

Printed Pages– 5

Roll No. ....

**322351(14)**

**B. E. (Third Semester) Examination, Nov.-Dec. 2021**

**(New Scheme)**

**(CSE Engg. Branch)**

**MATHEMATICS-III**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Part (a) is compulsory in each question carrying 2 marks and answer any two parts from part (b), (c) and (d) carrying 7 marks each.***

1. (a) The formulae for finding the half range cosine series for the function  $f(x)$  in  $(0, 1)$  are ..... 2

[ 2 ]

(b) Find the Fourier series for  $f(x)$  in the interval  $(-\pi, \pi)$ , where

$$f(x) = \begin{cases} -x+1 & \text{for } -\pi \leq x \leq 0 \\ x+1 & \text{for } 0 \leq x \leq \pi \end{cases}$$

and deduce the value of  $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$  7

(c) Find the half range sine series for the function

$$f(x) = x - x^2 \text{ in the interval } (0, 1). \quad 7$$

(d) Obtain the first three co-efficients in the Fourier cosine series for  $y$ , where  $y$  is given in the following table : 7

$x :$	0	1	2	3	4	5
$y :$	4	8	15	7	6	2

2. (a) Find 2

$$L^{-1} \left\{ \frac{1}{(s+4)^3} \right\} = \dots$$

(b) Find the Laplace transform of :

[ 3 ]

(i)  $\frac{1 - \cos 3t}{t}$  4

(ii)  $te^{-2t} \sin 3t$  3

(c) Using convolution theorem evaluate : 7

$$L^{-1} \left\{ \frac{1}{s^2(s+1)^2} \right\}$$

(d) Solve differential equation, by transform method 7

$$(D^2 - 3D + 2)y = 1 - e^{2t}, \quad y(0) = 1, \quad y'(0) = 0$$

3. (a) Write Residue theorem. 2

(b) Show that the function  $f(z) = \sqrt{|xy|}$  is not analytic at the origin even though C-R equation are satisfied there of. 7

(c) Using Cauchy's integral formula 7

Evaluate

$$\int_C \frac{e^{2z}}{(z+1)^4} dz, \quad C : |z| = 2$$

[ 4 ]

- (d) Apply the calculus of residues to prove that 7

$$\int_0^{2\pi} \frac{\cos 2\theta}{5+4\cos \theta} d\theta = \frac{\pi}{6}$$

4. (a) From the partial differential equation form 2

$$Z = f(x^2 + y^2)$$

- (b) Solve : 7

$$p - q = \log(x + y)$$

- (c) Solve : 7

$$(D^2 - DD' - 2D'^2)z = (y-1)e^x$$

- (d) Using the method of separation of variables, solve

$$3 \frac{\partial u}{\partial x} = 2 \frac{\partial u}{\partial y} + 0, \quad u(x, 0) = 4e^{-x} \quad 7$$

5. (a) State and explain random variable. 2

- (b) If  $x$  is a contineous random variable with

[ 5 ]

- probability density function given by : 7

$$f(x) = kx \quad (0 \leq x < 2)$$

$$= 2k \quad (2 \leq x < 4)$$

$$= -kx + 6k \quad (4 \leq x < 6)$$

find  $k$  and mean value of  $x$ .

- (c) The probability that a pen manufactured by a company will be defective is  $1/10$ . If 12 such pens are manufactured, find the probability that : 7

(i) exactly two will be defective

(ii) at least two will be defective

(iii) none will be defective

- (d) Fit a poisson distribution to the set of observation. 7

x :	0	1	2	3	4
f :	122	60	15	2	1

Printed Pages – 4

Roll No. : .....

