Code No: A109100102 **Set No. 1**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, March – 2011

MATHEMATICS – I

Objective Exam

Name: _____ Hall Ticket No. | | | | | | A | | | | |

Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

I. Choose the correct alternative:

1. The asymptote for the curve is $y^2 = x^2\frac{(a+x)}{a-x}$ [ ]

   $(a)x = a$ $(b)\ x = -a$ $(c)\ x = 0$ $(d)\ y = 0$

2. The Envelope of the family of curves $y = mx + \sqrt{a^2m^2 + b^2}$ is [ ]

   (a) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (b) $\frac{y^2}{a^2} - \frac{y^2}{b^2}$ (c) $y^2 = yax$ (d) $xy = c^2$

3. The surface area of the solid generated by the revolution of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ about its minor axis is [ ]

   a) $4\pi a\int_0^{\pi/2} \cos\theta\sqrt{b^2 + a^2e^2\sin^2\theta d\theta}$ b) $2\pi a\int_0^{\pi/2} \cos\theta\sqrt{b^2 + a^2e^2\sin^2\theta d\theta}$

   c) $4\pi a\int_0^{\pi/2} \sin\theta\sqrt{b^2 + a^2e^2\sin^2\theta d\theta}$ d) $2\pi a\int_0^{\pi} \sin\theta\sqrt{b^2 + a^2e^2\sin^2\theta d\theta}$

4. In Evaluating $\int\int xy(x+y)dxdy$ over the region between $y = x^2$ and $y = x$, the limits are [ ]

   (a) $x = 0$ *to* 1, $xy = 0$ *to* 1 (b) $x = 0$ *to* 1, $y = 0$ *to* x

   (c) $x = 0$ *to* 1, $y = 0$ *to* x^2 (d) $x = 0$ *to* 1, $y = x^2$ *to* x

5. The equation of the curve for which the length of sub tangent is constant is [ ]

   a) xy = K b) y = C $e^{\frac{x}{K}}$ c) y = 4ax d) y = C x $e^{\frac{x}{K}}$

6. Radius of curvature at $(0,0)$ of $x^3 + 3x^2y - 4y^3 + y^2 - 6x = 0$ is [ ]

   (a) 6 (b) 2 (c) 3 (d) 0

7. The curve $y(x^2 - 1) = x^2 + 1$ is symmetrical about [ ]

   (a) $x - ax$ is (b) $y - ax$ is (c) $y = x$ (d) y=-x

8. If for the curve $y\frac{dy}{dx} = 0$ at $(2,3)$ then the x coordinate of center of curvature $\bar{x}$ is [ ]

   (a) 0 (b) 1 (c) 3 (d) 2

Cont.....2

9. The solution of the differential equation $e^{y-x}dy - dx = x^2e^{-x}dx$ [ ]
   (a) $e^x + e^y = c$ (b) $e^x = ce^y$
   (c) $e^y - e^x = x^2$ (d) $e^y = e^x + \frac{x^3}{3} + c$

10. The differential equation of orthogonal trajectories of $ay^2 = x^3$ is [ ]
    a) y dy = x dx b) 2y dy = 3x dx c) 3y dy = - 2x dx d) y dy = -2 x dx

II Fill in the Blanks

11. The volume of the solid generated by revolving the curve r = a(1-Cos θ) about the initial line is _____

12. $\int_0^a \int_0^{\sqrt{a^2-y^2}} (a^2 - x^2 - y^2)dxdy =$ _____

13. The area cut off by the latus rectum from the parabola $y^2 = 4ax$ is _____

14. The solution of the differential equation xy $\frac{dy}{dx}$ = y+ 2 is _____

15. If the air is maintained at 30^0 C and the temperature of the body cools from 80^0 C to 60^0 C in 12 minutes, then the value of K is _____

