0106_R19_C Scheme_Extc_IV_ECC401_EMIV_QP

University of Mumbai
Examination 2021 under cluster 05 (Lead College: APSIT)
Examinations Commencing from 1st June 2021 to 10th June 2021
Program: BE Electronics and Telecommunication Engineering
Curriculum Scheme: Rev 2019 'C' Scheme
Examination: SE Semester IV
Course Code: ECC401   and Course Name: Engineering Mathematics IV

Time: 2 hour   Max. Marks: 80

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* Required

If x is a discrete random variable with the following probability distribution

x	1	2	3
P(x)	a	2a	a

Find P(X ≤ 2).

○ 1/4

○ 1/2

◉ 3/4

○ 1

Clear selection

The following results were obtained from records of age (x) and systolic blood pressure (y) of a group of 10 men:

	x	y
mean	53	142
variance	130	165

Correlation coefficient = 0.8
Estimate the blood pressure of a man whose age is 45?

- ⦿ 134.78
- ◯ 130.56
- ◯ 129.56
- ◯ 137.56

Clear selection

If X and Y are independent random variables with means 2,3 and variance 1,2 respectively, find the mean and variance of the random variable Z = 2X - 5Y

- ⦿ -11 , 54
- ◯ 19 , 54
- ◯ 19 , -8
- ◯ -11, -8

Clear selection

Name *

Sparsh Singh

SEAT NO *

20211EX4071

Evaluate $\int_C \frac{e^z}{z-1} dz$ where C where c is the circle $|z| = 2$.

○ 2 πi

○ 2 πie^2

◉ 2 πie

○ πie^2

Clear selection

Branch *

◉ EXTC

CONTACT NO *

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If the tangent of the angle made by the line of regression of y on x is 0.6 and $\sigma_x = \frac{1}{2}\sigma_y$. Find the correlation coefficient between x and y.

○ - 2 .5

○ 0. 25

○ - 0. 3

◉ 0. 3

Clear selection

A coefficient of correlation is computed to be -0.95 means that

⦿ The relationship between the two variables is weak

◯ The relationship between the two variables is strong and positive.

◯ The relationship between the two variables is strong but negative.

◯ The correlation coefficient cannot have this value.

Clear selection

A necessary condition for $I = \int_{x_1}^{x_2} f(x, y, y^I, y^{II}) dx$ to be an extremal is that

$$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y^I}\right) + \frac{d^2}{dx^2}\left(\frac{\partial f}{\partial y^{II}}\right) = 0$$

⦿ Option 1

$$\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y^I}\right) = 0$$

◯ Option 2

$$\frac{\partial f}{\partial y} + \frac{d}{dx}\left(\frac{\partial f}{\partial y^I}\right) = 0$$

◯ Option 3

$$\frac{\partial f}{\partial y} + \frac{d}{dx}\left(\frac{\partial f}{\partial y^I}\right) + \frac{d^2}{dx^2}\left(\frac{\partial f}{\partial y^{II}}\right) = 0$$

◯ Option 4

Clear selection

Find the value of the integral $\int_0^{1+i}(x^2 - iy)dz$ along   the path $y = x$

- ⦿ (5-i)/6
- ◯ (5+i)/6
- ◯ (1+5i)/6
- ◯ (1-5i)/6

Clear selection

Find $E(X)$ if X has the p.d.f $f(x) = \begin{cases} \frac{3}{4}(2x - x^2) & ,0 \le x \le 2 \\ 0 & ,otherwise \end{cases}$

- ◯ 3/2
- ⦿ 1
- ◯ 2
- ◯ 1/2

Clear selection

Find the residue of $f(z) = \dfrac{z^2}{(z+2)(z-1)^2}$ at $z = -2$

- ◯ 1/9
- ◯ 5/9
- ◯ 1/3
- ⦿ 4/9

Clear selection

The extremal of the functional $I=\int_a^b (16y^2 - y^{||^2} + x^2)dx$ is

$y = c_1 \cos 2x + c_2 \sin 2x$

○ Option 1

$y = c_1 e^{2x} + c_2 e^{-2x}$

○ Option 2

$y = c_1 e^{2x} + c_2 e^{-2x} + c_3 \cos 2x + c_4 \sin 2x$

● Option 3

$y = c_1 e^x + c_2 e^{-x} + c_3 \cos x + c_4 \sin x$

○ Option 4

Clear selection

If $u = (3, 1, 4, -2)$ $v = (2, 2, 0, 1)$ then find $\langle u, v \rangle$ and $\|u\|, \|v\|$