**322352(28)**

**B. E. (Third Semester) Examination, Nov.-Dec. 2021**

**(New Scheme)**

**(CSE Branch)**

**BASIC ELECTRONICS**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Attempt all questions. Part (a) of each question is compulsory. Solve any two parts from (b), (c) and (d) of each question.***

**Unit-I**

1. (a) Define law of junction. 2
- (b) What is diode capacitance? Derive the expression for transition capacitance. 7
- (c) With the help of diagram explain the V-I characteristics of a P-N junction diode. 7

**322352(28)**

**PTO**

[ 2 ]

- (d) For any step-graded junction, prove that 7

$$V_0 = V_T \ln \left( \frac{N_A N_D}{n_i^2} \right)$$

**Unit-II**

2. (a) Explain the necessity of filter at the output of the rectifier. 2
- (b) Draw and explain bridge-rectifier circuit with waveforms. 7
- (c) With the help of neat circuit diagram, explain the working of Zener diode as voltage regulator. 7
- (d) Describe the operation of  $\pi$  filters and calculate its ripple factor. 7

**Unit-III**

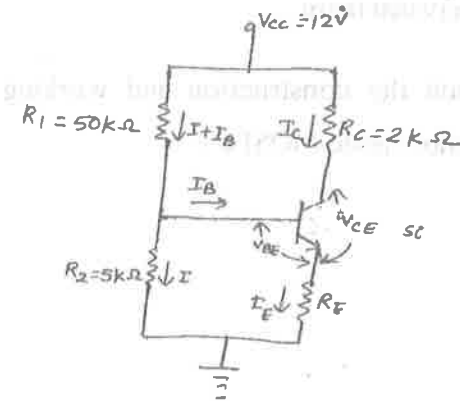
3. (a) Define  $\alpha$  and  $\beta$  of transistor. 2
- (b) With neat circuit diagram explain the various current components in a p-n-p transistor. 7

[ 3 ]

- (c) Explain the input and output characteristics of a transistor in CB configuration. 7
- (d) Explain what is the 'Early Effect', and state its consequences. 7

**Unit-IV**

4. (a) Define three stability factors. 2
- (b) For collector to base bias circuit, determine  $s, s'$  and  $s''$ . 7
- (c) For the circuit shown in fig1,  $I_c = 2\text{mA}$ ,  $\beta = 100$ , calculate.  $R_E, V_{CE}$  and stability factors. 7



[ 4 ]

(d) Explain the diode compensation technique. 7

### Unit-V

5. (a) Draw and explain small signal model of FET at low frequency. 2
- (b) Sketch the drain characteristics of a JFET and explain it before and after pinch off. 7
- (c) Define JFET parameters : 7
- (i) Transconductance ( $g_m$ )
  - (ii) Drain resistance ( $r_d$ )
  - (iii) Amplification factor ( $\mu$ ) and give relation between them.
- (d) Explain the construction and working of the depletion mode MOSFET. 7

Printed Pages – 4

Roll No. : .....

**322353(22)**

**B. E. (Third Semester) Examination, Nov.-Dec. 2021**

**(New Scheme)**

**(CSE Branch)**

**COMPUTATIONAL SCIENCE**

*Time Allowed : Three hours*

*Maximum Marks : 80*

*Minimum Pass Marks : 28*

*Note : Attempt all questions. Part (a) of each unit is compulsory. Attempt any two parts from (b), (c) and (d). Question (a) carry 2 mark, and (b), (c) and (d) carries 7 marks.*

**Unit-I**

1. (a) What do you mean by Program Design?

2

**322353(22)**

**PTO**

[ 2 ]

- (b) Explain modules and modulation criteria. 7
- (c) Describe the concept of test plan and design guidelines. 7
- (d) Explain the following : 7
- (i) Design techniques
  - (ii) Structured flow chart

**Unit-II**

2. (a) Define binding time. 2
- (b) Describe different structured data types in brief. 7
- (c) What do you mean by Encapsulation? Explain it with storage management. 7
- (d) Explain software simulated system in brief. 7

**Unit-III**

3. (a) Define functional programming language. 2
- (b) Write difference between functional and imperative programming language. 7

[ 3 ]

- (c) Explain the concept of LISP programming language. 7
- (d) Describe HASKELL programming language and their futures. 7

