Reg. No.:....

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Q.P. Code : [21 SC 03]

(For the candidates admitted from 2021 onwards)

B.Sc./B.C.A. DEGREE EXAMINATION, JANUARY 2022.

First Semester

Part III — Computer Science / Computer Application / Information Technology / Computer Technology / Software Systems / Multimedia and Web Technology / Hardware Systems and Networking Computer Science and Application

Allied : MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE

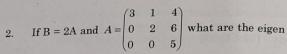
Time : Three hours Maximum : 50 marks

Answer ALL questions.

PART A —  $(10 \times 1 = 10 \text{ marks})$ 

Choose the correct answer:

- 1. For any square matrix if rank < n then
  - (a) |A| = 1
- (b) A is singular
- (c) |A| = n
- (d) A is non singular



values of B?

- (a) 3/2, 1, 5/2 (b) -3, -2, -5
- (c) 4, 6, 10 (d) 2, 3, 5

The iterative method of solving simultaneous equation is — method.

- (a) Gauss Elimination
- (b) Gauss Jordon
- (c) Gauss seidal
- (d) Newton Raphson

In Gauss Elimination method of solving simultaneous linear equation the coefficient matrix A is reduced into \_\_\_

- (a) Diagonal matrix
- (b) Lower triangular matrix
- Unit matrix
- (d) Upper triangular matrix

 $\Delta y_1 =$ 

- (a)  $y_0 y_1$
- (b)  $y_1 y_0$
- (c)  $y_2 y_1$
- (d)  $y_1 y_2$

6.	Using Newtons forward interpolation formula to find x at which the function is maxima or minima from the given tabular values we assume	
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- (a)  $\frac{dy}{dx} > 0$
- (b)  $\frac{dy}{dx} < 0$
- (c)  $\frac{dy}{dx} = 0$
- (d)  $\frac{dy}{dx} =$

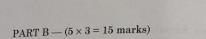
7. The sum of squares of deviation of set of values is \_\_\_\_\_ When taken about mean.

- (a) mode
- (b) Crude mode
- (c) median
- (d) mean

- (a) A.M > G.M > H.M (b) A.M > H.M > G.M
- (c) G.M > H.M > A.M (d) G.M > A.M > H.M

9. The variables 
$$x$$
 and  $y$  are not linearly correlated when ————.

- (a) r = 0
- (b) r = 1
- (c) r = -1
- (d)  $r = \pm 1$
- 10. Regression coefficients are independent of
  - (a) Change of origin
  - (b) Change of scale
  - (c) Change of origin and scale
  - (d) Change of origin but not scale



Answer ALL questions.

11. (a) Find the inverse of the matrix  $A = \begin{pmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{pmatrix}.$ 

Or

(b) Find the Rank of the matrix

 $A = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 6 & 7 & 8 & 9 & 10 \\ 11 & 12 & 13 & 14 & 15 \\ 16 & 17 & 18 & 19 & 20 \\ 21 & 22 & 23 & 24 & 25 \end{pmatrix}$ 

12. (a) Solve by Gauss elimination method x-y+z=1, -3x+2y-3z=-6,

$$x-y+z=1, -3x+2y-2x-5y+4z=5.$$

Or

(b) Solve the following system of equation by Gauss Jordan method

$$5x + 3y = 11, \ 2x + 9y = 20$$

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(a)

(b)

18.4

(a)

Cl

(b)

(a)

(b) If x and y same mean and regression lines are y = ax + b,  $x = ay + \beta$  find common mean and correlation coefficient.

PART C —  $(5 \times 5 = 25 \text{ marks})$ 

Answer ALL questions.

- 16. (a) Verify Cayley-Hamilton theorem for the matrix  $A = \begin{pmatrix} 1 & 0 & 3 \\ 2 & 1 & -1 \\ 1 & -1 & 1 \end{pmatrix}$ .
  - (b) Find the eigen values and eigen vectors of the matrix  $A = \begin{pmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 0 & 0 & 1 \end{pmatrix}$ .
- 17. (a) Solve by Gauss Jordon method  $x+2y+z=3,\ 2x+3y+3z=10,$  3x-y+2z=13 Or
  - (b) Solve the following system of equation by Gauss Seidel method. 8x-3y+2z=20; 4x+11y-z=33; 6x+3y+12z=35.

18. (a) Evaluate  $\int_0^1 e^{-x^2} dx$  using Trapezoidal rule by taking n=5.

Or

- (b) Evaluate  $\int_0^\pi \sin x \ dx$  by Simpson's rule dividing the range into 10 equal parts.
- 19. (a) Obtain Mean, Median and Mode of the following.

x:	10-25	25-40	40-55	55-70	70-85	85-100
f:	6	20	44	26	3	1

Or

(b) Following are the marks obtained by two students. Who is more intelligent and who is more consistent?

A	74	75	78	72	78	77	79
В	87	84	80	88	89	85	86

- - 20. (a) Obtain the coefficient of correlation and find the lines of regression from the data given below.

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<i>y</i> :	20	20	21	29	27	24	27	31

Or

(b) If  $\theta$  be the angle between the lines of regression, show that  $\tan\theta = \frac{1-r^2}{r} \frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2}$ .

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- (a)
- (b)
- (c)
- (d)