

Seat No. : \_\_\_\_\_

**AE-141**  
**April-2019**  
**M.Sc., Sem.-II**  
**410 : Statistics**  
**(Computer Programming)**  
**(New)**

**Time : 2:30 Hours]**

**[Max. Marks : 70**

**Instruction :** Scientific Calculator is allowed.

1. (A) Answer the following :

(1) Discuss applications of computer in various fields. 7

(2) Economic order quantity can be evaluated from the equation  $Q = \sqrt{\frac{2RS}{I}}$ , where R is the yearly requirement, S is the setup cost and I is inventory carrying cost per item. Draw a flow chart to compute EOQ of 100 items. 7

**OR**

(1) Explain the terms :

- (i) Hardware
- (ii) Software
- (iii) Programmes
- (iv) Data
- (v) File
- (vi) Document
- (vii) User

(2) The mean arrival rate of persons at a cinema house ticket window is  $\lambda$  and the mean service rate with which the ticket issuer can issue tickets is  $\mu$ . If it is assumed that the arrival and the service process follow a Poisson distribution, then the probability that there are n person waiting in a queue is

$$P_n = \left(\frac{\lambda}{\mu}\right)^n \left(1 - \frac{\lambda}{\mu}\right), \text{ where } \frac{\lambda}{\mu} < 1$$

If  $\mu = 20$ ,  $\lambda = 4$ , draw a flow chart to compute  $P_n$  for  $n = 0, 1, 2, 3, 4, 5$ .

(B) Answer any **four** :

4

- (1) What is meant by 'Algorithm' ?
- (2) State advantages of flow charts.
- (3) State major functions performed by an 'Operating system'.
- (4) Explain : Source program and object program
- (5) Evaluate the expression

$$j = \frac{\left(\frac{57}{4} + \frac{31}{19} + \frac{15}{6} * 2\right)}{\left(\frac{23}{5} + \frac{7}{8}\right)}, \text{ where } j \text{ is integer}$$

- (6) Evaluate the expression

$$x = \frac{\frac{10.5}{14.1} + \frac{32.0}{5.7} + 56.0}{(2.0 * 8.1 * 2.2)}$$

where  $x$  is float.

2. (A) Answer the following :

- (1) Explain the following terms with suitable examples :

7

- (i) Type Declaration Instruction.
- (ii) Arithmetic Instruction
- (iii) Integer and Float conversions
- (iv) Hierarchy of operations
- (v) Input and Output statements

- (2) Write a C++ programme to obtain value of  $2 \times 2$  Two-person-zero-sum game without saddle point having payoff matrix of player A as :

7

$$\begin{array}{cc} & \textbf{Player B} \\ & \begin{array}{cc} B_1 & B_2 \end{array} \\ \textbf{Player A} & \begin{array}{l} A_1 \left[ \begin{array}{cc} a_{11} & a_{12} \end{array} \right] \\ A_2 \left[ \begin{array}{cc} a_{21} & a_{22} \end{array} \right] \end{array} \end{array}$$

**OR**

- (1) Define the following terms with suitable examples :

- (i) if statement
- (ii) if-else statements
- (iii) Multiple statements within if
- (iv) Nested if-else statement

- (2) Write a C++ program to evaluate the following function :

A function  $f(x)$  is given by

$$f(x) = \begin{cases} x(x-5)(x-6) & \text{if } 0 \leq x < 5 \\ (x-5)(x-6)(x-7) & \text{if } 5 \leq x < 7 \\ 0 & \text{if } x \geq 7 \end{cases}$$

- (B) Answer any **four** :

4

- (1) What is meant by 'Logical Operators' ?
- (2) Explain the term 'Conditional Operators'.
- (3) Convert the following equation into C++ statement.

$$y = \frac{\left( \frac{5}{x_1} + 8 \left( \frac{1}{x_2} + \frac{1}{x_3} \right) \right)}{\left( \frac{2}{x_5} + \frac{3}{x_6} \right)}$$

- (4) Find the decimal equivalent of binary number  $(1101)_2$ .
- (5) Find conversion of binary number  $(10111.1101)_2$  into corresponding octal number.
- (6) Obtain conversion of binary number  $(1110011.1110)_2$  into corresponding octal number.

3. (A) Answer the following :

- (1) Discuss while loop, for loop and Nesting of loops with suitable examples. 7
- (2) Write a C++ program to obtain sum of the series : 7

$$1 + \frac{1}{3} + \frac{1}{5} + \frac{1}{7} + \dots + \frac{1}{99}$$

**OR**

- (1) Discuss break statement, continue statement and do-while loop in details.
- (2) Consider the quadratic polynomial

$y = 3x^2 - 7x + 28$ . Write a C++ program which finds  $y$  for values of  $x$  from  $(-10)$  to  $(+50)$  in steps of  $(2.0)$ .

- (B) Answer any **three** : 3
- (1) Find conversion of Hexadecimal number  $(FBE)_{16}$  into corresponding Binary number.
  - (2) Find conversion of octal number  $(25.25)_8$  into Hexadecimal number.
  - (3) Obtain conversion of binary number  $(1001.1101)_2$  into corresponding hexadecimal number.
  - (4) Find conversion of decimal number  $(125.5)_{10}$  in to binary number.
  - (5) What is meant by 'Header files' ?

4. (A) Answer the following :

- (1) Define 'Function'. Discuss its utility. Explain pointers with suitable examples. 7
- (2) A factory gives following rates of commission for monthly sales of the product : 7

Monthly Sales (in ₹)	Commission
Below 20,000	No commission
20001 to 25000	5% commission
25001 to 35000	7% commission
above 35000	10% commission

Write a C++ program to read the sales and print the commission.