**Unit-IV**

4. (a) What is Neuron? 2
- (b) Explain activation function and single layer network in brief. 7
- (c) Describe auto associative neural network with suitable diagram. 7
- (d) Draw nerve structure and explain it in brief. 7

**Unit-V**

5. (a) Define fuzzy set. 2
- (b) Explain the flow diagram and principal of genetic algorithm. 7
- (c) Define fuzzy logic and explain the concept to convert fuzzy to crisp. 7
- (d) Explain the following : 7



[ 4 ]

(i) Mutation

(ii) Properties of fuzzy set

Printed Pages – 5

Roll No. : .....

**322354(22)**

**B. E. (Third Semester) Examination, Nov.-Dec. 2021**

**(New Scheme)**

**(CSE Engg. Branch)**

**PROBLEM SOLVING & LOGIC BUILDING using C**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Attempt all questions. Part (a) of each question is compulsory and carries 2 marks. Any two may be attempted out of parts (b), (c) and (d). Each part is of 7 marks include suitable header file in all your program.***

**Unit-I**

1. (a) How type conversion can be carried out in C?

**322354(22)**

**PTO**

[ 2 ]

- (b) Explain the processes of building compiling and executing a C program with diagram.
- (c) What is flow chart? Also draw the flow chart to calculate area and circumference of circle for given formula.
- (d) Write a C program to find the area of a triangle if its three sides are given

(Formula :  $\text{area} = \sqrt{S(S-a)(S-b)(S-c)}$  . Also draw its flow chart.

### Unit-II

2. (a) Consider the following code

```
# include <stdio.h>
```

```
main ( )
```

```
{
```

```
    int var1, var2;
```

```
    Printf("Enter any number");
```

```
    Scanf("%d", & var1);
```

```
    var2 = var1 + 1;
```

```
    var1 = var2 + 1;
```

322354(22)

[ 3 ]

```
Printf("var2 = %d ln", var2);
```

```
Printf("var1 = %d ln", var1);
```

```
}
```

What would be the output if the user enters 10 as the number?

- (b) Write a program to generate the following Pattern :

```
A  B  C  D  D  C  B  A
```

```
A  B  C          C  B  A
```

```
A  B              B  A
```

```
A                  A
```

- (c) Write a program to generate Fibonacci series using for loop.

- (d) Explain various jump statements in "C" with the help of examples.

### Unit-III

3. (a) What is an array? How it differ from the ordinary variable.

- (b) What is recursion? Write a program which calculate

322354(22)

PTO

[ 4 ]

factorial for a given number using recursive function.

- (c) What are the advantages of using function? Explain function declaration call and definition with the help of an example.
- (d) Write a program to input 4×4 matrix by the using test and print whether the matrix is symmetric or not.

#### Unit-IV

- 4. (a) Array is a sequential data access. Justify the statement.
- (b) How will you represent a one-dimensional integer array using pointer? Write a C program to input an integer array and then display it using the concept of pointer.
- (c) Discuss call by value and call by reference using examples. Why it is recommended to pass structures and arrays using pass by address?
- (d) What are dynamic memory allocation? Explain each one of them with an example.

[ 5 ]

#### Unit-V

- 5. (a) What is the difference between a text file and a binary file?
- (b) Write a program that concatenates two file which appends the content of one file to the end of another file write the result in the third file.
- (c) Can a structure be within a structure? Give appropriate example to support your answer.
- (d) What are user define data types? What is their use in programming?

Printed Pages – 4

Roll No. : .....

**322355(22)**

**B. E. (Third Semester) Examination, Nov.-Dec. 2021**

**(New Scheme)**

**(CSE Branch)**

**COMPUTER CONCEPTS & WEB TECHNOLOGY**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Attempt all questions. Part (a) of each question is compulsory and carries 2 marks each and attempt two parts from (b), (c) and (d) carrying 7 marks each.***

**Unit-I**

1. (a) What is system clock?

