

No Preview  
Available

Total No. of Question : [4]

Registration No. :

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Programme Name : Bachelor of Chemical Engineering  
Regular S.Y.B.Tech. ESE ( A.Y. 2023-24) Sem. III Nov.2023  
III SEMESTER ( 2022 BATCH)  
201CHL201-Engineering Mathematics-III (TH)

Duration : [ 11:00 AM - 01:00 PM ]

Date : 21 Nov, 2023

Day : Tuesday

Marks : 50

Instructions :

1.Read questions carefully.

(Q1) Attempt the following questions.

[20.0]

(1.1)

[6.0]

$$\text{Solve } (D^2 - 2D + 4)y = e^x \cos 2x$$

CO :- C201.1

Blooms Taxonomy :- Understand, Apply

(1.2)

[7.0]

The size of the hats is normally distributed with the mean 18.5 cm and standard deviation is 2.5 cm. How many hats in a total of 2000 will have size between (i) 18 cm and 20 cm  
(ii) above 20 cm

(Given for standardized normal variable (S.N.V) area between  $z = 0$  to  $z = 0.6$  is 0.2257  
and area between  $z = 0$  to  $z = 0.2$  is 0.0793)

CO :- C201.2

Blooms Taxonomy :- Understand, Apply

(1.3)

[7.0]

$$\text{Evaluate } \int_0^{\infty} e^{-t} \left( \frac{1 - \cos t}{t} \right) dt$$

CO :- C201.3

Blooms Taxonomy :- Understand, Apply

(Q2) Attempt the following questions.

[10.0]

(2.1)

[4.0]

Find the equations of the lines of regression of the following data.

x	2	4	6	8	12	14
y	4	2	5	10	11	12

CO :- C201.4

Blooms Taxonomy :- Understand, Apply

(2.2)

[6.0]

Fit a parabola for the following data. Take x as independent variable.

x	1	2	3	5	7	11	13	17	19	23
y	2	3	5	7	11	13	17	19	23	29

OR

The equations to the two lines of regression are  $6y = 5x + 90$  and  $15x = 8y + 130$   
Find the means of x and y. If the variance of x is 16 then find standard deviation of y.

CO :- C201.4

Blooms Taxonomy :- Understand, Apply

(Q3) Attempt the following questions.

[10.0]

(3.1)

[4.0]

Find the angle between the tangents to the curve

$$\overline{r(t)} = ti + t^2j + t^3k \text{ at points } t = 1 \text{ and } t = -1$$

CO :- C201.5

Blooms Taxonomy :- Understand, Apply

(3.2)

[6.0]

Prove that  $\vec{F}$  is a solenoidal and determine a,b,c if  $\vec{F}$  is irrotational. Where,

$$\vec{F} = (x + 2y + az)i + (bx - 3y - z)j + (4x + cy + 2z)k$$

OR

Find the value of a for which the vector  $\vec{F} = (x^2 - yz + ax)i + (z^2 - 3y)j + (y^2 - 2xz)k$  is solenoidal. Also check whether is  $\vec{F}$  irrotational or not.

CO :- C201.5

Blooms Taxonomy :- Understand, Apply

(Q4) Attempt any two of the following.

[10.0]

(4.1)

[5.0]

Solve by method of separation of variables

$$\frac{\partial u}{\partial x} = 4 \frac{\partial u}{\partial y} \quad \text{where } u(0, y) = 8e^{-3y}$$

CO :- C201.6

Blooms Taxonomy :- Understand, Apply

(4.2)

[5.0]

A homogeneous rod of conducting material of length  $l$  has ends kept at zero temperature and the temperature at the centre is  $T$  and falls uniformly at zero at two ends. Then find temperature  $u(x, t)$  at any time.

CO :- C201.6

Blooms Taxonomy :- Understand, Apply

(4.3)

[5.0]

Solve Laplace equation by using Gauss-Seidal method

$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$

for the figure given on the r.h.s.

	100		100		100		
50							50
0		$u_7$		$u_8$		$u_9$	0
0		$u_4$		$u_5$		$u_6$	0
0		$u_1$		$u_2$		$u_3$	0
0							0
	0		0		0		

CO :- C201.6

Blooms Taxonomy :- Understand, Apply

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