I D NO.	

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 40 % Max Marks: 80 Max Time: 2 hrs. 07 May 2018, Monday

ENDTERM FINAL EXAMINATION MAY 2018

Even Semester 2017-18 Course: **MAT 102 Engineering Mathematics – II** II Sem. All Branches

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Instructions:

(i) *Read the question properly and answer accordingly.*
(ii) *Question paper consists of 3 parts.*
(iii) Scientific and Non-programmable calculators are permitted.
(iv) In Part C, answer any **TWO** questions.

Part A

(4 Q x 5 M = 20 Marks)

1. Form the partial differential equation from the relation $z = a\log\left(x^2 + y^2\right) + b,$ by eliminating the arbitrary constants ***a*** and ***b***.

2. Solve $\dfrac{\partial^2 z}{\partial x^2} + z = 0$ given that $z = e^y$ and $\dfrac{\partial z}{\partial x} = 1$ at $x = 0.$

3. Find $L\left[e^{-4t} t^{\frac{5}{2}}\right].$

4. Find $L^{-1}\left[\dfrac{2s-5}{s^2+25} + \dfrac{4}{9-s^2} + \dfrac{5}{3s-9}\right].$

Part B

(3 Q x 10 M = 30 Marks)

5. Solve $\dfrac{\partial^2 z}{\partial x \partial y} = e^{-y}\cos x,$ given that $z = 0$ at $y = 0$ and $\dfrac{\partial z}{\partial y} = 0$ at $x = 0.$

6. If $f(t)=t^2, 0<t<2$ and $f(t+2)=f(t)\,\text{for}\, t>2,$ then find $L\left[f(t)\right]$.

7. Using Convolution theorem, find $L^{-1}\left[\frac{1}{(s-1)(s^2+1)}\right]$.

Part C (Answer any **TWO** questions)

(2Q x 15 M = 30 Marks)

8. Express $f(t)=\begin{cases}\cos t, 0<t<\pi \\ \cos 2t, \pi<t<2\pi \\ \cos 3t, t>2\pi\end{cases}$ in terms of Heaviside unit step function and hence find the Laplace transform.

9. Solve the DE $\frac{d^2y}{dt^2}-2\frac{dy}{dt}+y=e^{2t}$ with $y(0)=0; y'(0)=-1$ using Laplace transform method.

10. (a) Evaluate $\int_0^\infty te^{-3t}\cos 2t\,dt$ using Laplace transform.

(b) Find $L^{-1}\left[\frac{2s-1}{s^2+4s+29}\right]$.

ID NO:	

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20% Max Marks: 40 Max Time: 1 hr. 29 March Thursday 2018

TEST – 2 **SET A**

Even Semester 2017-18 Course: **MAT 102 Engineering Mathematics – II** II Sem All Branches

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Instructions:

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A

(3 Q x 4 M = 12 Marks)

1. Solve $\frac{d^3y}{dx^3}+6\frac{d^2y}{dx^2}+11\frac{dy}{dx}+6y=0.$

2. Solve $\frac{d^2y}{dx^2}+4\frac{dy}{dx}+4y=2^x.$

3. Solve $(D^2+4)y=\sin 2x.$

Part B

(2 Q x 8 M = 16 Marks)

4. Solve $\frac{d^2y}{dx^2}+2\frac{dy}{dx}+y=2x+x^2$

5. Solve $(D^2-2D+5)y=e^{2x}\sin x$

Part C

(1Q x 12 M = 12 Marks)

6. Solve $\frac{d^2y}{dx^2}-2\frac{dy}{dx}+y=e^x\log x$ by the method of variation of parameters.

(OR)

Solve $(2x+1)^2\frac{d^2y}{dx^2}-6(2x+1)\frac{dy}{dx}+16y=8(2x+1)^2$

ID NO:	

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20 % Max Marks: 40 Max Time: 1 hr. 19 Feb Monday 2018

TEST – 1

Even Semester 2017-18 Course: **MAT 102 Engineering Mathematics – II** All Branches

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Instructions:

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted.

Part A

(3 Q x 4 M = 12 Marks)

1. Evaluate $\int_0^a \int_0^b \left(x^2+y^2\right) dy dx.$
2. Evaluate the integral $\int_0^{\pi/2} \sin^4\theta \cos^3\theta \, d\theta$ by expressing in terms of gamma function.
3. Evaluate $\int_0^{\infty}\int_0^{\infty} e^{-\left(x^2+y^2\right)} dx dy$ by changing into polar coordinates.

Part B

(2 Q x 8 M = 16 Marks)

4. Find by double integration the area enclosed by the curve $r = a(1+\cos\theta)$ between $\theta = 0$ and $\theta = \pi$.
5. Evaluate $\iint_C (yz\hat{i} + zxj + xyk)\cdot \hat{n} dS$ where *S* is the surface of the sphere $x^2+y^2+z^2=a^2$ in the first octant.

Part C

(1Q x 12 M = 12 Marks)

6. Verify Green's theorem in the *xy*-plane for $\int_C (xy+y^2)dx + x^2 dy$, where C is the closed curve of the region bounded by $y = x$ and $y = x^2$.

(OR)

Prove that $\int_0^1 \frac{x^2 dx}{\sqrt{(1-x^4)}} \times \int_0^1 \frac{dx}{\sqrt{(1+x^4)}} = \frac{\pi}{4\sqrt{2}}.$