16. The number of loops for the curve r = a Cos3 θ _____

17. The area of one loop of the curve $r = a\cos 2\theta$ is _____

18. The solution of the differential equation $\frac{dy}{dx} = (x + y)^2$ is _____

19. The nature of the differential equation $y\sin 2xdx - (y^2 + \cos^2 x)dy = 0$ _____

20. The equation of the curve for which the length of sub normal is constant K is_____

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Code No: A109100102 **Set No. 2**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, March – 2011

MATHEMATICS – I

Objective Exam

Name: _____ Hall Ticket No. | | | | | | A | | | | |

Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

I. Choose the correct alternative:

1. In Evaluating $\int\int xy(x+y)dxdy$ over the region between $y=x^2$ and $y=x$, the limits are [ ]
   (a) $x=0$ *to* 1, $xy=0$ *to* 1 (b) $x=0$ *to* 1, $y=0$ *to* x
   (c) $x=0$ *to* 1, $y=0$ *to* x^2 (d) $x=0$ *to* 1, $y=x^2$ *to* x

2. The equation of the curve for which the length of sub tangent is constant is [ ]
   a) xy = K b) y = C $e^{\frac{x}{K}}$ c) y = 4ax d) y = C x $e^{\frac{x}{K}}$

3. Radius of curvature at $(0,0)$ of $x^3+3x^2y-4y^3+y^2-6x=0$ is [ ]
   (a) 6 (b) 2 (c) 3 (d) 0

4. The curve $y(x^2-1)=x^2+1$ is symmetrical about [ ]
   (a) $x-ax$ is (b) $y-ax$ is (c) $y=x$ (d) y=-x

5. If for the curve $y\frac{dy}{dx}=0$ at $(2,3)$ then the x coordinate of center of curvature $\bar{x}$ is [ ]
   (a) 0 (b) 1 (c) 3 (d) 2

6. The solution of the differential equation $e^{y-x}dy-dx=x^2e^{-x}dx$ [ ]
   (a) $e^x+e^y=c$ (b) $e^x=ce^y$ (c) $e^y-e^x=x^2$ (d) $e^y=e^x+\frac{x^3}{3}+c$

7. The differential equation of orthogonal trajectories of $ay^2 = x^3$ is [ ]
   a) y dy = x dx b) 2y dy = 3x dx c) 3y dy = - 2x dx d) y dy = -2 x dx

8. The asymptote for the curve is $y^2=x^2\frac{(a+x)}{a-x}$ [ ]
   $(a)x=a$ (b) $x=-a$ (c) $x=0$ (d) $y=0$

9. The Envelope of the family of curves $y=mx+\sqrt{a^2m^2+b^2}$ is [ ]
   (a) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ (b) $\frac{y^2}{a^2}-\frac{y^2}{b^2}$ (c) $y^2=yax$ (d) $xy=c^2$

Cont....2

10. The surface area of the solid generated by the revolution of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about its minor axis is [ ]

a) $4\pi a\int_0^{\pi/2}\cos\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$ b) $2\pi a\int_0^{\pi/2}\cos\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$

c) $4\pi a\int_0^{\pi/2}\sin\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$ d) $2\pi a\int_0^{\pi}\sin\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$

II Fill in the Blanks

11. The solution of the differential equation xy $\frac{dy}{dx}$ = y+ 2 is _____

12. If the air is maintained at 30^0 C and the temperature of the body cools from 80^0 C to 60^0 C in 12 minutes, then the value of K is _____

13. The number of loops for the curve r = a Cos3 θ _____

14. The area of one loop of the curve $r=a\cos 2\theta$ is _____

15. The solution of the differential equation $\frac{dy}{dx}=(x+y)^2$ is _____

16. The nature of the differential equation $y\sin 2xdx-(y^2+\cos^2 x)dy=0$ _____

17. The equation of the curve for which the length of sub normal is constant K is_____

18. The volume of the solid generated by revolving the curve r = a(1-Cos θ) about the initial line is _____

19. $\int_0^a\int_0^{\sqrt{a^2-y^2}}\left(a^2-x^2-y^2\right)dxdy=$ _____

20. The area cut off by the latus rectum from the parabola $y^2=4ax$ is _____

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Code No: A109100102 **Set No. 3**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, March – 2011