[ 2 ]

- (b) What do you mean by system software? Explain its types.
- (c) Differentiate between 32-bit and 64-bit processor.
- (d) Why an operating system is required for a computer? Explain the following :
- (i) Batch operating system
  - (ii) Multiprogramming operating system

#### Unit-II

2. (a) What is protocol?
- (b) What are the services provided by Internet? Describe the working of email system.
- (c) Explain Asynchronous, synchronous and Isochronous mode of transmission.
- (d) Draw and explain :
- (i) Twisted pair cable
  - (ii) Coaxial cable

#### Unit-III

322355(22)

[ 3 ]

3. (a) How will you create a password field in HTML form.
- (b) Design an HTML page which makes use of internal and external hyperlinking as well as image as link.
- (c) What is DTD? How to define DTD for single element, Nested element and attribute in XML?
- (d) What is XSL, XLINK, XPATH and XPOINTER?

#### Unit-IV

4. (a) What is scripting language?
- (b) Describe exception handling using try-catch statement in Java Script.
- (c) Explain in detail CSS border of CSS outline.
- (d) Explain about the object that helps AJAX to reload parts of a web page reloading the whole page.

#### Unit-V

5. (a) How is session tracking achieved by URL rewriting.

322355(22)

PTO

[ 4 ]

- (b) Explain the life cycle of applet. How will you pass parameters to applet.
- (c) Explain the environment variable in CGI & also explain debugging the CGI program.
- (d) Describe the type of operation used in perl.

Printed Pages – 4

Roll No. : .....

**322356(28)**

**B. E. (Third Semester) Examination,**

**Nov.-Dec. 2021**

**(New Scheme)**

**(CSE Branch)**

**DIGITAL ELECTRONICS & LOGIC DESIGN**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Attempt all units. Part (a) of each unit is compulsory carrying 2 marks. Attempt any two parts from parts (b), (c) and (d) carrying 7 marks each.***

**Unit-I**

1. (a) State De Morgan's theorem. 2
  
- (b) Minimize the following using K-map 7

**322356(28)**

**PTO**



[ 2 ]

$$f(A, B, C) = \sum m(1, 2, 3, 5, 7)$$

(c) Simplify the expression

$$Y = \Pi(0, 1, 4, 5, 6, 8, 9, 12, 13, 14) \quad 7$$

(d) Simplify Boolean function : 7

$$F(A, B, C, D) = \sum m(1, 3, 7, 11, 15) + \sum d(0, 2, 5)$$

### Unit-II

2. (a) Define "fan in" and "fan out". 2

(b) Describe Resistor Transistor Logic (RTL) with its logic operation with relevant diagram. 7

(c) Explain ECL with circuit diagram. 7

(d) Draw and explain TTL NAND gate. 7

### Unit-III

3. (a) Define combinational circuit. 2

[ 3 ]

(b) Describe full adder circuit. Design full adder with two half adder. 7

(c) Design a 4 bit binary to gray code converter. 7

(d) Describe multiplexer and demultiplexer circuit with diagram. 7

### Unit-IV

4. (a) Define Asynchronous and synchronous counter. 2

(b) Describe Master slave JK flip-flop in detail. 7

(c) Describe D flip-flop and T flip-flop with truth table and block diagram. 7

(d) Describe serial input parallel output and serial input serial output. 7

### Unit-V

5. (a) Define state diagram. 2

(b) Describe mealy state and moore state machine in detail. 7

(c) Draw and explain PLA. ; 7

(d) Short notes on static RAM and Dynamic RAM. 7

# B000311(014)

B. Tech. 3rd Semester (AICET Scheme)

Examination Nov-Dec 2021

Branch: Chem, Civil, CSE, Elec, EEE, ET & T, IT, Mech, Mining,  
Mechatronics, Automobile, Agriculture, Plastic

Mathematics-III

Time Allowed : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note: Attempt all questions. Part (a) of each question is compulsory and carries 4 marks. Attempt any two parts from (b), (c) and (d) of each question carry 8 marks.