○ -6 , √(30) , √10

○ 5 , √2 , √6

○ 5 , √30 , 3

● 6 , √30 ,3

Clear selection

Write down the matrix of the quadratic form
$x_1{}^2 + 2x_2{}^2 - 7x_3{}^2 - 4x_1x_2 + 6x_2x_3 + 8x_3x_1$

$$\begin{bmatrix} 1 & -2 & 4 \\ -2 & 2 & 3 \\ 4 & 3 & -7 \end{bmatrix}$$

○ Option 1

$$\begin{bmatrix} 1 & -4 & 8 \\ -4 & 2 & 6 \\ 8 & 6 & -7 \end{bmatrix}$$

⦿ Option 2

$$\begin{bmatrix} 1 & 2 & 4 \\ 2 & 2 & 3 \\ 4 & 3 & -7 \end{bmatrix}$$

○ Option 3

$$\begin{bmatrix} 1 & 4 & 8 \\ 4 & 2 & 6 \\ 8 & 6 & 7 \end{bmatrix}$$

○ Option 4

Clear selection

Identify the type of singularity of the function $f(z) = \frac{sinhz}{z^7}$

○ z = 0 is a pole of order 7 for the given function

⦿ z = 0 is a pole of order 6 for the given function

○ z = 0 is an essential singularity

○ z = 0 is a pole of order 3 for the given function

Clear selection

Suppose the number of accidents occurring weekly on a particular stretch of a highway follow a Poisson distribution with mean **3** .Calculate the probability that there is at least one accident this week.

○ 0.6 347

◉ 0.9502

○ 0.7275

○ 0.8002

Clear selection

Find the rank , signature, index of the transformed quadratic   form
$$3y_1{}^2 + \frac{2}{3}y_2{}^2 - \frac{39}{2}y_3{}^2.$$

○ rank = 3, signature =2, index =1

◉ rank = 3, signature =1, index =2.

○ rank = 2, signature =3, index =1.

○ rank = 2, signatur e=1, index =3.

Clear selection

The functional $I=\int_a^b (y'^2 + 12xy)dx$ has the following extremal with c_1 and c_2 as arbitrary constants.

$$c_1 x^3 + c_2 x$$

◉ Option 1

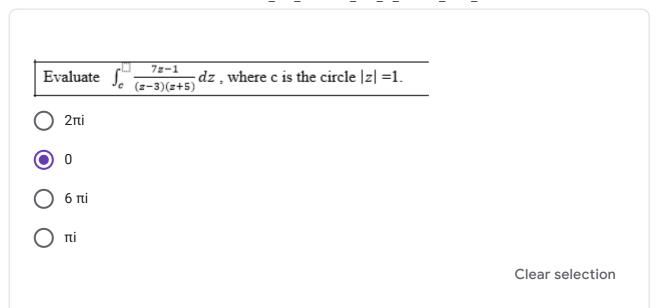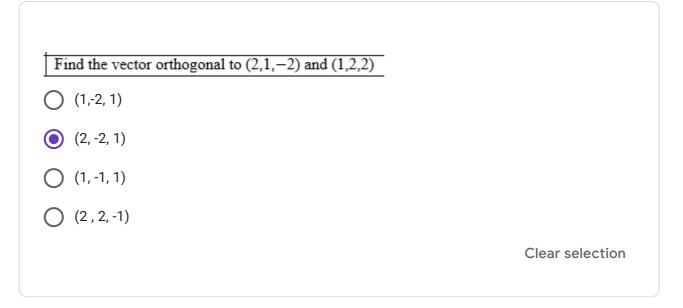$$x^2 + c_1 x + c_2$$

○ Option 2

$$c_1 x + c_2$$

○ Option 3

$$x^3 + c_1 x + c_2$$

○ Option 4

Clear selection

Determine which of the following are subspaces of R^3

$W_1 = \{(a, 0, b), a, b \in R\}$

$W_2 = \{(a, b, 1), a, b \in R\}$

W_1 and W_2 are the subspaces of R^3

○ Option 1

W_1 and W_2 are not the subspaces of R^3

○ Option 2

W_1 is a subapace of R^3 but W_2 is not a subspace of R^3

○ Option 3

W_1 is not a subapace of R^3 but W_2 is a subspace of R^3

⦿ Option 4

Clear selection

SUBJECT *

⦿ EM IV

Evaluate $\int_{c} \frac{7z-1}{(z-3)(z+5)} dz$, where c is the circle $|z| = 1$.

- ○ 2πi
- ● 0
- ○ 6 πi
- ○ πi

Clear selection

Find the vector orthogonal to $(2,1,-2)$ and $(1,2,2)$

- ○ (1,-2, 1)
- ● (2, -2, 1)
- ○ (1, -1, 1)
- ○ (2 , 2, -1)

Clear selection

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