MATHEMATICS – I

Objective Exam

Name: _____ Hall Ticket No. | | | | | | A | | | | |

Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

I. Choose the correct alternative:

1. Radius of curvature at $(0,0)$ of $x^3+3x^2y-4y^3+y^2-6x=0$ is [ ]
   (a) 6 (b) 2 (c) 3 (d) 0

2. The curve $y(x^2-1)=x^2+1$ is symmetrical about [ ]
   (a) $x-ax$ is (b) $y-ax$ is (c) $y=x$ (d) $y=-x$

3. If for the curve $y\frac{dy}{dx}=0$ at $(2,3)$ then the x coordinate of center of curvature $\bar{x}$ is [ ]
   (a) 0 (b) 1 (c) 3 (d) 2

4. The solution of the differential equation $e^{y-x}dy-dx=x^2e^{-x}dx$ [ ]
   (a) $e^x+e^y=c$ (b) $e^x=ce^y$ (c) $e^y-e^x=x^2$ (d) $e^y=e^x+\frac{x^3}{3}+c$

5. The differential equation of orthogonal trajectories of $ay^2 = x^3$ is [ ]
   a) $y\,dy = x\,dx$ b) $2y\,dy = 3x\,dx$ c) $3y\,dy = -2x\,dx$ d) $y\,dy = -2x\,dx$

6. The asymptote for the curve is $y^2=x^2\frac{(a+x)}{a-x}$ [ ]
   $(a)x=a$ $(b)\ x=-a$ $(c)\ x=0$ $(d)\ y=0$

7. The Envelope of the family of curves $y=mx+\sqrt{a^2m^2+b^2}$ is [ ]
   (a) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ (b) $\frac{y^2}{a^2}-\frac{y^2}{b^2}$ (c) $y^2=yax$ (d) $xy=c^2$

8. The surface area of the solid generated by the revolution of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about its minor axis is [ ]
   a) $4\pi a\int_0^{\pi/2}\cos\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$ b) $2\pi a\int_0^{\pi/2}\cos\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$
   c) $4\pi a\int_0^{\pi/2}\sin\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$ d) $2\pi a\int_0^{\pi}\sin\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$

9. In Evaluating $\int\int xy(x+y)dxdy$ over the region between $y=x^2$ and $y=x$, the limits are [ ]
   (a) $x=0$ *to* 1, $xy=0$ *to* 1 (b) $x=0$ *to* 1, $y=0$ *to* x
   (c) $x=0$ *to* 1, $y=0$ *to* x^2 (d) $x=0$ *to* 1, $y=x^2$ *to* x

Cont.....2

10. The equation of the curve for which the length of sub tangent is constant is [ ]
    a) xy = K b) y = C $e^{\frac{x}{K}}$ c) y = 4ax d) y = C x $e^{\frac{x}{K}}$

II Fill in the Blanks

11. The number of loops for the curve r = a Cos3 θ _____

12. The area of one loop of the curve $r = a\cos 2\theta$ is _____

13. The solution of the differential equation $\frac{dy}{dx} = (x+y)^2$ is _____

14. The nature of the differential equation $y\sin 2x dx - (y^2 + \cos^2 x)dy = 0$ _____

15. The equation of the curve for which the length of sub normal is constant K is_____

16. The volume of the solid generated by revolving the curve r = a(1-Cos θ) about the initial line is _____

17. $\int_0^a \int_0^{\sqrt{a^2-y^2}} (a^2 - x^2 - y^2)dxdy =$ _____

18. The area cut off by the latus rectum from the parabola $y^2 = 4ax$ is _____

19. The solution of the differential equation xy $\frac{dy}{dx}$ = y+ 2 is _____

20. If the air is maintained at 30^0 C and the temperature of the body cools from 80^0 C to 60^0 C in 12 minutes, then the value of K is _____

