)$), Mean, Mean square value and Variance. 10M
12. A). i) State and Prove Total Probability Theorem. 5M
 ii) For a certain binary communication channel, the probability that a transmitted '0' is received as a '0' is 0.8 and the probability that a transmitted '1' is received as '1' is 0.9. If the probability that a '0' is transmitted is 0.4, find the probability that
 a) a '1' is received 5M
 b) a '1' was transmitted given that a '1' was received.

OR

12. B). Derive the Poisson density function and find its mean & variance. 10M

(P.T.O..)

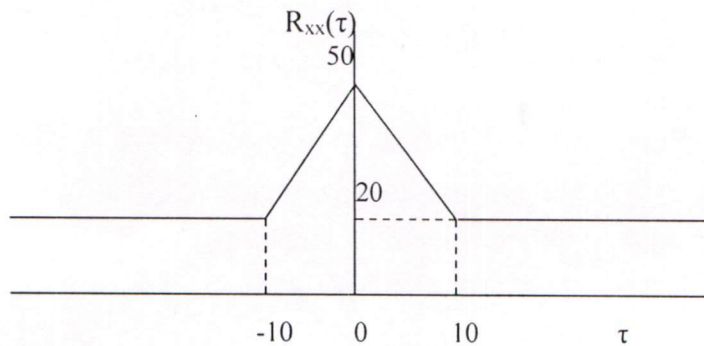
13. A). i) Find the joint characteristic function and moment generating function of uniformly distributed RV 'X' over the interval (-1,+1). 5M

ii) If X and Y are independent exponentially distributed random variables with probability density functions $e^{-x}, x \geq 0$ and $e^{-y}, y \geq 0$ respectively. Find the joint density function of $Z = X+Y$. 5M

OR

13. B). State any three properties of joint characteristic function. 10M
 Let $Z=X+Y-C$, where X and Y are independent random variables with variance σ^2_X, σ^2_Y and C is constant. Find the variance of Z in terms of σ^2_X, σ^2_Y and C.

14. A). For a stationary ergodic process having the autocorrelation function shown in fig. Find 10M
 i) $E[X(t)]$ (ii) $E[X^2(t)]$ (iii) σ_x^2



OR

14. B). Show that the random process $X(t) = A \cos(\omega_0 t + \theta)$ is Wide Sense Stationary (WSS), if A and ω_0 are constants and θ is uniformly distributed Random variable in the interval $(0,2\pi)$. 10M

15. A). A product device is applied with two inputs, one is a random signal X(t) and the other is a high frequency carrier $A \cos(\omega_0 t)$. Find the power spectrum of response in terms of power spectrum of input X(t). 10M

OR

15. B). Derive the relationship between cross power density and cross correlation function. 10M

H.T No:

--	--	--	--	--	--	--	--	--	--

R18

Course Code: A30403



CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(UGC AUTONOMOUS)

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

Course Name: SWITCHING THEORY & LOGIC DESIGN

(Electronics & Communication 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. Given that $(64)_{10} = (100)_b$, determine the value of b. 2 M
2. Obtain the Dual of the following Boolean expressions 2 M
(i) $A+B+A'B'C$ (ii) $AB+A(B+C)+B'(B+D)$
3. State the types of ROM. 2 M
4. Implement OR gate using only two input NAND gates. 2 M
5. Define race around condition. 2 M
6. Write the characteristic equation for JK Flip-flop. 2 M
7. List out the applications of shift registers and counters. 2 M
8. Assume that the 5bit binary counter starts in the 0000 state then what will be the count after 144 input pulses. 2 M
9. Compare mealy and Moore model of finite state machine. 2 M
10. What is state reduction and what is the need for state reduction. 2 M

PART-B

Answer the following. Each question carries TEN Marks.

5x10=50M

- 11.A). Simplify the following Boolean expression: 10M
(i) $F = (A+B)(A'+C)(B+C)$. (ii) $F = A+B+C'+D(E+F)'$
- OR**
11. B). Convert the given decimal number 234 to binary, quaternary, octal, hexadecimal and BCD equivalent. 10M
12. A). Simplify the following expression to sum of products using Tabulation Method: 10M
 $F(a, b, c, d) = \sum m(0,4,8,10,12,13,15) + d(1,2)$
- OR**
12. B). Explain Carry Look Ahead Adder circuit with the help of logic diagram. 10M
13. A). i) Draw the logic symbol, characteristics table and derive characteristics equation of JK flip flop. 5M
ii) Design T Flip Flop by using JK Flip Flop and draw the timing diagram 5M
- OR**
13. B). i) Construct a JK flip-flop using D flip-flop, 2×1 multiplexer and an inverter. 5M
ii) Convert SR flip – flop to T flip – flop. 5M

(P.T.O.)

14. A). Describe the operation of four bit synchronous binary counter with neat sketch. 10M

OR

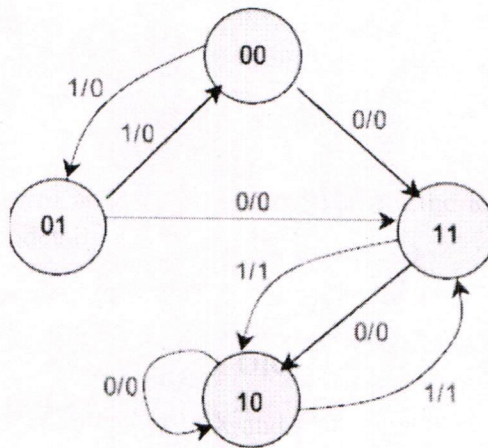
14. B). With a neat circuit diagram and function table, explain the logical operation of a 4-bit universal shift register in detail. 10M

15. A). Draw the ASM chart for binary multiplier. 10M

OR

15. B). A finite state machine (FSM) with input X and output Z is described by the state diagram showing below 10M

- i) Obtain the corresponding state transition table
- ii) Design the FSM with D flip-flops and gates



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 $\rho=10 \Omega$. 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 μ F 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 200 Ω | 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 |

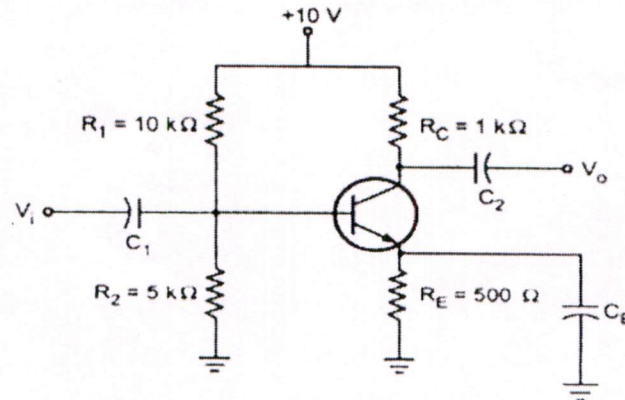
(P.T.O..)

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

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

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
