Q1. The differential equation of the form $Mdx + Ndy = 0$ is said to be exact if

a) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$ b) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ c) $\frac{\partial M}{\partial y} + \frac{\partial N}{\partial x} = 0$ d) $\frac{\partial M}{\partial y} - \frac{\partial N}{\partial y} = 0$

Q2. If the non exact differential equation $Mdx + Ndy = 0$ is of homogeneous type with $Mx + Ny \neq 0$ then the integrating factor is

a) $\frac{1}{My-Nx}$ b) $\frac{1}{Mx-Ny}$ c) $\frac{1}{Mx+Ny}$ d) $\frac{1}{My+Nx}$

Q3. Solution of $xdy + ydx = 0$ is

a) $xy = c$ b) $x + y = c$ c) $x - y = c$ d) none of these

Q4. For the non-exact differential equation $Mdx + Ndy = 0$,if $\frac{1}{N}\left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}\right) = f(x)$, Then the integrating factor is

a) $e^{f(x)}$ b) $\frac{1}{f(x)}$ c) $e^{\int f(x)dx}$ d) $\int f(x)dx$

Q5. Integrating Factor of $ydx - xdy + a(x^2 + y^2)dx = 0$ is

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

Q6. The general solution of equation $xp^2 - yp + a = 0$, where $p = \frac{dy}{dx}$, is given by

a) $y = cx - e^c$ b) $y = cx + \frac{a}{c}$ c) $y = cx - sin^{-1}c$ d) $(y - cx)^2 = a^2c^2 + b^2$

Q7. The equation having e^{2x} and xe^{2x} as independent solution is

(a) y''-4y'+4=0 (b) y''-5y'+4=0 (c) y''-4y=0 (d) y''-3y'+2=0

Q8. The solution of y''-4y'+4y =0 is

a) $Ae^{-2x} + Be^{2x}$ b) $Ae^{-2x} + Be^{x}$

c) $(A + Bx)e^{2x}$ d) $(A + Bx)e^{-2x}$

Q9. The wronskian of the function 1, sin x, cos x is

a) -1 b) 1 c) 0 d) 2

Q10. The set of linearly independent solution of $\frac{d^4y}{dx^4} - \frac{d^2y}{dx^2} = 0$ is

(a) $\{1, x, e^{x}, e^{-x}\}$ (b) $\{1, x, e^{-x}, xe^{-x}\}$ (c) $\{1, x, e^{x}, xe^{x}\}$ (d) $\{1, x, e^{x}, xe^{-x}\}$

Q11. The general solution of the equation y''-6y'+13y=0 is

(a) $e^{x}(c_1x^2 + c_2x + c_3)$ (b) $e^{3x}(c_1cos2x + c_2sin2x)$

(c) $e^{x}(c_1x^2 + (c_2 + c_3)x)$ (d) $e^{2x}(c_1sin^2x + c_2\cos x + c_3)$

Q12. The general solution of the equation $\frac{d^5y}{dx^5} - \frac{d^3y}{dx^3} = 0$ is

(a) $c_1e^{2x} + c_2e^{x} + (c_3 + c_4x + c_5x^2)$ (b) $c_1e^{-x} + c_2e^{x}$

(c) $c_1e^{-x} + c_2e^{x} + (c_3 + c_4x + c_5x^2)e^{3x}$ (d) $c_1e^{-x} + c_2e^{x} + (c_3 + c_4x + c_5x^2)$

Q13. The value of $\frac{1}{f(D)}.1$ $when\ f(D) = D^n\ is$

(a) $\frac{x^n}{n}$ (b)0 (c) $\frac{x^n}{n!}$ (d) None of these

Q14. The particular integral of $\frac{d^2y}{dx^2} + y = x^2\ is$

(a) x (b) x^3 (c) x^2 (d) None of these

Q15. The general solution of $(D^2 + D - 2)y = e^x$ is

(a) $y = Ae^x + Be^{-2x} + \frac{1}{3}xe^x$

(b) $y = Ae^x + Be^{-2x}$

(c) $y=Ae^x+Be^{-2x}+\frac{1}{6}(x^2e^x)$

(d) $y = (A + Bx)e^{-2x} + \frac{1}{3}xe^x$

Q16. Particular integral of $\frac{d^2y}{dx^2} + y = 1$ is

(a)0 (b) x (c)1 (d) x^2

Q17. The complementary function for the solution of the differential equation $2x^2y''+3xy'-3y=x^3$ is