## UNIT-I

Q. 1. (a) Find the inverse transform of  
$$\frac{4s+5}{(s-1)^2(s+2)}$$

4

(b) Find the Laplace transform of  
$$\frac{1-\cos t}{t^2}$$

8

(c) Using convolution theorem to prove that  
$$L^{-1}\left\{\frac{8}{(s^2+1)^3}\right\} = (3-t^2)\sin t - 3t\cos t.$$

8

(d) Solve the differential equation by transform method  
$$ty'' + 2y' + ty = \sin t, \text{ when } y(0) = 1$$

8

## UNIT-2

Q. 2. (a) Form the partial differential equation from  $z = f(x^2 + y^2, z - xy)$

(b) solve  $z(y^2 - z^2)p + y(z^2 - x^2)q = z(x^2 - y^2)$

(c) solve  $(D^2 - DD' - 2D'^2)z = (y-1)e^x$

(d) solve by method of separation of variables

$$\frac{\partial u}{\partial x} = 4 \frac{\partial u}{\partial y}, \quad u(0, y) = 8e^{-3y}$$

## UNIT-3

Q. 3. (a) A variate  $x$  has a probability distribution

$x$ :	-3	6	9
$P(x=x)$ :	$\frac{1}{6}$	$\frac{1}{2}$	$\frac{1}{3}$

Find  $E(x)$  and  $E(x^2)$ . Hence evaluate  $E(2x+1)^2$

(b) If  $x$  is a continuous random variable with probability density function given by

$$f(x) = \begin{cases} kx & 0 \leq x \leq 2 \\ 2k & 2 \leq x < 4 \\ -kx + 6k & 4 \leq x < 6 \end{cases}$$

Find  $k$  and mean value of  $x$ .

(c) Find the moment generating function of the exponential distribution

$$f(x) = \frac{1}{c} e^{-x/c}, \quad 0 \leq x < \infty, \quad c > 0$$

Hence find its mean and S.D.

- (c) out of 800 families with 5 children each, how many would you expect to have  
 (a) 3 boys (b) 5 girls (c) Either 2 or 3 boys  
 Assume equal probabilities for boys and girls.

### UNIT-4

Q.4. (a) Find the missing values in the following

$x:$	0	5	10	15	20	25
$f(x):$	6	10	$\bar{\phantom{0}}$	17	—	31

(b) Given  $\sin 45^\circ = 0.7071$ ,  $\sin 50^\circ = 0.7660$ ,  
 $\sin 55^\circ = 0.8192$ ,  $\sin 60^\circ = 0.8660$   
 find  $\sin 52^\circ$  using Newton's forward interpolation

(c) Find  $F(35)$  correct upto 2 places, using Stirling's formula

$x:$	20	30	40	50
$F(x):$	512	439	346	243

(d) Using Newton's divided difference formula evaluate  $f(9)$  and  $f(15)$ , given

$x:$	4	5	7	10	11	13
$f(x):$	48	100	294	900	1210	2028

### UNIT-5

Q.5. (a) If  $\frac{dy}{dx} = x - y$ ,  $y(0) = 1$  find the value of  $y(1)$  using Picard's method

(b) solve  $\frac{dy}{dx} = x+y$ ,  $y(0)=1$  by Taylor's series method. Hence find the value of  $y$  at  $x=0.1$  and  $x=0.2$

(c) Using Runge-Kutta method of fourth order to solve

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}, \quad y(0)=1 \quad \text{at } x=0.2 \text{ and } x=0.4.$$

(d) Given  $2 \frac{dy}{dx} = (1+x^2)y^2$  and

$$y(0)=1, \quad y(0.1)=1.06, \quad y(0.2)=1.12$$

$$y(0.3)=1.21$$

Evaluate  $y(0.4)$  by Milne's predictor corrector method.

— x —

Printed Pages – 4

Roll No. : .....

