**Printed Page:- 04** 

#### Subject Code:- BBT0101

2C-202

Roll. No:

# NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

**B.Tech** 

SEM: I - THEORY EXAMINATION (2024 - 2025)

**Subject: Elementary Mathematics** 

#### Time: 3 Hours General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.
1. This Question paper comprises of three Sections -A, B, & C. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.
2. Maximum marks for each question are indicated on right -hand side of each question.
3. Illustrate your answers with neat sketches wherever necessary.
4. Assume suitable data if necessary.
5. Desfemble antice the anomalous in connection and an antice of the section.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

### **SECTION-A**

1. Attempt all parts:-

1-a. If  $x^2 = -9$  then the value of x is : (CO1, K1)

- (a) (-2, 2)
- (b) (-2,∞)
- (c)  $(2, \infty)$
- (d) No solution

(1/2, 3/2)

1-b. If -2 < 2x - 1 < 2 then the value of x lies in the interval. (CO1, K1)

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(b) (-1/2, 3/2)

(a)

- (c) (3/2, 1/2)
- (d) (3/2, -1/2)

1-c.



- (a) 0
- (b) 1
- (c) 2
- (d) -2

Max. Marks: 100

20

1

1

1-d.	The derivative of function $f(x) = 2x^2 + 3x - 5$ at $x = -1$ is : (CO2,K1)		1
	(a)	1	
	(b)	-1	
	(c)	0	
	(d)	4	
1-e.	T	he value of $\int \frac{2x}{x^4+1} dx$ is : (CO3, K1)	1
	(a)	$\sin^{-1}(\mathbf{x}^2) + \mathbf{c}$	
	(b)	$\cos^{-1}(x^2) + c$	
	(c)	$\sec^{-1}(\mathbf{x}^2) + \mathbf{c}$	
	(d)	$\tan^{-1}(\mathbf{x}^2) + \mathbf{c}$	
1-f.	Ir	ntegration of	1
	x sinx is : (CO3, K1)		
	(a)	x sinx-cosx+c	
	(b)	x cosx-cosx+c	
	(c)	-x cosx+sinx+c	
	(d)	cosx-sinx+c	
1-g.		$\frac{dy}{dt} + 3y = e^{-2x}$	1
	Т	he integrating factor of $dx$ . (CO4,K1)	
	(a)	ex	
	(b)		
	(c)	e <sup>3x</sup>	
	(d)	none of these	_
1-h.		$\left[5 + \left(\frac{\mathrm{dy}}{\mathrm{dy}}\right)^2\right]^{\frac{3}{3}} = x^5 \frac{\mathrm{d}^2 \mathrm{y}}{\mathrm{dy}}.$	1
	Т	he degree of the differential equation: $\left[ \frac{dx}{dx} \right] = \frac{dx^2}{dx^2}$ (CO4,K1)	
	(a)	2	
	(b)	0	
	(c)		
	(d)	3	
1-i.	$\mathbf{F}_{1}$	ind the missing term 1, 2, 9, ?, 16900 (CO5,K1)	1
	(a)	100	
	(b)	121	
	(c)	60	
	(d)	none of these	
1-j.	6	00 is increased by 20% then the new number is (CO5,K1)	1
	(a)	720	
	(b)	700	

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- (c) 750
- (d) none of these
- 2. Attempt all parts:-

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2.a.	Solve : $3x+8>2$ , when x is a real number. (CO1,K3)	2
2.b.	Find the second derivative at $x = 2$ of the function $y = x^4 - 2x + 2$ . (CO2,K2)	2
2.c.	$\int \frac{x^3 - x^2 + 2x - 2}{4x} dx$	2
	Evaluate $\int \frac{dx}{x}$ . (CO3,K2)	
2.d.	Solve the differential equation $\frac{dy}{dx} = \frac{y}{x}$ . (CO4,K3)	2
2.e.	John made a profit of 25% while selling a book for Rs.250. Find the cost price of the book? (CO5,K1)	2
<b>SECTIO</b>	<u>DN-B</u>	30
3. Answe	er any <u>five</u> of the following:-	
3-a.	Solve the inequality and show the graph for the solution on number line $3x-2 < 2x+1$ . (CO1,K3)	6
3-b.	Solve: $\sqrt{3}x^2 - 4x + \sqrt{3} = 0$ . (CO1,K3)	6
3-c.	Find the value of k for which $f(x) = \begin{cases} kx+5, & x \le 2\\ x-1, & x > 2 \end{cases}$ is continuous at $x = 2$ .	6
2.4	(CO2, R2) Find local maximum and local minimum values of the function f given by	6
3-u.	$f(x) = x^3 - x^2 + 9x - 8$ . (CO2,K1)	0
3.e.	Evaluate $\int \frac{\mathbf{x}}{(\mathbf{x}+1)(\mathbf{x}-2)} d\mathbf{x}$ .(CO3,K2)	6
3.f.	Find the general solution of differential equation $\frac{dy}{dx} = 4(1 + x^2)(1 + y^2)$ . (CO4,K1)	6
3.g.	In certain code language 'si po re' means 'book is thick', 'ti na re' means 'bag is heavy', 'ka si' means 'interesting book' and 'de ti' means 'that bag'. What should stand for 'that is interesting' in that code language? (CO5,K1)	6
<b>SECTIO</b>	<u>DN-C</u>	50
4. Answe	er any <u>one</u> of the following:-	
4-a.	Solve the following system inequalities graphically $5x+4y \le 20, x \ge 2, y \ge 4$ . (CO1,K3)	10
4-b.	In an experiment, a solution of hydrochloric acid is to be kept between 30° and 35°C. What is the range in temperature in degree Fahrenheit (F) if the Celsius / Fahrenheit (F) conversion formula is given by $C=5/9(F-32)$ . (CO1,K1)	10
5. Answe	er any <u>one</u> of the following:-	

5-a. Find the derivative of sin x from first principle. (CO2,K2)

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5-b. if  $y=3 \cos(\log x) + 4\sin(\log x) + x^2 y_2 + x y_1 + y = 0$ . (CO2,K2) 10

6. Answer any one of the following:-

Evaluate 
$$\int \log x \, dx$$
. (CO3,K1) 10

6-b.

6-a.

$$(3x^3 - 4x^2 + 6x + 5)dx$$
 (CO3 K1)

7. Answer any one of the following:-

Evaluate

7-a.

Find the general solution of  $\frac{dy}{dx} - 2y = e^x$ . (CO4,K2)

10

10

10

7-b. Solve 
$$(x^2 + xy)dy = (x^2 + y^2)dx$$
. (CO4,K3)

8. Answer any one of the following:-

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8-a. (a) In an examination, 50% students failed in English and 40% in Math and 15% 10 students failed in both subjects. If 200 students passed in both the subjects, find the number of students appeared in the examination ?
(b) In a certain code 'MISSIONS' is written as 'MSIISNOS'. How is 'ONLINE' written in that code?

(c) A person bought an article and sold it at a loss of 10%. If he had bought it for 20% less and sold it for Rs.55 more, he would have had a profit of 40%. Find the C.P. of the article? (CO5,K2)

8-b. (a) Rakesh bought a cycle for Rs. 800. and marked it up by 50% and gave a discount of 10%. A customer came in to buy the cycle and bargained with Rakesh for an additional discount of 20% on the already discounted price. What is the profit earned by Rakesh?

(b) If in a code language, SPARK is written as TQBSL, then what will be the code for FLAME in that language 2

(c) The average of five numbers is 56. If the average of first four numbers is 54, what is the value of the fifth number ? (CO5,K2)