(a) Ax^2+Bx (b) $Ax^{\frac{3}{2}} + Bx^{\frac{3}{2}}$ (c) $Ax + Bx^{\frac{-3}{2}}$ (d) $Ax + Bx^{\frac{3}{2}}$

Q18. On putting $x = e^z$, the transformed differential equation of $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = x\ is$

(a) $\frac{d^2y}{dz^2} + y = e^z$ (b) $\frac{d^2y}{dz^2} - y = e^z$ (c) $\frac{dy}{dz} + y = e^z$ (d) $\frac{dy}{dz} - y = e^{z^2}$

Q19. The initial solution taken by method of separation of variables for the differential equation

$\frac{\partial u}{\partial t} = c^2\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right)$ is

(a) $u(x,t) = X(x)T(t)$

(b) $u(y,t) = Y(y)T(t)$

(c) $u(x,y,t) = X(x)Y(y)T(t)$

(d) $u(x,y,t) = X(y)Y(x)T(t)$

Q20. Which of the following represent one dimensional wave equation?

(a) $\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right) = 0$ (b) $\left(\frac{\partial^2 u}{\partial x^2} - \frac{\partial^2 u}{\partial t^2}\right) = 0$ (c) $\left(\frac{\partial^2 u}{\partial x^2} - \frac{\partial u}{\partial t}\right) = 0$ (d) None of these

Q21. Which of the following represent two dimensional Heat equation.

(a) $\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right)C^2 = \frac{\partial u}{\partial t}$

(b) $\left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right)C^2 = \frac{\partial^2 u}{\partial t^2}$

(c) $\left(\frac{\partial^2 u}{\partial x^2} - \frac{\partial u}{\partial t}\right) = 0$

(d) None of these

Q22. Which of the following is one dimensional Heat equations?;

(a) $\frac{\partial u}{\partial t} - \frac{\partial^2 u}{\partial x^2} = 0$ (b) $\frac{\partial^2 u}{\partial t^2} - \frac{\partial^2 u}{\partial x^2} = 0$ (c) $\frac{\partial^2 u}{\partial x^2} - \frac{\partial^2 u}{\partial y^2} = 0$ (d) $\frac{\partial^2 u}{\partial t^2} + \frac{\partial^2 u}{\partial x^2} = 0$

Q23. Which of the following represents the solution of $\frac{\partial^2 u}{\partial x^2}c^2 = \frac{\partial u}{\partial t}$;

$u(0,t) = 0;\ u(L,t) = 0;\ u(x,0) = f(x)$

(a) $u(x,t) = \sum_n b_n \sin\left(\frac{n\pi x}{L}\right).e^{\frac{n^2\pi^2c^2}{L^2}t}$

(b) $u(x,t) = \sum_n b_n \sin\left(\frac{n\pi x}{L}\right).\cos\left(\frac{n\pi\ ct}{L}\right)$

(c) $u(x,t) = \sum_n b_n \sin\left(\frac{n\pi\ ct}{L}\right).\cos\left(\frac{n\pi x}{L}\right)$

(d) Both (b) and (c)

Q24. The possible solution of $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0$;

(a) $u(x,t)=(C_1\cos kx+C_2\sin kx)(C_3e^{ky}+C_4e^{-ky})$

(b) $u(x,t)=(C_1+C_2x)(C_3+C_4t)$

(c) $u(x,t)=(C_1\cos ky+C_2\sin ky)(C_3e^{kx}+C_4e^{-kx})$

(d) All of the above

Q25. If The solution of $\frac{\partial^2 u}{\partial x^2}C^2=\frac{\partial^2 u}{\partial t^2}$; $u(0,t)=0$; $u(L,t)=0$; $\left(\frac{\partial u}{\partial t}\right)_{t=0}=0$; $u(x,0)=f(x)$

is $u(x,t)=\sum_n b_n\sin\left(\frac{n\pi x}{L}\right).\cos\left(\frac{n\pi\, ct}{L}\right)$ then the value of b_n is given by

