Code No: R07A1BS02 **R07** **Set No. 2**

I B.Tech Examinations,December 2010
MATHEMATICS - I
Common to CE, ME, CHEM, BME, IT, MECT, MEP, AE, BT, AME, ICE, E.COMP.E, MMT, ETM, E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Find the radius of curvature of x = 2a sint + a sin2t, y = 2a cost + a cos2t.
   (b) Show that the envelope of the circles whose centre lies on the parabola $y^2 = 4ax$ and which passes through its vertex is $y^2 (x + 2a) + x^3 = 0$. [8+8]

2. Solve the equation $(D^2 - 4D + 4)y = e^{2x} + x^2 + \sin 3x$. [16]

3. (a) Solve $(x^2 + y^2 - a^2) x\, dx + (x^2 + y^2 - b^2) y\, dy = 0$.
   (b) If 20 percent of a radioactive element disappears in 1 year, compute its half-life. [8+8]

4. (a) Find L^{-1} [$\tan^{-1}$ s].
   (b) Find L^{-1} [log ((s^2+1) /(s^2 -4))]. [8+8]

5. (a) Evaluate $\iiint\limits_V (xy + yz + zx) \quad dxdydz$, where V is the region of space bounded by $x = 0, x = 1, y = 0, y = 2, z = 0, z = 3$.
   (b) Find the value of $\iint xy\ dxdy$ taken over the positive quadrant of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. [8+8]

6. Verify Stoke's theorem for $\vec{F} = (x^2 - y^2)\vec{i} + 2xy\,\vec{j}$ over the box bounded by the planes $x = 0, x = a, y = 0, y = b, z = c$. [16]

7. (a) Examine the convergence or divergence of $\sum x^{2n-2}/ (n + 1)n^{1/2}$, x > 0.
   (b) Examine the convergence or divergence of $\sum \frac{(n!)^2}{(n+1)!} x^n$, $x > 0$. [8+8]

8. (a) Verify Rolle's theorem for $f(x) = x^2 - 2x - 3$ in the interval (1,-3).
   (b) Prove that $u = \frac{x^2-y^2}{x^2+y^2}$, $v = \frac{2xy}{x^2+y^2}$ are functionally dependent and find the relation between them. [8+8]

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Code No: R07A1BS02 **R07** **Set No. 4**

I B.Tech Examinations,December 2010
MATHEMATICS - I
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) Find L^{-1} [$\tan^{-1} s$].
   (b) Find L^{-1} [$\log((s^2+1)/(s^2-4))$]. [8+8]

2. (a) Examine the convergence or divergence of $\sum x^{2n-2}/(n+1)n^{1/2}$, $x > 0$.
   (b) Examine the convergence or divergence of $\sum \frac{(n!)^2}{(n+1)!} x^n$, $x > 0$. [8+8]

3. (a) Find the radius of curvature of $x = 2a \sin t + a \sin 2t$, $y = 2a \cos t + a \cos 2t$.
   (b) Show that the envelope of the circles whose centre lies on the parabola $y^2 = 4ax$ and which passes through its vertex is $y^2(x + 2a) + x^3 = 0$. [8+8]

4. (a) Evaluate $\iiint\limits_V (xy + yz + zx) \; dxdydz$, where V is the region of space bounded by $x = 0, x = 1, y = 0, y = 2, z = 0, z = 3$.
   (b) Find the value of $\iint xy \; dxdy$ taken over the positive quadrant of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. [8+8]

5. (a) Solve $(x^2 + y^2 - a^2)\, x\, dx + (x^2 + y^2 - b^2)\, y\, dy = 0$.
   (b) If 20 percent of a radioactive element disappears in 1 year, compute its half-life.