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Code No: A109100102 **Set No. 4**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, March – 2011

MATHEMATICS – I

Objective Exam

Name: _____ Hall Ticket No. | | | | | | A | | | | |

Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

I. Choose the correct alternative:

1. If for the curve $y\frac{dy}{dx}=0$ at $(2,3)$ then the x coordinate of center of curvature $\bar{x}$ is [ ]

   (a) 0 (b) 1 (c) 3 (d) 2

2. The solution of the differential equation $e^{y-x}dy-dx=x^2e^{-x}dx$ [ ]

   (a) $e^x+e^y=c$ (b) $e^x=ce^y$ (c) $e^y-e^x=x^2$ (d) $e^y=e^x+\frac{x^3}{3}+c$

3. The differential equation of orthogonal trajectories of $ay^2 = x^3$ is [ ]

   a) y dy = x dx b) 2y dy = 3x dx c) 3y dy = - 2x dx d) y dy = -2 x dx

4. The asymptote for the curve is $y^2=x^2\frac{(a+x)}{a-x}$ [ ]

   $(a)x=a$ $(b)\ x=-a$ $(c)\ x=0$ $(d)\ y=0$

5. The Envelope of the family of curves $y=mx+\sqrt{a^2m^2+b^2}$ is [ ]

   (a) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ (b) $\frac{y^2}{a^2}-\frac{y^2}{b^2}$ (c) $y^2=yax$ (d) $xy=c^2$

6. The surface area of the solid generated by the revolution of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ about its minor axis is [ ]

   a) $4\pi a\int_0^{\pi/2}\cos\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$ b) $2\pi a\int_0^{\pi/2}\cos\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$

   c) $4\pi a\int_0^{\pi/2}\sin\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$ d) $2\pi a\int_0^{\pi}\sin\theta\sqrt{b^2+a^2e^2\sin^2\theta}d\theta$

7. In Evaluating $\int\int xy(x+y)dxdy$ over the region between $y=x^2$ and $y=x$, the limits are [ ]

   (a) $x=0$ *to* 1, $xy=0$ *to* 1 (b) $x=0$ *to* 1, $y=0$ *to* x

   (c) $x=0$ *to* 1, $y=0$ *to* x^2 (d) $x=0$ *to* 1, $y=x^2$ *to* x

8. The equation of the curve for which the length of sub tangent is constant is [ ]

   a) xy = K b) y = C $e^{\frac{x}{K}}$ c) y = 4ax d) y = C x $e^{\frac{x}{K}}$

9. Radius of curvature at $(0,0)$ of $x^3+3x^2y-4y^3+y^2-6x=0$ is [ ]

   (a) 6 (b) 2 (c) 3 (d) 0

Cont....2

10. The curve $y(x^2-1)=x^2+1$ is symmetrical about [ ]
(a) $x-ax$ is (b) $y-ax$ is (c) $y=x$ (d) y=-x

II Fill in the Blanks

11. The solution of the differential equation $\frac{dy}{dx}=(x+y)^2$ is _____

12. The nature of the differential equation $y\sin 2xdx-(y^2+\cos^2 x)dy=0$ _____

13. The equation of the curve for which the length of sub normal is constant K is_____

14. The volume of the solid generated by revolving the curve r = a(1-Cos θ) about the initial line is _____

15. $\int_0^a\int_0^{\sqrt{a^2-y^2}}\left(a^2-x^2-y^2\right)dxdy=$ _____

16. The area cut off by the latus rectum from the parabola $y^2=4ax$ is _____

17. The solution of the differential equation xy $\frac{dy}{dx}$ = y+ 2 is _____

18. If the air is maintained at 30^0 C and the temperature of the body cools from 80^0 C to 60^0 C in 12 minutes, then the value of K is _____

19. The number of loops for the curve r = a Cos3 θ _____

20. The area of one loop of the curve $r=a\cos 2\theta$ is _____

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