Code No: R10202 **R10** **SET-1**

I B. Tech II Semester Supplementary Examinations, November - 2021
MATHEMATICS-II
(Com. to All Branches)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Find the $L\left\{\int_0^t e^{-3t}t^3\,dt\right\}$ (8M)
   b) Find $L\{f'(t)\}$ of the function $f(t)=\begin{cases}t, & 0\le t<3\\ 6, & t\ge 3\end{cases}$ (7M)

2. a) Find $L^{-1}\left\{\frac{1+2s}{(s+2)^2(s-1)^2}\right\}$ (8M)
   b) Find $L^{-1}\left\{\frac{1}{2}log\left(\frac{s^2+b^2}{s^2+a^2}\right)\right\}$ (7M)

3. a) Find the Fourier series of f(x) = sinx in (-π, π) (8M)
   b) Find the Half range cosine series of f(x) = 2x in [0,2] (7M)

4. a) Find the Fourier sine transform of $\frac{e^{-ax}}{x}$ (8M)
   b) Find the Fourier transform of $f(x)=\begin{cases}\frac{\sqrt{2\pi}}{2a} & if\ |x|<a\\ 0 & if\ |x|>a\end{cases}$ (7M)

5. a) Prove that $\beta(m,n)=\int_0^1 \frac{x^{m-1}+x^{n-1}}{(1+x)^{m+n}}dx$ (8M)
   b) Evaluate $\int_0^1 x^3\left(\log\frac{1}{x}\right)^4 dx$ using beta –gamma function (7M)

6. a) Form the PDE from z = f(x+iy)+g(x-iy) by eliminating arbitrary functions. (8M)
   b) Solve the PDE p tanx + q tany = tanz. (7M)

7. Find the temperature in a thin metal rod of length '*l*' with both ends are insulated with initial temperature is $\sin\left(\frac{\pi x}{l}\right)$ (15M)

8. a) Solve $u_{n+2}-u_n=2^n$ where $u_0=0; u_1=1$ using Z-transform method. (8M)
   b) Find $Z[\cos(3n+5)]$ (7M)
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