   [8+8]

6. Verify Stoke's theorem for $\vec{F} = (x^2 - y^2)\vec{i} + 2xy\,\vec{j}$ over the box bounded by the planes $x = 0, x = a, y = 0, y = b, z = c$. [16]

7. Solve the equation $(D^2 - 4D + 4)y = e^{2x} + x^2 + \sin 3x$. [16]

8. (a) Verify Rolle's theorem for $f(x) = x^2 - 2x - 3$ in the interval (1,-3).
   (b) Prove that $u = \frac{x^2-y^2}{x^2+y^2}$, $v = \frac{2xy}{x^2+y^2}$ are functionally dependent and find the relation between them. [8+8]

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Code No: R07A1BS02 **R07** **Set No. 1**

I B.Tech Examinations,December 2010
MATHEMATICS - I
Common to CE, ME, CHEM, BME, IT, MECT, MEP, AE, BT, AME, ICE, E.COMP.E, MMT, ETM, E.CONT.E, EIE, CSE, ECE, CSSE, EEE

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Examine the convergence or divergence of $\sum x^{2n-2} / (n+1) n^{1/2}$, x > 0.
   (b) Examine the convergence or divergence of $\sum \frac{(n!)^2}{(n+1)!} x^n$, $x > 0$. [8+8]

2. (a) Find L^{-1} [$\tan^{-1}$ s].
   (b) Find L^{-1} [log ((s^2+1) /(s^2 -4))]. [8+8]

3. (a) Verify Rolle's theorem for f(x) = x^2 - 2x -3 in the interval (1,-3).
   (b) Prove that u = $\frac{x^2-y^2}{x^2+y^2}$, v = $\frac{2xy}{x^2+y^2}$ are functionally dependent and find the relation between them. [8+8]

4. (a) Find the radius of curvature of x = 2a sint + a sin2t, y = 2a cost + a cos2t.
   (b) Show that the envelope of the circles whose centre lies on the parabola y^2 = 4ax and which passes through its vertex is y^2 (x + 2a) + x^3 = 0. [8+8]

5. Verify Stoke's theorem for $\vec{F} = (x^2 - y^2)\vec{i} + 2xy\,\vec{j}$ over the box bounded by the planes $x = 0, x = a, y = 0, y = b, z = c$. [16]

6. (a) Solve (x^2 +y^2 - a^2) x dx + (x^2 + y^2 - b^2) y dy = 0.
   (b) If 20 percent of a radioactive element disappears in 1 year, compute its half-life. [8+8]

7. Solve the equation (D^2 - 4D + 4)y = e^{2x} + x^2+sin3x. [16]

8. (a) Evaluate $\iiint_V (xy + yz + zx) \quad dxdydz$, where V is the region of space bounded by $x = 0, x = 1, y = 0, y = 2, z = 0, z = 3$.
   (b) Find the value of $\iint xy \; dxdy$ taken over the positive quadrant of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. [8+8]

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Code No: R07A1BS02 **R07** **Set No. 3**

I B.Tech Examinations,December 2010
MATHEMATICS - I
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Evaluate $\iiint\limits_V (xy + yz + zx) \quad dxdydz$, where V is the region of space bounded by $x = 0, x = 1, y = 0, y = 2, z = 0, z = 3$.
   (b) Find the value of $\iint xy \; dxdy$ taken over the positive quadrant of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. [8+8]

2. (a) Examine the convergence or divergence of $\sum x^{2n-2}/(n+1)n^{1/2}$, $x > 0$.
   (b) Examine the convergence or divergence of $\sum \frac{(n!)^2}{(n+1)!} x^n$, $x > 0$. [8+8]

3. (a) Solve $(x^2 + y^2 - a^2)\, x\, dx + (x^2 + y^2 - b^2)\, y\, dy = 0$.
   (b) If 20 percent of a radioactive element disappears in 1 year, compute its half-life. [8+8]

4. (a) Find the radius of curvature of x = 2a sint + a sin2t, y = 2a cost + a cos2t.
   (b) Show that the envelope of the circles whose centre lies on the parabola $y^2 = 4ax$ and which passes through its vertex is $y^2(x + 2a) + x^3 = 0$. [8+8]

5. (a) Verify Rolle's theorem for $f(x) = x^2 - 2x - 3$ in the interval (1,-3).
   (b) Prove that $u = \frac{x^2-y^2}{x^2+y^2}$, $v = \frac{2xy}{x^2+y^2}$ are functionally dependent and find the relation between them. [8+8]

6. Verify Stoke's theorem for $\vec{F} = (x^2 - y^2)\vec{i} + 2xy\,\vec{j}$ over the box bounded by the planes $x = 0, x = a, y = 0, y = b, z = c$. [16]

7. (a) Find $L^{-1}[\tan^{-1} s]$.
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8. Solve the equation $(D^2 - 4D + 4)y = e^{2x} + x^2 + \sin 3x$. [16]

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