**B022312(022)**

**B.Tech. (Third Semester) Examination**

**Nov.-Dec. 2021** AICTE

**(CSE Branch)**

**DATA STRUCTURE & ALGORITHMS**

***Time Allowed : Three hours***

***Maximum Marks : 100***

***Minimum Pass Marks : 35***

***Note : Attempt any two parts from (b), (c) and (d)  
carry 8 marks and part (a) is compulsory of  
each unit contain 4 marks.***

**Unit-I**

1. (a) What is data structure? Explain time and space complexity. 4

(b) Write the Algorithm to insert new node at the

[ 2 ]

begining, at the middle position and at the end of a single linked list. 8

- (c) Write an algorithm to add two polynomials represented using linked list. 8
- (d) Explain sparse Matrices and their representation. 8

**Unit-II**

- 2. (a) Define overflow and underflow in stack. 4
- (b) Write an algorithm for recursive solution to the Tower of Hanoi problem for N disk. 8
- (c) Write an algorithm for push, pop and traversing of stack by using array. 8
- (d) Explain Priority Queue and also explain how you implement it by using array. 8

**Unit-III**

- 3. (a) What is Tree? Explain Array and Linked representation of Binary Trees. 4
- (b) Construct A Binary Tree from given Inorder and

[ 3 ]

Preorder Traversals. 8

Preorder : A B D H E C F G

Inorder : D H B E A F C G

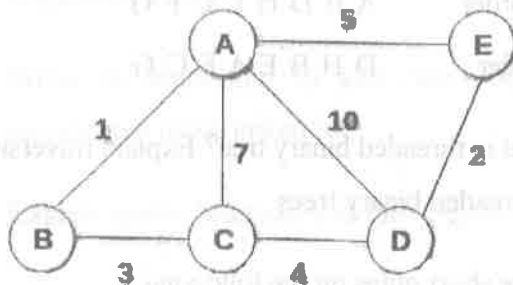
- (c) What is threaded binary tree? Explain traversing in threaded binary trees. 8
- (d) Write short notes on the following : 8
  - (i) Full binary tree
  - (ii) Complete binary tree
  - (iii) Strictly binary tree
  - (iv) Extended binary tree

**Unit-IV**

- 4. (a) What is graph explain sequential and linked representations of graph? 4
- (b) Write DFS algorithm for graph traversal with suitable example. 8
- (c) Find the minimum spanning tree of the following graph using Kruskal's algorithm. 8



[ 4 ]



- (d) Explain Warshalls algorithm for shortest path in graph. 8

### Unit-V

5. (a) Explain Linear search. 4
- (b) Consider inserting the key - 29, 46, 18, 36, 43, 21, 24, 54 into hash table of size ( $M=11$ ) using linear probing consider the primary hash ( $\cdot$ ) is  $H(k)=k \pmod{m}$ . 8
- (c) Explain B+ tree and Hash Function. 8
- (d) Sort the following array by using radix sort. 8

348, 143, 361, 423, 538, 128, 321, 543, 366

Printed Pages – 3

Roll No. : .....

**B022314(022)**

**B. Tech. (Third Semester) Examination,**

**Nov.-Dec. 2021**

**(AICTE Scheme)**

**(CSE Engg. Branch)**

**DIGITAL ELECTRONICS & LOGIC DESIGN**

***Time Allowed : Three hours***

***Maximum Marks : 100***

***Minimum Pass Marks : 35***

***Note : Part (a) is compulsory and attempt any two parts from (b), (c) and (d).***

**Unit-I**

1. (a) Convert 10101001 in Gray code.

