Unit Test I
State Board of Technical Education and Training, A. P
III SEM
Subject name: Engineering Mathematics-II
Sub Code: AEI/BM/CH/CHOT/CHPP/CHPC/CHST/EC-301

Time: 90 minutes **Max. Marks: 40**

Part-A **16 Marks**

Instructions: (1) Answer **all** questions.
(2) First question carries **four** marks and the remaining questions carry **three** marks each.

1. Answer the following:

   a. $\int x^6 dx =$ _____ . **(CO1)**

   b. $\int \frac{1}{16+x^2} dx =$ _____ . **(CO1)**

   c. $\int e^x \left(f(x) + f'(x) \right) dx = e^x f(x) + c$: State TRUE/FALSE **(CO1)**

   d. $\int_0^1 x dx =$ _____ . **(CO2)**

2. Evaluate $\int \left(\sec^2 x + 2e^x \right) dx.$ **(CO1)**

3. Evaluate $\int \frac{\sin(\log x)}{x} dx.$ **(CO1)**

4. Evaluate $\int_0^{\frac{\pi}{2}} \cos x dx$ **(CO2)**

5. Evaluate $\int_0^{1/2} \frac{1}{\sqrt{1-x^2}} dx$ **(CO2)**

Part-B **3×8=24 Marks**

Instructions: (1) Answer **all** questions. (2) Each question carries **eight** marks

(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. A) Evaluate $\int \sin^4 x \cos x dx.$ **(CO1)**

(OR)

B) Evaluate $\int \frac{1}{(x+1)(x+2)} dx.$ **(CO1)**

7. A) Evaluate $\int \sqrt{1-\sin 2x} dx.$ **(CO1)**

(OR)

B) Evaluate $\int x^2 e^{3x} dx.$ **(CO1)**

8. A) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x} dx$ **(CO2)**

(OR)

B) Find the RMS value of $y = \sqrt{2x+3}$ between $x = 1, x = 2.$ **(CO2)**

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Unit Test II **C –23, XX -301**

State Board of Technical Education and Training, A. P

III Sem

Subject name: **Engineering Mathematics-II**

Sub Code: **AEI/BM/CH/CHOT/CHPP/CHPC/CHST/EC-301**

Time : 90 minutes Max.marks:40

Part-A **16 Marks**

Instructions: (1) Answer **all** questions.

(2) First question carries **four** marks and the remaining questions carry **three** marks each

1. Answer the following:

   a. The order of the differential equation $\frac{d^3y}{dx^3}+\frac{d^2y}{dx^2}+y=0$ is _____. **(CO3)**

   b. The auxiliary equation of the differential equation $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+y=0$ is ____.

   (CO3)

   c. If $L\{f(t)\}=F(s)$, then $L\{e^{at}f(t)\}=F(s-a)$: State TRUE/FALSE **(CO4)**

   c. The formula for finding the coefficient a_0 in the Fourier series expansion of the function $f(x)$ in the interval $0<x<2\pi$ is_____. **(CO4)**

2. Form the differential equation by eliminating the arbitrary constant m from $y=mx+1.$

   (CO3)

3. Verify $y=\sin x$ is a solution of the differential equation $y''+y=0.$ (**CO3**)

4. Solve the differential equation $(D^2-9)y=0.$ **(CO3)**

5. Evaluate $L\{2\cos t+3\sin t\}$ **(CO4)**

Part-B **3×8=24 Marks**

Instructions: (1) Answer **all** questions.
(2) Each question carries **eight** marks
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

6. A) Solve $\frac{dy}{dx}+\frac{y}{x}=x^2$. **(CO3)**

(OR)

B) Solve $\left(D^2-2D+1\right)y=0.$ **(CO3)**

7. A) Evaluate $L\left\{3\sin t+4\cos t-e^t+t^2\right\}$. **(CO4)**

(OR)

B) Evalaute $L^{-1}\{\frac{1}{s-3}+\frac{5}{s^2}-\frac{s}{s^2+4}\}$ **(CO4)**

8. A) Find the Fourier series for $f(x)=k$(constant) in the interval $[0,2\pi]$ **(CO4)**

(OR)

B) Find the Fourier series for $f(x)=x$ in the interval $\left(-\pi,\pi\right)$. **(CO4)**

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END EXAM MODEL PAPERS

STATE BOARD OF TECHNICAL EDUCATION, A.P

ENGINEERING MATHEMATICS-II

AEI/BM/CH/CHOT/CHPP/CHPC/CHST/EC-301

TIME : 3 HOURS **MODEL PAPER-1** **MAX.MARKS : 80M**

PART-A

Answer All questions. Each question carries THREE marks. **10x3=30M**

1. Evaluate $\int (x^5 + 5^x)\,dx$ **(CO 1)**

2. Evaluate $\int \left(\sqrt{x} - \frac{1}{\sqrt{x}} \right) dx$ **(CO 1)**

3. Evaluate $\int (\sin 3x + \cos 2x)dx.$ **(CO 1)**

4. Evaluate $\int (2x - 3)^8 dx$ **(CO 1)**

5. Evaluate $\int_0^1 (x^3 + 1)dx$ **(CO 2)**

6. Evaluate $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin x\,dx$ **(CO2)**

7. Find the area bounded by the curve $y = x^2$, x-axis and the lines $x = 2$ and $x = 5.$ **(CO 2)**

8. Find the mean value of the function $f(x) = \frac{1}{1+x^2}$ in the interval $[0,1]$. (**CO 2)**

9. Find the order and degree of the differential equation $\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} + 5y = 0$. (**CO 3)**

