No. of Printed Pages : 7

CS-08

00507

ADCA / MCA (II Year)

Term-End Examination

June, 2011

CS-08 : NUMERICAL AND STATISTICAL COMPUTING

Time : 3 hours *Maximum Marks : 75*

Note : *(i) Use of **calculator** is **allowed**.*

*(ii) Question number **1** is **compulsory**. Answer **any three** questions from the rest.*

---

1. (a) What is the final value of B in the following programme ? **10x3=30**

```
B = 5.65
B = (B + 0.09)*20
J = B
B = J
B = B/10.0
```

Further, if the value of B were taken as 5.45 instead of 5.65 at the beginning of the above program, what would be the final value ?

(b) What is the value of I calculating in the following arithmetic statements ?

(i) $I = J * 2/4 + K/3 + 8 - J ** 3/8$

$(J = 2, k = 6)$

(ii) $M = M + N*10$

$I = M \qquad (M = 2, N = -6)$

(iii) $A = SQRT\ (Z * T) + X ** 2$

$I = A$

$(Z = 12.0, T = 3.0, X = -4.0)$

(c) Write a FORTRAN 90 statement for each of the following :

(i) $$p = \frac{s^3 - t^3}{t + q^2 + e^x} + \frac{rt^9}{9\,s}$$

(ii) $$y = 4s^2 + 9s + 6 + \sqrt{(ac)^p}$$

(iii) $$v = u + at$$

(d) What is the value of x, if the mean of 3, 4, x, 7, and 10 is 6 ?

(e) Given the following formula

$$FDD = \frac{1}{e^U - 1}$$

Write a FORTRAN 90 programme that will prepare a table of this function for U varying from 1.0 to 10.0 in steps of 0.05.

(f) Write a FORTRAN 90 program that computes the value of R, R is given by the relation $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$. R, R_1, R_2 are real numbers in same units.

(g) Find the line of regression of y on x :

x :	1	2	3	4	5	8	10
y :	9	8	10	12	14	16	15

(h) The measurement (in mm) of the diameters of the heads of 107 screws gave the following frequency distribution.

Diameter	33 - 35	36 - 38	39 - 41	42 - 44	45 - 47
Frequency	17	19	23	21	27

(i) A box A contains 2 white and 4 black balls. Another box B contains 5 white and 7 black balls. A ball is transferred from the box A to the box B. Then a ball is drawn from the box B. Find the probability that it is white.

(j) What value will be stored in location K at the end of the following sequence ? Justify your answer.

```
      DO   100      J=1, 5
      K=5
      DO   100      N=1, 10
100   K=K+N
      PRINT *,      K.
```

2. (a) In the following frequency distribution, the frequency of the class - interval (40 - 50) is missing. It is known that the mean of the distribution is 52. Find the missing frequency. **3x5=15**

Class Interval	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
Frequency	5	3	4	?	2	6	13

(b) The probability density function of a variable X is

X	0	1	2	3	4	5	6
P(X)	K	3K	5K	7K	9K	11K	13K

(i) Find $P(X < 4)$, $P(X \geq 5)$, $P(3 < X \leq 6)$

(ii) What will be the minimum value of K so that $P(X \leq 2) \geq 3$?

(c) Write short note on Moving Average Method.

3. (a) Write a FORTRAN 90 programme that read the radius and calculate the surface area and volume of a sphere. **3x5=15**

$\left(\text{Given Area} = 4\pi r^2 \text{ ; Volume} = \frac{4}{3}\pi r^3\right)$

(b) Explain the following :

(i) INTEGER B(60, 60)

(ii) LOGICAL MARKS (120)

(iii) REAL SALES (20, 25, 5)

(iv) REAL B(50, 50)

(v) CHARACTER * 20 C(10), M(60)

(c) In an entrance test that is graded on the basis of two examination, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing at least one of them is 0.95. What is the probability of passing both ?

4. (a) The data about annual production of an Indian state, is given below : **3x5=15**

Commodity	Wheat	Sugar	Rice	Maize	Gram
Annual Production (in tonnes)	2750	2500	1500	1000	1250

Draw a pie chart to represent the above data.

(b) Given the statement :

DIMENSION A(50), B(30, 30), C(40)

Identify errors, if any, in the following FORTRAN statements.

(i) Z = A(5.0) + B(30.0)/7.5

(ii) B(1, 1) = A/C * A(4)/B (2, 2)

(iii) DO 66, I = 1, M,

(iv) DO 8, I = I, 3

(v) DO 44 K = 1, M + 2, N

(c) Find the errors in each of the following statements, Give reasons also

(i) The probability that it will rain tomorrow is 0.40, and the probability that it will not rain tomorrow is 0.52.

(ii) On a single draw from a deck of playing cards, the probability of selecting a heart is $\frac{1}{4}$, the probability of selecting a black card is $\frac{1}{2}$ and the probability of selecting a heart and a black card is $\frac{1}{8}$.

5. (a) The two regression equations of the variables x and y are **3x5=15**

$$x = 19.13 - 0.87y, \text{ and}$$

$$y = 11.64 - 0.50x.$$

Find

(i) mean of x's

(ii) mean of y's, and

(iii) the correlation coefficient between x and y.

(b) Two one-dimensional arrays X and Y have 50 elements each. Write a FORTRAN program to compute and print the quantities,

$$P = \sum_{K=1}^{50} (x_k + y_k)^2$$

$$R = \sum_{K=1}^{50} |x_k - y_k|$$

(c) An article manufactured by a company consists of two parts A and B. In the process of manufacture of part A, 9 out of 100 are likely to be defective. Similarly, 5 out of 100 are likely to be defective in the manufacture of part B. Calculate the probability that the assembled article will not be defective (assuming that the events of finding the part A non - defective and that of B are independent)

6. (a) Find the correlation coefficient between x and y from the given data : **3x5=15**

x :	78	89	97	69	59	79	68	57
y :	125	137	156	112	107	138	123	108

(b) Write a FORTRAN 90 statement for each of the following :

(i) $EOQ = \sqrt{\frac{2DC_o}{C_cC_3}}$

(ii) $EOQ = \sqrt{\frac{2DC_o}{C_c}\left(\frac{C_c + C_s}{C_s}\right)}$

(iii) $TC = \sqrt{2DC_oC_c\left(1 - \frac{C}{P}\right)}$

(iv) $R = X^{2/3}\,Y^{3/7} + \sqrt{(X + Y)Z} + \left|X^2 + Y^2\right|$

(v) $Z = \sqrt{R^2 + \left(\omega L - \frac{1}{\omega C}\right)^2}$

(c) Write short note on limb relative method.