4

[ 2 ]

- (b) State and prove Demorgan's law. 8
- (c) Describe NAND and NOR gate as universal gate. 8
- (d) For 7 bit hamming code received code is 1111101  
find error use even parity. 8

**Unit-II**

2. (a) Define Fan in and Fan out. 4
- (b) Describe CMOS NAND gate. 8
- (c) Describe CMOS NOR gate. 8
- (d) Describe TTL open collector circuit. 8

**Unit-III**

3. (a) Define the term Combinational Circuit. 4
- (b) Describe full adder circuit with diagram and truth table. 8
- (c) Design 4×16 decoder using 3×8 decoder. 8
- (d) Implement the Boolean expression  
$$F(A, B, C) = \Sigma m(0, 2, 5, 6)$$
  
using 4 : 1 multiplexer. 8

[ 3 ]

**Unit-IV**

4. (a) Define sequential circuits. 4
- (b) Describe S-R flip-flop with diagram. 8
- (c) What is race around condition and also describe  
master slave flip-flop? 8
- (d) Describe how to convert D flip flop into T flip-flop. 8

**Unit-V**

5. (a) Define state diagram. 4
- (b) Describe Mealy State Machine. 8
- (c) Describe Moore State Machine. 8
- (d) Describe basic components of ASM charts. 8

Printed Pages – 5

Roll No. : .....

**B022315(022)**

**B. Tech. (Third Semester) Examination,  
Nov.-Dec. 2021**

**AICTE (New Scheme)**

**(CSE Branch)**

**OPERATING SYSTEMS**

**Time Allowed : Three hours**

**Maximum Marks : 100**

**Minimum Pass Marks 35**

**Note :** Attempt all questions. Part (a) of each question is compulsory. Attempt any two from (b), (c) and (d) parts of each question. Part (a) carry 4 marks each and part (b), (c) and (d) carry 8 marks each.

**Unit-I**

1. (a) What do you mean by time sharing operating? Give an example.

4

[ 2 ]

- (b) What are the functions of operating system? Explain in brief. 8
- (c) Explain the working and architecture of an operating system in detail. 8
- (d) Explain the various system calls in an operating system. 8

**Unit-II**

2. (a) Define process control block with proper diagram. 4
- (b) Consider the above set of processes that arrive at time zero. Calculate the average waiting time, average turnaround time and throughput with FCFS and SJF. 8

Process	Burst time
P <sub>1</sub>	5
P <sub>2</sub>	24
P <sub>3</sub>	16
P <sub>4</sub>	10
P <sub>5</sub>	3

[ 3 ]

- (c) What do you mean by Dining Philosopher method? Explain with suitable diagram. 8
- (d) Explain Producer-Consumer problem in detail. 8

**Unit-III**

3. (a) Define resource allocation graph with suitable diagram. 4
- (b) Explain the method used in deadlock prevention. 8
- (c) What are the four necessary conditions required to hold a deadlock? 8
- (d) An operating system uses the banker's algorithm for deadlock avoidance when managing the allocation of three resource types X, Y, and Z to three processes P<sub>0</sub>, P<sub>1</sub> and P<sub>2</sub>. The table given below presents the current system state. Here, the allocation matrix shows the current number of resources of each type allocated to each process and the max matrix shows the maximum number of resources of each type required by each process during its execution. 8

[ 4 ]

	Allocation			Max		
	X	Y	Z	X	Y	Z
P0	0	0	1	8	4	3
P1	3	2	0	6	2	0
P2	2	1	1	3	3	3

There are 3 units of type X, 2 units of type Y and 2 units of type Z still available. The system is currently in safe state. Consider the following independent requests for additional resources in the current state :

REQ 1 : P0 requests 0 units of X, 0 units of Y and 2 units of Z

REQ 2 : P1 requests 2 units of X, 0 units of Y and 0 units of Z

**Unit-IV**

- 4. (a) Define resident monitor. 4
- (b) Explain address translation from logical address to physical address. 8

[ 5 ]

- (c) What is page replacement algorithm? Explain any one algorithm with example. 8
- (d) What is thrashing? State the cause of thrashing. 8

**Unit-V**

- 5. (a) What is buffering? 4
- (b) Explain virtual machine operating system. 8
- (c) Explain file organization and access mechanism. 8
- (d) Explain the various disk scheduling algorithm with suitable example. 8