(a) $b_n=\frac{1}{L}\int_0^L f(x)\sin\left(\frac{n\pi x}{L}\right)dx$

(b) $b_n=\frac{1}{L}\int_0^L f(x)\sin\left(\frac{\pi x}{L}\right)dx$

(c) $b_n=\frac{2}{L}\int_0^L f(x)\sin\left(\frac{\pi x}{L}\right)dx$

(d) None of these

Q26. The solution of $2x\frac{\partial u}{\partial x}-3y\frac{\partial u}{\partial y}=0$ by separation of variable is

(a) $u=cx^k y^k$

(b) $u=cx^{k/2}y^k$

(c) $u=cx^k y^{k/3}$

(d) $u=cx^{k/2}y^{k/3}$

Q27. If The solution of $\frac{\partial^2 u}{\partial x^2}c^2=\frac{\partial^2 u}{\partial t^2}$; $u(0,t)=0$; $u(L,t)=0$; $\left(\frac{\partial u}{\partial t}\right)_{t=0}=0$; $u(x,0)=\sin^3\left(\frac{\pi x}{L}\right)$

is $u(x,t)=\sum_n b_n\sin\left(\frac{n\pi x}{L}\right).\cos\left(\frac{n\pi\, ct}{L}\right)$ then the value of b_1,b_3 is

(a) $\frac{3}{4},\frac{1}{4}$

(b) $\frac{1}{4},\frac{3}{4}$

(c) $\frac{3}{4},-\frac{1}{4}$

(d) $-\frac{1}{4},\frac{3}{4}$

Q28. If the following represents the solution of $\frac{\partial^2 u}{\partial x^2}c^2=\frac{\partial u}{\partial t}$;

$u(0,t)=0$; $u(2,t)=0$; $u(x,0)=\sin\left(\frac{3\pi x}{2}\right)-3\sin\left(\frac{2\pi x}{2}\right)$ is $u(x,t)=\sum_n b_n\sin\left(\frac{n\pi x}{2}\right).e^{-\frac{n^2\pi^2c^2}{4}t}$ then the value of b_1,b_2 is

(a) 1,3

(b) 3,0

(c) 1,-3

(d) 0,-3

Q29. The solution of the equation

$\frac{\partial^2 u}{\partial x^2}C^2=\frac{\partial^2 u}{\partial t^2}:u(0,t)=0;u(l,t)=0:u(x,0)=f(x);\left(\frac{\partial u}{\partial t}\right)_{t=0}=h(x)$ by D'Alembert's method is

(a) $u(x,t)=\frac{1}{2}[f(x+ct)+f(x-ct)]+\frac{1}{2c}\int_{x-ct}^{x+ct}g(x)dx$

(b) $u(x,t)=[f(x+ct)+f(x-ct)]+\frac{1}{2c}\int_{x-ct}^{x+ct}g(x)dx$

(c) $u(x,t)=\frac{1}{2}[f(x+ct)+f(x-ct)]+\frac{1}{c}\int_{x-ct}^{x+ct}g(x)dx$

(d) $u(x,t)=\frac{1}{2}[f(x+ct)+f(x-ct)]+\frac{1}{2}\int_{x-ct}^{x+ct}g(x)dx$

Q30. If The solution of $\frac{\partial^2 u}{\partial x^2}c^2 = \frac{\partial^2 u}{\partial t^2}$; $u(0,t)=0$; $u(\pi,t)=0$; $\left(\frac{\partial u}{\partial t}\right)_{t=0} = 0$; $u(x,0)=x$

Is $u(x,t) = \sum_n b_n \sin nx \cos ncxt$ then the value of b_n is given by

(a) $\frac{(-1)^n}{n+1}$ (b) $\frac{(-1)^{n+1}}{n}$ (c) $2\frac{(-1)^{n+1}}{n}$ (d) None of these

