C-16-EC/CHPC/PCT-301

6232

BOARD DIPLOMA EXAMINATIONS

COMMON-THIRD SEMESTER

OCT/NOV-2019

ENGINEERING MATHEMATICS - II

Time: 3 hours Max. Marks: 80

PART – A **3 X 10 = 30**

Instructions: *1. Answer **all** questions.*
*2. Each question carries **Three** Marks.*
3. Answer should be brief and straight to the point and should not exceed Five simple sentences.

1. Evaluate $\int (x + \frac{1}{x})^2 \, dx$
2. Evaluate $\int \sin^2 x \, dx$
3. Evaluate $\int_{-2}^{2} (x^{99} + x^2 + 5) \, dx$
4. Find the mean value of $f(t) = x^2 - 3x + 2$ between the values of x where the expression vanishes.
5. Find $L\{ \cos^2 t \}$
6. $Find\ L^{-1} \{ \frac{1}{s(s-3)} \}$
7. Obtain the value of a_0 in the half range cosine series expansion of $f(x) = 3x + 1$ in $0 < x < 2$

[Cont..,

8. Find the order and degree of the Differential Equation

$\log\left(\frac{dy}{dx}\right) = ax + by$ where a and b are constants.

9. Solve $\frac{dy}{dx} = e^{2x+y}$

10. Solve $\frac{d^2y}{dx^2} + y = 0$

PART – B **5 X 10 = 50**

Instructions: *1. Answer any **Five** questions*
*2. Each question carries **TEN** Marks.*
3. Answer should be comprehensive and a criterion for valuation is the content but not the length of the answer.

11. a) Evaluate $\int sin^7 x \; cos^5 x \; dx$

b) Evaluate $\int \left(\frac{1}{5-3\cos x} \right) dx$

12. a) Evaluate $\int tan^{-1} x \; dx$

b) Evaluate $\int_0^1 \frac{cos^{-1} x}{\sqrt{1-x^2}} dx$

13. (a) Find the area bounded by the curve $y = x^2 + 3x$ and x-axis

(b) Find the volume generated by revolving the Ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ about its minor axis.

[Cont..,

14. a) Calculate the approximate value of π from $\int_0^1 \frac{1}{1+x^2}\,dx$

using Trapezoidal's rule by dividing [0,1] into 4 equal parts.

b) Find $L\{t\cos 2t\}$

15. a) Find $L^{-1}\left\{\frac{s-3}{s^2-6s+5}\right\}$

b) using Convolution theorem Find $L^{-1}\left\{\frac{1}{s(s^2+1)}\right\}$

16. Find the Fourier series for $f(x) = e^x$ in $0 < x < 2\pi$

17. (a)Solve $\frac{dy}{dx} = \sin(x+y)$

(b) solve $\frac{dy}{dx} + y\sec x = \tan x$

18. Solve the following differential equations

a) $\frac{d^3y}{dx^3} + \frac{d^2y}{dx^2} - \frac{dy}{dx} - y = 0$

b) $(D^2 - 1)y = \cosh 2x$, where $D = \frac{d}{dx}$