10. Write the Euler's formulae for finding the Fourier coefficients of a function f(x) in the interval $[c, c + 2\pi]$. (**CO 4)**

PART-B

Answer any FIVE questions. Each question carries TEN marks. **5x10=50M**

11. (a) Evaluate $\int \left(\cos 5x + 4\sec^2 x + 8e^{4x} + \frac{2}{x} \right) dx.$ **(CO 1)**

    (b) Evaluate $\int \sqrt{1 + \sin 2\theta}\, d\theta$ **(CO 1)**

12. (a) Evaluate $\int \frac{1}{(x-1)(x+2)} dx.$ **(CO 1)**

(b) Evaluate $\int x e^{2x}\, dx$ **(CO 1)**

13. (a) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\cos x}{\sin x + \cos x} dx$ **(CO 2)**

(b) Find the R.M.S. value of the function $f(x) = \sqrt{sinx}$ over the range $x = 0$ and $x = \pi$ **(CO 2)**

14. Solve $\frac{dy}{dx} + ytanx = secx$ **(CO 3)**

15. (a) Solve $(D^2 - 4)y = 0$ **(CO 3)**

(b) Solve $\left(D^2 + 4D + 3\right) y = 0.$ **(CO 3)**

16. (a) Evaluate $L\left\{1 + 4e^{5t} - 3\sin 4t + 2\cos 2t\right\}$ **(CO 4)**

(b) Evaluate $L\{e^{2t}t^3\}$ **(CO 4)**

17. (a) Evaluate $L^{-1}\{\frac{1}{s-3} + \frac{5}{s^2} - \frac{s}{s^2+4}\}$ **(CO 4)**

(b) Evaluate $L^{-1}\{\frac{s-2}{(s-2)^2+9}\}$ **(CO 4)**

18. Obtain Fourier series of $f(x) = x$ in the interval $(-\pi, \pi)$. **(CO 4)**

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STATE BOARD OF TECHNICAL EDUCATION, A.P
C-23 ENGINEERING MATHEMATICS-II
AEI/BM/CH/CHOT/CHPP/CHPC/CHST/EC-301

TIME : 3 HOURS **MODEL PAPER-2** **MAX.MARKS : 80M**

PART-A

Answer All questions. Each question carries THREE marks. **10x3=30M**

1. Evaluate $\int (x^3 + 3^x)\,dx$ **(CO 1)**
2. Evaluate $\int \sqrt{x}\,(x+1)\,dx$ **(CO 1)**
3. Evaluate $\int (\sin 2x + \cos 3x)dx$ **(CO 1)**
4. Evaluate $\int (2x+9)^5 dx$ **(CO 1)**
5. Evaluate $\int_{-1}^{2} (3 - x^2)dx$ **CO 2)**
6. Evaluate $\int_{0}^{\frac{1}{\sqrt{2}}} \frac{1}{\sqrt{1-x^2}}\,dx$ **(CO2)**
7. Determine the area enclosed by the curve $y = 2x + 3$, x-axis and the lines $x = 1$ and $x = 4$. **(CO 2)**
8. Find the mean value of the function $f(x) = x^2$ in the interval $[1, 2]$. (**CO 2)**
9. Find the order and degree of the differential equation $\frac{d^3y}{dx^3} + 3\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + y = 0$. (**CO 3)**
10. Write the Euler's formulae for finding the Fourier coefficients of a function f(x) in the interval $[-\pi,\ \pi]$. (**CO4)**

PART-B

Answer any FIVE questions. Each question carries TEN marks. **5x10=50M**

11. (a) Evaluate $\int \left(1 + 2e^x + \sec x \tan x + \frac{3}{x}\right)dx$ **(CO 1)**

    (b) Evaluate $\int \frac{dx}{1+2x^2}$ **(CO 1)**

12. (a) Evaluate $\int \frac{x-1}{(x+1)(x-2)}\,dx$ **(CO 1)**

    (b) Evaluate $\int x \sec^2 x\,dx$ **(CO 1)**

13. (a) Evaluate $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\sin x}}{\sqrt{\sin x}+\sqrt{\cos x}}\,dx$ **(CO 2)**

(b) Find the R.M.S. value of the function $f(x) = \sqrt{x}$ over the range $x = 1$ and $x = 2$ **(CO 2)**

14. Solve $\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2}$ **(CO 3)**

15. (a) Solve $(D^2 + 4D + 4)y = 0$ **(CO 3)**

(b) Solve $\left(D^2+3D+2\right)y = 0.$ **(CO 3)**

16. (a) Evaluate $L\left\{1+4e^{-3t}-2t^3+2\sin 5t\right\}$ **(CO 4)**

(b) Evaluate $L\{e^{-t}\cos 2t\}$ **(CO 4)**

17. (a) Evaluate $L^{-1}\{\frac{1}{s} + \frac{1}{s-4} - \frac{2}{s^2+4}\}$ **(CO 4)**

(b) Evaluate $L^{-1}\{\frac{s+2}{(s+2)^2+4}\}$ **(CO 4)**

18. Obtain Fourier series of $f(x) = x$ in the interval $(0, 2\pi)$. **(CO 4)**

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