Q31. The partial differential equations obtained by eliminating the arbitrary constants a & b from z = (x – a) (y - b) is

a) $z = pq$ b) $z = \frac{p}{q}$ c) $z = p + q$ d) None of these

Q32. The partial differential equation $u_{xx} + x^2 u_{xy} + u_y = 0; x \neq 0$ is classified as

(a)Parabolic (b)Elliptic (c)Hyperbolic (d)None of these

Q33. Which of the following is Laplace equation?

a) $\frac{\partial^2 u}{\partial x^2} = \frac{\partial u}{\partial t}$ b) $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ c) $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ d) None of these

Q34. The Laplace equation is classified as

(a)Parabolic (b)Elliptic (c)Hyperbolic (d) None of these

Q35. Laplace equation is a special case of

(a) One dimensional Wave equation (b) One dimensional Heat equation
(c) Two dimensional Wave equation (d) Two dimensional Heat equation

Q36. The parametric equation of the curve $x + y + z = 8, y - z = 0$ is

(a) $x = y = z = t$ (b) $y = z = t, x = 8 - 2t$ (c) $y = z = t, x = 8 - t$ (d) None of these

Q37. The tangent vector to the curve whose parametric representation is $x = \cos t, y = \sin t, z = t, -\pi \leq t \leq \pi$, is given by

(a) $\cos t\ \hat{\imath} + \sin t\ \hat{\jmath} + t\ \hat{k}$ (b) $-\sin t\ \hat{\imath} + \cos t\ \hat{\jmath} + \hat{k}$
(c) $-\cos t\ \hat{\imath} - \sin t\ \hat{\jmath} + t\ \hat{k}$ (d) $\cos t\ \hat{\imath} + \sin t\ \hat{\jmath} - t\ \hat{k}$

Q38. If $\vec{V}(t) = (\cos t + t^2)(t\hat{\imath} + \hat{\jmath} + 2\hat{k})$ then $\vec{V'}(t)$ is

(a) $(3t^2 - t\sin t + \cos t)\hat{\imath} + (2t - \sin t)\hat{\jmath}$ (b) $(3t^2 - t\sin t + \cos t)\hat{\imath} + (2t - \sin t)\hat{k}$
(c) $(3t^2 - t\sin t + \cos t)\hat{\imath} + (2t - \sin t)(\hat{\jmath} - 2\hat{k})$ (d) $3t^2 - t\sin t + \cos t)\hat{\imath} + (2t - \sin t)(\hat{\jmath} + 2\hat{k})$

Q39. The length of the Helix traced by $\vec{r}(t) = \cos t\,\hat{\imath} + \sin t\,\hat{\jmath} + t\,\hat{k},\ 0 \leq t \leq 2\pi$ is

(a) 2π (b) $2\sqrt{2}\pi$ (c) $\sqrt{2}\pi$ (d) $2\sqrt{2}$

Q40. If the position vector of the moving particle is $\vec{r}(t) = t^3\hat{\imath} + t\hat{\jmath} + t^2\hat{k}$ then its speed is

(a)$(9t^4 + 4t^2 + 1)^{\frac{1}{2}}$ (b)$(9t^4 - 4t^2 + 1)^{\frac{1}{2}}$ (c) $(9t^4 + 4t^2 - 1)^{\frac{1}{2}}$ (d) $(9t^4 - 4t^2 - 1)^{\frac{1}{2}}$

Q41. Normal vector to the curve $x^2 + y^2 = 16$ at $(3,4)$ is

(a) $6\hat{\imath} - 8\hat{\jmath}$ (b) $6\hat{\imath} + 6\hat{\jmath}$ (c) $6\hat{\imath} + 8\hat{\jmath}$ (d) None of these

Q42. The unit normal vector $\hat{n}$ to the surface $f(x,y,z) = k$ is given by

(a) $\frac{grad\ f}{|grad\ f|}$ (b) $\frac{1}{|grad\ f|}$ (c) $\frac{grad\ f^2}{|grad\ f|}$ (d) None of these

Q43. The angle between the surfaces $f_1(x,y,z) = k_1$ and $f_2(x,y,z) = k_2$ at any point (x_0, y_0, z_0) is given by

