SE. SEM: IV . I.T. & comp. 22/11/2017

Applied Maths. IV

Q.P. Code :23022

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question.No.1 is compulsory.
2. Attempt any three questions from Q.2 to Q.6
3. Use of statistical table permitted.
4. Figures to the right indicate full marks.

Q.1

a) Evaluate $\int_C \log z \, dz$ where C is the unit circle in the z - plane. 05

b) Find the eigen values of the adjoint of $A = \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 0 \\ -1 & 0 & 2 \end{bmatrix}$ 05

c) If the arithmetic mean of regression coefficient is p and their difference is 2q, find the correlation coefficient. 05

d) Write the dual of the following L.P.P. 05

Maximise $Z = 2x_1 - x_2 + 4x_3$

Subject to $x_1 + 2x_2 - x_3 \leq 5$

$2x_1 - x_2 + x_3 \leq 6$

$x_1 + x_2 + 3x_3 \leq 10$

$4x_1 + x_3 \leq 12$

$x_1, x_2, x_3 \geq 0$

Q.2

a) Evaluate $\int_C \frac{\cot z}{z} dz$ where C is the ellipse $9x^2 + 4y^2 = 1$ 06

b) Show that $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 5 \end{bmatrix}$ is non- derogatory. 06

c) If X is a normal variate with mean 10 and standard deviation 4, find 08

i) $P(|X - 14| < 1)$, ii) $P(5 \leq X \leq 18)$, iii) $P(X \leq 12)$

Q.3 a) Find the expectation of number of failures preceeding the first success in an infinite series of independent trials with constant probabilities p & q of success and failure respectively. 06

b) Using Simplex Method solve the following L.P.P 06

Maximise $Z = 10x_1 + x_2 + x_3$

Subject to $x_1 + x_2 - 3x_3 \leq 10$

$4x_1 + x_2 + x_3 \leq 20$

$x_1, x_2, x_3 \geq 0$

c) Expand $f(z) = \frac{1}{z(z+1)(z-2)}$ 08

(i) Within the unit circle about the origin.

(ii) with in the annulus region between the concentric circles about the origin having radii 1 and 2 respectively.

(iii) In the exterior of the circle with centre at the origin and radius 2.

Q.4 a) If X is Binomial distributed with mean=2 and variance = 4/3, find the probability distribution of X. 06

b) Calculate the value of rank correlation coefficient from the following data regarding score of 6 students in physics & chemistry test. 06

Marks in Physics : 40, 42, 45, 35, 36, 39

Marks in Chemistry : 46, 43, 44, 39, 40, 43

c) Is the matrix $A=\begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$ diagonalisable? If so find the diagonal form and the transforming matrix. 08

Q.5 a) A random sample of 50 items gives the mean 6.2 and standard deviation 10.24 . Can it be regarded as drawn from a normal population with mean 5.4 at 5% level of significance? 06

b) Evaluate $\int_0^\infty \frac{dx}{(x^2+a^2)^3}$, $a>0$ Using Cauchy's residue theorem. 06

c) Using Kuhn-Tucker condition to solve the following N.L.P.P 08

Maximise $Z = 8x_1 + 10x_2 - x_1^2 - x_2^2$

Subject to $3x_1 + 2x_2 \leq 6$

$x_1, x_2 \geq 0$

Q.6 a) The following table gives the number of accidents in a city during a week. Find whether the accidents are uniformly distributed over a week. 06

Day:	Sun,	Mon,	Tue,	Wed,	Thu,	Fri,	Sat,	Total.
No. of accidents:	13	15	9	11	12	10	14	84

b) If two independent random samples of sizes 15 & 8 have respectively the following means and population standard deviations, 06

$\overline{X_1} = 980$ $\overline{X_2} = 1012$

$\sigma_1 = 75$ $\sigma_2 = 80$

Test the hypothesis that $\mu_1 = \mu_2$ at 5% level of significance.

(Assume the population to be normal)

c) Using Penally (Big M) method solve the following L.P.P. 08

Minimise $Z = 2x_1 + x_2$

Subject to $3x_1+x_2 = 3$

$4x_1+3x_2 \geq 6$

$x_1+2x_2 \leq 3$

$x_1 , x_2 \geq 0$

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(5)

SE SEM IV CBGS

COAA 12/12/17

Q.P. Code :23710

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question.No.1 is compulsory.
2. Solve any **three** questions out of remaining five questions.
3. Assume suitable data if necessary
4. Figures to right indicate marks

Q. 1 Attempt **any 4** sub questions.

a) Define the terms Computer Organization and Computer Architecture. **(05)**
b) Draw and explain single and double precision IEEE 754 binary floating point representation formats. **(05)**
c) List and Explain important parameters significant in choosing a computer memory. **(05)**
d) Draw and explain five stage instruction pipelining. **(05)**
e) Explain Programmed I/O technique of Data transfer. **(05)**

Q. 2 a) Calculate the number of page hits and faults using FIFO, LRU and OPTIMAL page replacement algorithms for the following page frame.
Sequence: 5,6, 6, 3, 8, 5, 7, 8, 6, 5, 8, 5. (FRAME SIZE = 3). **(10)**
b) Draw and explain basic instruction execution cycle. **(10)**

Q. 3 a) Explain memory hierarchy of a computer. **(10)**
b) Describe Flynn's classification in detail. **(10)**

Q. 4 a) Describe different addressing modes. **(10)**
b) Draw the flowchart of Booths algorithm and multiply (6)*(-4) using Booths algorithm. **(10)**

Q. 5 a) Explain interrupt driven I/O technique of Data transfer. **(10)**
b) Explain hardwired approach to the design of a control unit. **(10)**

Q. 6 Write notes on **(any three)** **(20)**
a) Register Organization of a processor
b) Von Neumann architecture
c) Associative memory
d) Nano Programming
e) Pipeline Hazards

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COMP. SE-IV - CBS GS - 22/12/17

QP CODE: 24607

(2)

Duration: 3 Hours ~~Compiler Systems~~ Computer Graphics **Total Marks assigned: 80**

N.B.: (1) Question No. **1 is compulsory**.

(2) Attempt any **three** of remaining **five** questions.

(3) Assume any suitable **data** if necessary and justify the same.

1. (a) What is antialiasing? Explain any one method of antialiasing. [05]
   (b) Define shearing and give example. [05]
   (c) Derive the transformation matrix for fixed point scaling. [05]
   (d) Explain inside outside test used in filling algorithm. [05]

2. (a) Explain the midpoint circle generation algorithm. [10]
   (b) Discuss all the steps used in reflection of an object about an arbitrary line with an example. [10]

3. (a) Explain the Cohen-Sutherland line clipping algorithm with suitable example. [10]
   (b) Explain any one polygon clipping algorithm. [10]

4. (a) Define window, viewport and derive window to viewport transformation. [10]
   (b) Discuss parallel and perspective projections. [10]

5. (a) Discuss Bezier curve with its properties. [10]
   (b) Explain Gouraud and Phong shading along with their advantages and disadvantages [10]

6. Write a short note on any **two** of the following [20]
   (a) 3-D representation methods.
   (b) Area Subdivision method
   (c) Fractals.

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