

Set No. 1

Max Marks: 75

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Code No: R10202/R10

Set No. 2
I B.Tech II Semester Supplementary Examinations, July. 2015
MATHEMATICS- II

(Common to Civil Engineering, Electrical & Electronics Engineering, Mechanical Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Chemical Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Information Technology, Electronics & Computer Engineering, Aeronautical Engineering, Bio-Technology, Automobile Engineering, Mining and Petroliem Technology)

Time: 3 hours
Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Find $L(t^2 e^t \cos 2t)$
 (b) Find $L\left(\frac{e^{-at} - e^{-bt}}{t}\right)$ [7+8]
2. (a) Find $L^{-1} \left\{ \frac{s+1}{(s+2s+2)^2} \right\}$.
 (b) Find $L^{-1} \left\{ \frac{1}{(s^2-1)(s^2+25)} \right\}$ using convolution theorem. [7+8]
3. Find a fourier expansion of $f(x)=x \cos x$, $0 < x < 2\pi$ [15]
4. Find the inverse fourier sine transform of $f(x)$ of $[F_s(p)]=p/1+p^2$ [15]
5. (a) Solve $p^2+q^2=x^2+y^2$
 (b) Solve $(x-a)p + (y-b)q = z-c$. [8+7]
6. A tightly stretched string with fixed points $x=0$ and $x=l$ is initially at rest in its equilibrium position. If it is set vibrating by giving to each of its points a velocity $\frac{dy}{dt} = 3(lx - x^2)$ at $t=0$, find $y(x, t)$. [15]
7. (a) Find the inverse Z-transform of $\frac{z}{(z-1)(z-2)}$
 (b) Determine u_2 where $U(z) = \frac{2z^2+3z+4}{(z-3)^3}$, $|z| > 3$ [8+7]
8. (a) Show that $\int_0^\infty x^m e^{-ax^n} dx = \frac{1}{na^{\frac{m+1}{n}}} \Gamma\left(\frac{m+1}{n}\right)$ where m, n are positive constants.
 (b) Evaluate $4 \int_0^\infty \frac{x^2}{1+x^4} dx$ using beta and gamma functions. [8+7]

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Set No. 3**I B.Tech II Semester Supplementary Examinations, July. 2015****MATHEMATICS- II**

(Common to Civil Engineering, Electrical & Electronics Engineering,
Mechanical Engineering, Electronics & Communication Engineering,
Computer Science & Engineering, Chemical Engineering, Electronics &
Instrumentation Engineering, Bio-Medical Engineering, Information
Technology, Electronics & Computer Engineering, Aeronautical
Engineering, Bio-Technology, Automobile Engineering, Mining and
Petroleum Technology)

Time: 3 hours**Max Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Find the Laplace transform of $\cos 2t \cos 3t$
(b) Find the Laplace transform of $f(t) = \begin{cases} \cos t, & 0 < t < 2\pi \\ 0, & \text{otherwise} \end{cases}$ [7+8]
2. (a) Find inverse Laplace transform of $\frac{e^{-2s}}{s^2+4s+13}$
(b) Find inverse Laplace transform of $\frac{s}{2s^2-8}$ [7+8]
3. Expand $f(x) = 3x^2 - 2$ as a Fourier series in $(-3, 3)$ [15]
4. Find the finite Fourier sine and cosine transform of
 $f(x) = x, 0 \leq x \leq \pi/2,$
 $f(x) = \pi - x, \pi/2 \leq x \leq \pi$ [15]
5. (a) Solve $xp + yq = z$
(b) Solve $\frac{p}{x^2} + \frac{q}{y^2} = \frac{1}{z^2}$ [8+7]
6. A bar of length 30 cm. has its ends A and B maintained at 60°C and 0°C respectively until steady state conditions prevailed. Then the end B is suddenly insulated and kept so. The temperature at other end A is reduced to 0°C and maintained. And the temperature distribution in the bar. [15]
7. (a) Find $Z^{-1} \left(\frac{3z^2+z}{(5z-1)(5z+2)} \right)$.
(b) Find $Z^{-1} \left(\frac{z^2-3z}{(z+2)(z-5)} \right)$ [8+7]
8. (a) Prove that $\Gamma(m)\Gamma\left(m + \frac{1}{2}\right) = \frac{\sqrt{\pi}}{2^{2m-1}}\Gamma(2m)$
(b) Prove that $\int_0^\infty x^n e^{-a^2x^2} dx = \frac{1}{2a^{n+1}}\Gamma\left(\frac{n+1}{2}\right), n > -1$ [8+7]

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Set No. 4
I B.Tech II Semester Supplementary Examinations, July. 2015
MATHEMATICS- II

(Common to Civil Engineering, Electrical & Electronics Engineering, Mechanical Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Chemical Engineering, Electronics & Instrumentation Engineering, Bio-Medical Engineering, Information Technology, Electronics & Computer Engineering, Aeronautical Engineering, Bio-Technology, Automobile Engineering, Mining and Petroliem Technology)

Time: 3 hours
Max Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Find the Laplace transform of $\cos 3t \sin 5t$
 (b) Find the Laplace transform of $\frac{1-e^{-t}}{t}$ [7+8]
2. (a) Find $L^{-1} \left\{ \frac{1}{s} \cdot \cos \frac{1}{s} \right\}$.
 (b) Find $L^{-1} \left\{ \frac{s}{(s^2+a^2)^2} \right\}$ using convolution theorem. [7+8]
3. (a) Find the fourier series of periodicity 3 for $f(x)=2x-x^2$ in $0 < x < 3$
 (b) Expand $f(x)=3x^2-2$ as a fourier series in the interval $(-3,3)$ [8+7]
4. Find the fourier transform of $f(x)$ defined by
 $f(x)=1, |x| < a, f(x)=0, |x| > a$ and hence $\int_0^\infty \frac{\sin 2ax}{x^2} dx = \frac{\pi a}{2}$ [15]
5. (a) Solve $p-q=z-y$
 (b) Solve $(x-a)p + (y-b)q = z-c$ [8+7]
6. A long rectangular plate of width 'a' with insulated surface has its temperature 'v' equal to zero on both the long sides and one of the short sides so that $v(0, y)=0$, $v(a, y)=0$; $v(x, 8)=0$, and $v(x, 0) = kx$. Find the steady state temperature in the plate. [15]
7. (a) Find the inverse Z-transform of $\frac{4z^2-2z}{z^3-5z^2+8z-4}$.
 (b) Find $Z [n \cos n\theta]$ [8+7]
8. (a) Evaluate $\int_0^{\pi/2} \sin^{7/2} \theta \cos^{3/2} \theta d\theta$ using beta and gamma functions.
 (b) Show that $\int_a^b (x-a)^{m-1} (b-x)^{n-1} dx = (b-a)^{m+n-1} \beta(m, n)$. [8+7]
