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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Evaluate $\int_0^{1+i}(x^2 - iy)\,dz$ along $y=x$
Option A:	1
Option B:	6
Option C:	-1
Option D:	0
2.	Evaluate $\int_C \dfrac{dz}{z^3(z+4)}$ where C is the circle |z|=2
Option A:	0
Option B:	лi/32
Option C:	1
Option D:	4
3.	Compute a coefficient of correlation between X & Y
Option A:	1
Option B:	0.7
Option C:	2
Option D:	4
4.	Find the extremals of $\int_{x_1}^{x_2} \dfrac{y'^2}{x^2}\,dx$
Option A:	$y = c_1 x^3 + c_2$
Option B:	$y = c_1 x + c_2$
Option C:	$y = c_1 x^5 + c_2$
Option D:	$y = c_1 x^6 + c_2$
5.	Find k if pdf of rv X is
Option A:	1/5
Option B:	1/49
Option C:	2
Option D:	7

For Question 3:

X	3	6	4	5	7
Y	2	4	5	3	6

For Question 5:

X	0	1	2	3	4	5	6
P(X=x)	k	3k	5k	7k	9k	11k	13k

6.	Which trial equation Raleigh-Ritz method assume?
Option A:	$\bar{y}(x) = a + bx + cx^2$
Option B:	$\bar{y}(x) = ax + bx^2$
Option C:	$\bar{y}(x) = a + bx$
Option D:	$\bar{y}(x) = a + bx^2$
7.	Find E(X) if $f(x) = x$ $\qquad 0 \le x \le 1$
Option A:	1/3
Option B:	1
Option C:	2
Option D:	0
8.	If $u = (2,1,0)$ then $\|u\|$
Option A:	$\sqrt{50}$
Option B:	$\sqrt{3}$
Option C:	$\sqrt{5}$
Option D:	1
9.	The matrix form of the Quadratic form $x^2 - 2y^2 + 3z^2 - 4xy + xz - 2yz$ is
Option A:	$\begin{bmatrix} x & y & z \end{bmatrix} \begin{bmatrix} 1 & -2 & 1/2 \\ -2 & -2 & -1 \\ 1/2 & -1 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix}$
Option B:	$\begin{bmatrix} x \\ y \\ z \end{bmatrix} \begin{bmatrix} 1 & 0 & 2 \\ 2 & -2 & -1 \\ 1/2 & 1 & 3 \end{bmatrix}$
Option C:	$\begin{bmatrix} 1 & -2 & 1/2 \\ -2 & -2 & -1 \\ 1/2 & -1 & 3 \end{bmatrix} \begin{bmatrix} x & y & z \end{bmatrix}$
Option D:	$\begin{bmatrix} x \\ y \\ z \end{bmatrix} \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x & y & z \end{bmatrix}$
Q.10	If $u = (2,1,0)$ & $v = (1,-1,0)$ then u-v is
Option A:	(1,1,1)
Option B:	(1,2,0)
Option C:	(2,1,1)
Option D:	(0,0,0)

Q2	Solve any Four out of Six	5 marks each
A	Evaluate where C is the circle $\int_C \frac{e^{2z}}{(z-1)(z-2)}\, dz\, dz$, where c is $|z| = 3$.	
B	Fit a straight line to the following data X: 6 2 8 5 8 Y: 4 5 6 7 9	
C	For a normal variate with mean 30 and standard deviation 6. Find the probability $P(5 \leq X \leq 18)$.	
D	Find a vector orthogonal to both $u = (-6,4,2)$ and $v = (3,1,5)$.	
E	Reduce the quadratic form $x^2 - y^2 + 5z^2 + 2xy + 2yz + 4xz$ to canonical form using congruent transformations.	
F	Find the extremals of $\int_{x_1}^{x_2} \frac{y'^2}{x^3}\, dx$.	

Q3	Solve any Four out of Six	5 marks each
A	Using residue theorem evaluate $\int_C \frac{3z^2+z}{z^2-1}\, dz$ at $|z|=2$	
B	Calculate R from the following data X: 3 7 2 7 2 Y: 13 19 17 15 21	
C	Three factories A, B, C produce 30%, 50% and 20 % of the total production of an item. Out of their production 80%, 50% and 10% are defective. An item is chosen at random and found to be defective. Find the probability that it was produced by the factory A.	
D	Construct an orthonormal basis of R^3 Using Gram-Schmidt process to S={(1,2,0),(0,3,1)} .	
E	Reduce the quadratic form to Diagonal form. $6x^2 - y^2 + 14z^2 + 2xy + 2yz + 4xz$ Also find its rank & signature.	
F	Find the extremals of $\int_{x_1}^{x_2}(2xy - y''^2)dx$ dx	

Q4	Solve any Four out of Six	5 marks each
A	Expand $f(z) = \frac{1}{(z-1)(z+2)}$ about $z = -1$	
B	Calculate r from the following data X: 12 15 21 25 23 Y: 125 120 115 116 120	
C	Fit a poission distribution to the following data No. of deaths : 0 1 2 3 4 Frequencies : 120 60 12 1 2	
D	Let V be a set of positive real numbers with addition and scalar multiplication defined as (a,b)+(c,d) = (a+c, b*d) and K(a,b)=(ka,0) Show that V is a vector space under this addition and scalar multiplication.	
E	Find the singular value decomposition of $[4\ 4\ -3\ 3]$.	
F	Using Rayleigh-Ritz method , solve the boundary value problem $\int_{x0}^{x1}(2xy - y^2 - y'^2)\, dx$; $0 \leq x \leq 1$ given y(0) = y (1) = 0 .	