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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, February – 2012

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 radius of curvature for the curve $(at^2, 2at)$s [ ]

   (a) $2a(1+t^2)$ (b) $a(1+t^2)^2$ (c) $\frac{2a(1+t^2)^{3/2}}{t^2}$ (d) $2a(1+t^2)^{3/2}$

2. The curve $x = a\cos^3 t, y = a\sin^3 t$ is symmetrical about the line [ ]

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

3. The tangents to the curve $y^2 = x^2\frac{(a+x)}{a-x}$ at the origin are [ ]

   (a) $x = 0,\ y = 0$ (b) $x = \pm a$ (c) $y = \pm x$ (d) y =o and y = a

4. After transforming to polar coordinates $\int_0^\infty\int_0^\infty e^{-(x^2+y^2)}dxdy =$ [ ]

   (a) $\int_0^{\pi/2}\int_0^1 e^{-r2}drd\theta$ (b) $\int_0^{\pi/2}\int_0^1 e^{-r2}rdrd\theta$

   (c) $\int_0^{\pi/2}\int_0^\infty e^{-r2}rdrd\theta$ (d) $\int_0^{\pi/2}\int_0^\infty e^{-y2}rdrd\theta$

5. The orthogonal trajectories of $xy = c$ is [ ]

   (a) $x^2 + y^2 = a^2$ (b) $x^2 - y^2 = a^2$ (c) $x^2 + 2x = c$ (d) $y^2 - 2x = c$

6. The rate of bending of a curve in any interval is the [ ]
   (a) radius of curvature (b) curvature (c) evolute (d) envelope

7. 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

8. The differential equation reduced from $\frac{dy}{dx} = \frac{x+y}{x-y}$ is [ ]

   (a) $\frac{(1+v)dv}{1+v^2} = \frac{dx}{x}$ (b) $\frac{(1+v)dv}{1-v^2} = \frac{dx}{x}$

   (c) $\frac{(2+v)dv}{1-v^2} = \frac{dx}{x}$ (d) $\frac{(1-v)dv}{1+v^2} = \frac{dx}{x}$

Cont....2

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

(a) Homogeneous (b) Linear (c) Bernoulli (d) Exact

10. The integrating factor of $e^y\left(\frac{dy}{dx}+1\right)=e^x$ is [ ]

(a) e^x (b) $e^{x/2}$ (c) e^{-x} (d) x

II Fill in the Blanks

11. Envelope of $y=mx+\frac{2}{m}$ is _____

12. The curve $r=a(1+\cos\theta)$ is symmetrical about _____

13. $\int_0^{\pi}\int_0^{a\cos\theta} r\sin\theta dr d\theta$ _____

14. In Evaluating $\iint xy(x+y)dxdy$ over the region between $y=x^2$ and $y=x$, the limits are _____

15. The integrating factor of $(x+2y^3)\frac{dy}{dx}=y$ is_____

16. The x-coordinates of centre of curvature of $xy=3$ at $(3,1)$ is_____

17. $\int_0^1\int_0^2 xy^2 dydx$ = _____

18. $\int_0^a\int_0^x\int_0^y xyzdxdydz$ = _____

19. The length of arc from 0 to π of x= a $(\theta+\sin\theta)$ y= a$(1+\cos\theta)$ is _____

20. If $\frac{dy}{dx}=\frac{x+2y-3}{2x+y-3}, x=X+h, y=Y+k$ then the values of h and k are _____

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, February – 2012

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. After transforming to polar coordinates $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dxdy =$ [ ]

   (a) $\int_0^{\pi/2} \int_0^1 e^{-r2} drd\theta$ (b) $\int_0^{\pi/2} \int_0^1 e^{-r2} rdrd\theta$

   (c) $\int_0^{\pi/2} \int_0^\infty e^{-r2} rdrd\theta$ (d) $\int_0^{\pi/2} \int_0^\infty e^{-y2} rdrd\theta$

2. The orthogonal trajectories of $xy = c$ is [ ]

   (a) $x^2 + y^2 = a^2$ (b) $x^2 - y^2 = a^2$ (c) $x^2 + 2x = c$ (d) $y^2 - 2x = c$

3. The rate of bending of a curve in any interval is the [ ]

   (a) radius of curvature (b) curvature (c) evolute (d) envelope

4. 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

5. The differential equation reduced from $\frac{dy}{dx} = \frac{x+y}{x-y}$ is [ ]

   (a) $\frac{(1+v)dv}{1+v^2} = \frac{dx}{x}$ (b) $\frac{(1+v)dv}{1-v^2} = \frac{dx}{x}$

