C-18-AA-A-C-CM-CH-EI-EC-EE-FW-
M-MET-MNG-PKG-TT-**202F**

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BOARD DIPLOMA EXAMINATION, (C-18)

JUNE - 2019

COMMON - II SEMESTER EXAMINATION

ENGINEERING MATHEMATICS

Time : 2 Hours] [Total Marks : 40

PART - A **08×01=08**

Instructions : *(1) Answer **ALL** questions*
*(2) Each question carries **ONE** marks*

1 Write the equation of the straight line in intercept form.

2 Evaluate $\lim_{x \to 0} \frac{x^2 + 3x + 2}{13x + 8}$.

3 Write the equation of the normal to the curve $y = f(x)$ at the point (x_1, y_1).

4 Write the equation of the circle whose centre is (h,k) and radius is 'r'.

5 Find the slope of the tangent to the curve $y = x^2$ at (2, 4).

6 Write the formula to find length of sub-tangent to the curve $y = f(x)$ at the point (x_1, y_1)

[Contd..

7 **Find the velocity of a particle when** $s = t^3 - 3t^2 + 8t + 5$.

8 **Define decreasing function.**

PART - B

$04 \times 03 = 12$

Instructions : *(1) Answer any* ***FOUR*** *questions.*
(2) Each question carries ***THREE*** *marks.*

9 (a) Find the centre and radius of the circle $3x^2 + 3y^2 - 5x - 6y + 4 = 0$.

OR

(b) Find the slope of the normal to the curve $y = 2x^2 + 3\sin x$ at $x = 0$.

10 (a) Differentiate $x^3 \tan x$ w.r.t.x.

OR

(b) Find the stationery points of the curve $y = x^3 - 6x^2 + 9x + 1$.

11 (a) Find the length of tangent to the curve $y = x^3 + 4x^2$ at $(-1, 3)$.

OR

(b) Find the equation of tangent and normal to the curve $y = 5x^4$ at $(1, 5)$

12 (a) The law of motion of the particle along a line $s = t^3 - 9t^2 + 24t - 8$. At what instant of particle comes to rest.

OR

(b) Find the turning points of $4x^3 - 18x^2 + 24x - 7$.

PART - C

04×05=20

Instructions : *(1) Answer any FOUR questions.*
(2) Each question carries FIVE marks.

13 (a) Find the equation of the ellipse whose focus is (3, 1) eccentricity is 1/2 and directrix is $x - y + 6 = 0$.

OR

(b) Find the length of tangent to the curve $xy = 9$ at the point (3, 3).

14 (a) Differentiate $\cos^{-1}(4x^3 - 3x)$ w.r.t.x.

OR

(b) The sum of two numbers is 24. Find the numbers when the sum of their squares is minimum.

15 (a) Find the angle between the curves $x^2 = 4y$ and $y^2 = 4x$.

OR

(b) Find the equation of tangent & normal of the curves $x = a(\theta - \sin\theta)$, $y = a(1 - \cos\theta)$, at $\theta = \frac{\pi}{3}$.

16 (a) A circular plate of metal expanded by heat so that its radius increases at the rate of 0.01m/sec. At what rate the surface area increasing when the radius is 2 cms.

OR

(b) A wire of length 40 cm is bent so as to form a rectangle. If its area to be maximum find the dimensions of the rectangle.