



AJEENKYA

D Y PATIL UNIVERSITY

End Term Examinations (April 2019)

School: School of Engineering

Program: BTECH (MACT/CTIS/DS)

Course: Differential Equation & Integral Calculus

Course Code: ENG102

Semester: II

Max Marks: 50

Duration (mins): 90 mins

Section A

Q1 Fill in the Blanks. (Any Five)

10 Marks

1) $\int_0^{\pi} x \sin^7 x \cos^8 x dx = \dots\dots\dots$

2) $\frac{d^2y}{dx^2} = \sqrt{1 + \left(\frac{dy}{dx}\right)^2}$ Having order and degree is

3) The general equation of Right circular cone is

4) If the plane $U=0$ touch the sphere $S=0$ then.....

5) Reduction formula for $\int \cos^n x dx = \dots\dots\dots$

6) The equation is said to be exact differential equation if

7) $\int_0^1 \frac{x(1-x^2)}{(1+x)^5} dx = \dots\dots\dots$

Section B

Q2. Answer the following (Any Four)

20 Marks

1) Find the reduction formula for $\int_0^{\pi/4} \sin^n x dx$

2) Solve $\frac{dy}{dx} = \frac{x-y+1}{x+y+3}$

3) Find equation of right circular cone which passes through (1 , 1 , 2) axis the line $6x = -3y = 4z$.

4) $x^3 \frac{dy}{dx} = y^3 + y^2 \sqrt{y^2 - x^2}$

5) A sphere S has points (1 , -2 , 3) and (4 , 0 , 6) as opposite ends of diameter. Find the equation of the sphere having the intersection of S with the plane $x + y - 2z + 6 = 0$ as its great circle

6) Evaluate $\int_0^{2\pi} \sin^2 \theta (1 + \cos \theta)^4 d\theta$

Section C

Q3. Answer the following (Any Two)

20 Marks

- 1) Find the equation of sphere passing through the points
(1,-4, 3),(1,-5,2),(1,-3,0) and having its centre on the plane $x + y + z = 0$
- 2) Attempt the following: a) Solve $(y^2 e^{xy^2} + 4x^3)dx + (2xy e^{xy^2} - 3y^2) dy = 0$

b) $\frac{y}{x} \frac{dy}{dx} = \sqrt{1 + x^2 + y^2 + x^2 y^2}$

- 3) If $I_n = \int_0^{\frac{\pi}{2}} x \cos^n x dx$ then show that $I_n = -\frac{1}{n^2} + \frac{n-1}{n} I_{n-2}$ Hence find I_6

- 4) Evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} \int_0^{\sqrt{a^2-x^2-y^2}} xyz dx dy dz$