   (c) $\frac{(2+v)dv}{1-v^2} = \frac{dx}{x}$ (d) $\frac{(1-v)dv}{1+v^2} = \frac{dx}{x}$

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

   (a) Homogeneous (b) Linear (c) Bernoulli (d) Exact

7. The integrating factor of $e^y \left(\frac{dy}{dx} + 1\right) = e^x$ is [ ]

   (a) e^x (b) $e^{x/2}$ (c) e^{-x} (d) x

8. The radius of curvature for the curve $(at^2, 2at)$s [ ]

   (a) $2a(1+t^2)$ (b) $a(1+t^2)^2$ (c) $\frac{2a(1+t^2)^{3/2}}{t^2}$ (d) $2a(1+t^2)^{3/2}$

Cont....2

9. The curve $x = a\cos^3 t, y = a\sin^3 t$ is symmetrical about the line [ ]

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

10. The tangents to the curve $y^2 = x^2\dfrac{(a+x)}{a-x}$ at the origin are [ ]

(a) $x = 0,\ y = 0$ (b) $x = \pm a$ (c) $y = \pm x$ (d) y =o and y = a

II Fill in the Blanks

11. In Evaluating $\iint xy(x+y)dxdy$ over the region between $y = x^2$ and $y = x$, the limits are _____

12. The integrating factor of $(x+2y^3)\dfrac{dy}{dx} = y$ is_____

13. The x-coordinates of centre of curvature of $xy = 3$ at $(3,1)$ is_____

14. $\int_0^1\int_0^2 xy^2\,dydx$ = _____

15. $\int_0^a\int_0^x\int_0^y xyzdxdydz$ = _____

16. The length of arc from 0 to π of x= a $(\theta+\sin\theta)$ y= a$(1+\cos\theta)$ is _____

17. If $\dfrac{dy}{dx} = \dfrac{x+2y-3}{2x+y-3}, x = X+h, y = Y+k$ then the values of h and k are _____

18. Envelope of $y = mx + \dfrac{2}{m}$ is _____

19. The curve $r = a(1+\cos\theta)$ is symmetrical about _____

20. $\int_0^{\pi}\int_0^{a\cos\theta} r\sin\theta\,drd\theta$ _____

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, February – 2012

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 rate of bending of a curve in any interval is the [ ]
(a) radius of curvature (b) curvature (c) evolute (d) envelope

2. 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

3. The differential equation reduced from $\frac{dy}{dx}=\frac{x+y}{x-y}$ is [ ]
(a) $\frac{(1+v)dv}{1+v^2}=\frac{dx}{x}$ (b) $\frac{(1+v)dv}{1-v^2}=\frac{dx}{x}$
(c) $\frac{(2+v)dv}{1-v^2}=\frac{dx}{x}$ (d) $\frac{(1-v)dv}{1+v^2}=\frac{dx}{x}$

4. The nature of the differential equation $y\sin 2xdx-(y^2+\cos^2 x)dy=0$ [ ]
(a) Homogeneous (b) Linear (c) Bernoulli (d) Exact

5. The integrating factor of $e^y\left(\frac{dy}{dx}+1\right)=e^x$ is [ ]
(a) e^x (b) $e^{x/2}$ (c) e^{-x} (d) x

6. The radius of curvature for the curve $(at^2, 2at)$s [ ]
(a) $2a(1+t^2)$ (b) $a(1+t^2)^2$ (c) $\frac{2a(1+t^2)^{3/2}}{t^2}$ (d) $2a(1+t^2)^{3/2}$

7. The curve $x=a\cos^3 t, y=a\sin^3 t$ is symmetrical about the line [ ]
(a) $x=0$ (b) $y=0$ (c) $x=0,\ y=0$ (d) $y=x$, y=-x

8. The tangents to the curve $y^2=x^2\frac{(a+x)}{a-x}$ at the origin are [ ]
(a) $x=0,\ y=0$ (b) $x=\pm a$ (c) $y=\pm x$ (d) y =o and y = a

Cont....2

9. After transforming to polar coordinates $\int_0^{\infty}\int_0^{\infty} e^{-\left(x^2+y^2\right)}dxdy =$ [ ]

(a) $\int_0^{\pi/2}\int_0^{1} e^{-r2}drd\theta$ (b) $\int_0^{\pi/2}\int_0^{1} e^{-r2}rdrd\theta$

(c) $\int_0^{\pi/2}\int_0^{\infty} e^{-r2}rdrd\theta$ (d) $\int_0^{\pi/2}\int_0^{\infty} e^{-y2}rdrd\theta$