**OR**

- (1) Define 'Arrays'. Explain two dimensional and three dimensional arrays with suitable examples. Discuss array of pointers.
- (2) Write a C++ program to obtain TRACE of a matrix A, where  $A = (a_{ij})_{3 \times 3}$

- (B) Answer any **three** : 3
- (1) What is meant by string ?
  - (2) Explain the term 'Turnery Operator'.
  - (3) Define 'Structures'.
  - (4) Explain switch statement.
  - (5) What is meant by 'One Dimensional Array' ?

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**Instruction :** Scientific Calculator is allowed.

1. (A) Answer the following :

- (1) Explain the following terms : 7
- (i) Processor
  - (ii) Memory and Storage
  - (iii) Input-Output Devices
  - (iv) Software
- (2) Draw a flow chart to obtain Karl Pearson correlation coefficient between following two variables X and Y where 7
- $$X = x_1, x_2, \dots, x_n, Y = y_1, y_2, \dots, y_n$$

**OR**

- (1) Discuss applications of computers in various fields.
- (2) Draw a flow chart to obtain coefficient of variation (c.v.) for the following n observations.
- $$x_1, x_2, x_3, \dots, x_n.$$

(B) Answer any **Four** : 4

- (1) Define 'Algorithm'.
- (2) What is meant by 'Computer Hardware' ?
- (3) Explain the term : Machine Language.
- (4) What is meant by 'Micro Computers' ?

(5) Evaluate the expression.

$$j = \frac{\left(\frac{58}{6} + \frac{29}{21} * 3\right)}{2}, \text{ where } j \text{ is integer.}$$

(6) Evaluate the expression.

$$x = \frac{\frac{8.0}{13.0} + \frac{29.0}{5.0} + 55.0}{(3.0 * 8.5)}$$

where  $x$  is float.

2. (A) Answer the following :

(1) Explain the following terms with suitable examples :

7

- (i) Input-Output statements
- (ii) Type Declaration Instruction
- (iii) Arithmetic Instruction
- (iv) Integer and Float Conversions
- (v) Constant and Variable

(2) Let  $X$  be a random variable having following probability distribution :

7

<b>X</b>	$x_1$	$x_2$	$x_3$	$x_4$	$x_5$	$x_6$
<b>P(x)</b>	$p_1$	$p_2$	$p_3$	$p_4$	$p_5$	$p_6$

Write a C++ program to obtain  $E(X^2)$ .

**OR**

(1) Discuss various Branching Statement using suitable examples.

(2) Write a C++ programme to compute the following functions :

$$f(x) = \begin{cases} x^2 + 5 & \text{if } x \geq 0 \\ x - 2 & \text{if } x < 0 \end{cases}$$

(B) Answer any **four** :

4

(1) Convert the equation :

$$r = \frac{2v + 1.23(c + k)}{\left(\frac{1}{x} + \frac{1}{y}\right)} \text{ into corresponding C++ statement.}$$

(2) Convert the C++ statement

$$\frac{\left(\frac{5}{x_1} + \frac{4}{x_2} + \frac{3}{x_3}\right)}{\left(\frac{2}{x_4}\right) * \left(\frac{3}{x_5}\right)}$$

into corresponding algebraic expression.

(3) Find decimal equivalent to binary number  $(0101)_2$ .

(4) Find conversion of binary number  $(1010.1111)_2$  into corresponding octal number.

(5) Find conversion of binary number  $(10011011.1010)_2$  into corresponding hexadecimal number.

(6) Define the term 'Logical Operators'.

3. (A) Answer the following :

(1) Discuss while loop, for loop and Nesting of loops with suitable examples. 7

(2) Write a C++ program to obtain sum  $\sum_{n=1}^{100} \left(\frac{1}{n^2}\right)$ . 7

**OR**

(1) Discuss break statement, continue statement and do-while loop in details.

(2) Consider the quadratic polynomial  $y = 2x^2 - 3x + 5$ . Write a C++ program which finds y for values of x from -4 to +4 in steps at 0.5

(B) Attempt any **Three** : 3

(1) Find conversion of Hexadecimal number  $(CAE)_{16}$  into corresponding Binary number.

(2) Find the conversion of Octal number  $(43.5)_8$  into Hexadecimal number.

(3) Obtain conversion of binary number  $(1100.1011)_2$  into corresponding Hexadecimal number.

(4) Find conversion of decimal number  $(25.25)_{10}$  into binary number.

(5) What is meant by conditional operators ?

4. (A) Answer the following :

(1) Explain the following terms : 7

- (i) Array initialization
- (ii) Two-dimensional Arrays
- (iii) Array of Pointers
- (iv) Structures

(2) Write a C++ program to obtain TRACE of a matrix A, where  $A = (a_{ij})_{3 \times 3}$ . 7

**OR**

(1) Define 'Function'. Explain the reasons of using functions with suitable examples. What is meant by pointers ?

(2) The monthly commission paid to a sales person is as follows :

If sales  $< ₹ 10,00$ , no Commission

If sales  $\geq 10000$  but less than ₹ 50,000, 10% commission

If sales  $\geq ₹ 50,000$ , 12% commission

Write C++ program to compute commission.

(B) Answer any **three** : 3

- (1) Define 'Strings'.
  - (2) What is meant by 'Pointers to functions' ?
  - (3) Explain the term 'Ternary Operator'.
  - (4) State the meaning of 'Header files'.
  - (5) Find  $(1111)_2 + (0101)_2$ .
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