Ministry of Higher Education & Scientific Res.
Salahaddin University- Erbil
Collage of Science
Computer Science & IT Department

Subject: Linear Algebra& Statistic
Class: 2nd

Q1) Answer the following:

a) **A problem is given to three people P, Q , R whose respective chances of solving it are 2/7, 4/7, 4/9 respectively. What is the probability that the problem is solved?**
b) **Two die are rolled, find the probability that the sum is equal to 1.**
c) **Tickets numbered 1 to 20 are mixed up and then a ticket is drawn at random. What is the probability that the ticket drawn has a number which is a multiple of 3 or 5 ?**
d) **Rotate x=(4,2) ,** $\frac{\pi}{4}$ **Counter-clockwise and then project on the x-axis.**
e) **Given u=(3,-1,4) and v=(2,0,1),then** $(v \times u)$ **=……**

Q2) Calculate Mean, Median, Mode for the following grouped data

Class	Frequency
10-12	5
13-15	8
16-18	5
19-21	10
22-24	2

Q3) Consider the polynomials $p(x)=1+3x+2x^2$, $q(x)=x+3+2x^2$, $r(x)=x^2+2x$ in P_2 ,is{p(x),q(x),r(x)} L.D or L.I ? Why?

Q4) Find all the Eigen values for the given matrix

$$A=\begin{bmatrix} 1 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 1 \end{bmatrix}$$

Q5)Prove that the set $V = M_{n\times n}$,which contains square matrix and $|M_{n\times n}| = 0$ is not avector space .

Instructor :Assist. Lect.: Dalya. A.Anwar

Q 6)By Using Cramer's rule solve the following system of linear equation (using while loop) write program and results

$$\begin{aligned} x + 3y - 2z &= 5 \\ 3x + 5y + 6z &= 7 \\ 2x + 4y + 3z &= 8 \end{aligned}$$

Q7) Find root of function $f(x) = 4xe^{-x^2} - 1$ using False position Method and Bisection method,in $[0, \frac{pi}{2}]$ and e=0.0001 ,in which iteration the root appears? Write the result of last iteration. (use while) don't use function inline .

Q8) *Write program that evaluate the sum of diagonal elements of a matrix and multiply the result by 3 when the input matrix is square and its size is greater than 3.(using while loop)*

Q9) Create a script file to generate (N X N) matrix in form like using (while, if)

$$\begin{bmatrix} 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \end{bmatrix}$$

Q10) Write a program to find $cos\theta$ for any two vectors , don't forget the norm should be positive ,then check if the vectors are orthogonal or not.

Q11) Write a Matlab program with

• input parameters A, a matrix,

and n, an integer,

• output parameter p where p = −1 if there is no column n in A; otherwise p is the maximum absolute value in column n of A

Q12) write program to evaluate the value of e^x , using while

$$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots + \frac{x^n}{n!} + \ldots$$

Q13) Write a program to display the multiplication table , using while.

Q14) let Grades are to be assigned as follows:

A 80% - 100%

B 65% - 79%

C 50% - 64%.

Write a script file to input a mark for **4** students and display the appropriate grade. If the user enters a number greater than 100 or less than zero, display that the mark is invalid.

Q15) write matlab program that evaluate the sum of series below

$$sum = \sum_{i=1}^{n} \frac{(-1)^{i-1}\, x^{2i-1}}{(2i-1)!}$$

Q16) ***Write program that evaluate the sum of first row of matrix and multiply the result by 3 when the input matrix is square and its sum of diagonal elements are equal to zero.(using while loop)***

Q17) Using a for loop to investigate the following consider all possible outputs , when x is from -6 to 8 in increments of 0.5, Also display how many answers are greater than 5

$$f(x) = \begin{cases} (6+x) & x < 0 \\ (x-2)+2 & 0 \le x \le 4 \\ \dfrac{x^2}{x+1} + 3e^{-4x}cos5x - \left(\dfrac{2e^{-3x}}{sin2x}\right) & x > 4 \end{cases}$$