10. The orthogonal trajectories of $xy = c$ is [ ]

(a) $x^2 + y^2 = a^2$ (b) $x^2 - y^2 = a^2$ (c) $x^2 + 2x = c$ (d) $y^2 - 2x = c$

II Fill in the Blanks

11. The x-coordinates of centre of curvature of $xy = 3$ at $(3,1)$ is_____

12. $\int_0^1\int_0^2 xy^2dydx$ = _____

13. $\int_0^a\int_0^x\int_0^y xyzdxdydz$ = _____

14. The length of arc from 0 to π of x= a $(\theta + \sin\theta)$ y= a$(1+\cos\theta)$ is _____

15. If $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}, x = X + h, y = Y + k$ then the values of h and k are _____

16. Envelope of $y = mx + \frac{2}{m}$ is _____

17. The curve $r = a(1+\cos\theta)$ is symmetrical about _____

18. $\int_0^{\pi}\int_0^{a\cos\theta} r\sin\theta drd\theta$ _____

19. In Evaluating $\iint xy(x+y)dxdy$ over the region between $y = x^2$ and $y = x$, the limits are _____

20. The integrating factor of $(x+2y^3)\frac{dy}{dx}$ = y is_____

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I B.Tech. II Mid Examinations, February – 2012

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 differential equation reduced from $\frac{dy}{dx} = \frac{x+y}{x-y}$ is [ ]

   (a) $\frac{(1+v)dv}{1+v^2} = \frac{dx}{x}$ (b) $\frac{(1+v)dv}{1-v^2} = \frac{dx}{x}$

   (c) $\frac{(2+v)dv}{1-v^2} = \frac{dx}{x}$ (d) $\frac{(1-v)dv}{1+v^2} = \frac{dx}{x}$

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

   (a) Homogeneous (b) Linear (c) Bernoulli (d) Exact

3. The integrating factor of $e^y\left(\frac{dy}{dx}+1\right) = e^x$ is [ ]

   (a) e^x (b) $e^{x/2}$ (c) e^{-x} (d) x

4. The radius of curvature for the curve $(at^2, 2at)$s [ ]

   (a) $2a(1+t^2)$ (b) $a(1+t^2)^2$ (c) $\frac{2a(1+t^2)^{3/2}}{t^2}$ (d) $2a(1+t^2)^{3/2}$

5. The curve $x = a\cos^3 t, y = a\sin^3 t$ is symmetrical about the line [ ]

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

6. The tangents to the curve $y^2 = x^2\frac{(a+x)}{a-x}$ at the origin are [ ]

   (a) $x = 0,\ y = 0$ (b) $x = \pm a$ (c) $y = \pm x$ (d) y =o and y = a

7. After transforming to polar coordinates $\int_0^\infty\int_0^\infty e^{-\left(x^2+y^2\right)}dxdy =$ [ ]

   (a) $\int_0^{\pi/2}\int_0^1 e^{-r2}drd\theta$ (b) $\int_0^{\pi/2}\int_0^1 e^{-r2}rdrd\theta$

   (c) $\int_0^{\pi/2}\int_0^\infty e^{-r2}rdrd\theta$ (d) $\int_0^{\pi/2}\int_0^\infty e^{-y2}rdrd\theta$

8. The orthogonal trajectories of $xy = c$ is [ ]

   (a) $x^2 + y^2 = a^2$ (b) $x^2 - y^2 = a^2$ (c) $x^2 + 2x = c$ (d) $y^2 - 2x = c$

Cont....2

9 The rate of bending of a curve in any interval is the [ ]
(a) radius of curvature (b) curvature (c) evolute (d) envelope

10. 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

II Fill in the Blanks

11. $\int_0^a\int_0^x\int_0^y xyzdxdydz$ = _____

12. The length of arc from 0 to π of x= a $(\theta+\sin\theta)$ y= a$(1+\cos\theta)$ is _____

13. If $\frac{dy}{dx}=\frac{x+2y-3}{2x+y-3}, x=X+h, y=Y+k$ then the values of h and k are _____

14. Envelope of $y=mx+\frac{2}{m}$ is _____

15. The curve $r=a(1+\cos\theta)$ is symmetrical about _____

16. $\int_0^{\pi}\int_0^{a\cos\theta} r\sin\theta dr d\theta$ _____

17. In Evaluating $\iint xy(x+y)dxdy$ over the region between $y=x^2$ and $y=x,$ the limits are _____

18. The integrating factor of $(x+2y^3)\frac{dy}{dx}$ = y is_____

19. The x-coordinates of centre of curvature of $xy=3$ at $(3,1)$ is_____

20. $\int_0^1\int_0^2 xy^2dydx$ = _____

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