Sanjay Ghodawat University, Kolhapur
Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2020-21

EXM/P/09/00

Year and Program: **S.Y. B. Tech**	**School of Technology**	**Department: Aeronautical**
Course Code: AET201	**Course Title: Differential Calculus and Transforms.**	**Semester : III**
Day : Monday **Date: 01.02.2021**	**End Semester Examination**	**Time: 2 Hrs.** **Max Marks:50**

Instructions: 1) All Questions are compulsory.
2) Use of non-programmable calculator is allowed

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any two)**			
a)	Solve the following differential equation $\frac{d^4y}{dx^4}+10\frac{d^2y}{dx^2}+9y=\sin 2x\sin x$	08	L3	CO1
b)	Solve the following differential equation $x^3\frac{d^3y}{dx^3}+3x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}=x^3\log x$	08	L3	CO1
c)	Solve the following partial differential equations i) $\sqrt{p}+\sqrt{q}=1$ ii) $px\tan y=q+1$	08	L1	CO2
Q.2	**Answer the following (any two)**			
a)	Formulate Fourier series for the function $f(x)=\begin{cases}\pi x & ;0<x<1\\ 0 & ;1<x<2\end{cases}$.	08	L4	CO3
b)	Find the Laplace transform of following functions i) $e^{-t}t^2\sin 4t$ ii) $\frac{1-\cos t}{t}$	08	L2	CO4
c)	Find Inverse Laplace transform of following functions i) $\frac{2s+3}{s^2+2s+2}$ ii) $\frac{s}{s^2+5s+6}$	08	L2	CO4
Q.3	**Answer the following (any two)**			
a)	i) Find $div\overline{F}$ and $curl\overline{F}$ at point $(1,-1,1)$ if $\overline{F}=x^2zi-2y^3z^3j+xy^2z^2k.$	05	L2	CO5
	ii) Find the unit normal to the surface $xy^3z^2=4$ at point $(-1,-1,2)$.	04	L2	CO5

b)	i) Prove that $\bar{r} = xi + yj + zk$ is irrotational and hence find its scalar potential ϕ.	04	L3	CO5
	ii) Find the directional derivative of $\phi(x, y, z) = xy^2 + yz^3$ at the point $(2, -1, 1)$ in the direction of the vector $i + 2j + 2k$.	05	L3	CO5
c)	Show that the function $e^x(\cos y + i \sin y)$ is analytic and hence find its derivative.	09	L3	CO6

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