(a) $\cos\theta = \left|\frac{(\nabla f_1)_{(x_0,y_0,z_0)} \cdot (\nabla f_2)_{(x_0,y_0,z_0)}}{|(\nabla f_1)_{(x_0,y_0,z_0)}||(\nabla f_2)_{(x_0,y_0,z_0)}|}\right|$ (b) $\sin\theta = \left|\frac{(\nabla f_1)_{(x_0,y_0,z_0)} \cdot (\nabla f_2)_{(x_0,y_0,z_0)}}{|(\nabla f_1)_{(x_0,y_0,z_0)}||(\nabla f_2)_{(x_0,y_0,z_0)}|}\right|$

(c) $\cos^{-1}\theta = \left|\frac{(\nabla f_1)_{(x_0,y_0,z_0)} \cdot (\nabla f_2)_{(x_0,y_0,z_0)}}{|(\nabla f_1)_{(x_0,y_0,z_0)}||(\nabla f_2)_{(x_0,y_0,z_0)}|}\right|$ (d) $\cos^2\theta = \left|\frac{(\nabla f_1)_{(x_0,y_0,z_0)} \cdot (\nabla f_2)_{(x_0,y_0,z_0)}}{|(\nabla f_1)_{(x_0,y_0,z_0)}||(\nabla f_2)_{(x_0,y_0,z_0)}|}\right|$

Q44. Directional derivative of $f = xyz$ at $(1,4,3)$ in the direction of line from $(1,2,3)$ to $(1,-1,-3)$ is

(a) $\frac{11}{5}$ (b) $-\frac{11}{\sqrt{5}}$ (c) 11 (d) None of these

Q45. If $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, then the value of $div(\vec{r})$ is

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

Q46. If divergence of a vector function $\vec{F}$ is zero then it said to be

(a) Irrotational (b) Solenoidal (c) Conservative (d) None of these

Q47. If $\vec{V} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, then $curl(\vec{V})$ is

(a) $2x\hat{\imath} + 2y\hat{\jmath} + 2z\hat{k}$ (b) $x\hat{\imath} + y\hat{\jmath} + z\hat{k}$ (c) 0 (d) None of these

Q48. If $\vec{r} = x^2\hat{\imath} + y^2\hat{\jmath} + z^2\hat{k}$, then the value of $div(Curl\,\vec{r})$ is

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

Q49. If $\vec{V}$ be a differentiable vector field then the value of $div\,(curl\,\vec{V})$ is

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

Q50. If $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$ and $\vec{a}$ is a constant vector then $div(\vec{a} \times \vec{r})$ is

(a) 3 (b) 0 (c) 1 (d) None of these

Q51. If $\vec{V} = (2x+3y)\hat{\imath} + (x-y)\hat{\jmath} - (x+y+z)\hat{k}$, then $div(\vec{V})$ is

(a) $y\hat{\imath} + z\hat{\jmath} + x\hat{k}$ (b) 0 (c) $(2\hat{\imath} - \hat{k})$ (d) None of these

Q52. Let f be a differentiable scalar field then $curl(grad\ f)$ is

a) $\vec{0}$ b) 1 c) 2 d) None of these

Q53. The value of line integral $\int_C (x^2y\,dx + x^2dy)$, where C is the boundary described counter clockwise of the triangle with vertices (0, 0), (1, 0), (1, 1) {By using of green's theorem} is

a) $-\frac{5}{12}$ b) $\frac{12}{5}$ c) $\frac{5}{12}$ d) $-\frac{12}{5}$

Q54. The value of line integral $\int_C (x^2+xy)dx + (x^2+y^2)dy$, where C is the square formed by $x = \pm 1,\ y = \pm 1$ {By using of green's theorem} is

a) 0 b) -1 c) 1 d) None of these

Q55. The value of $\iiint_v Div\ \vec{F}\ dv,\ where\ \vec{F} = 3x\hat{i} + 4y\hat{j} + 5z\hat{k}$ over the region bounded by the sphere $x^2+y^2+z^2 = 1$ is

a) $\frac{3584}{3}\pi$ b) $\frac{3584}{4}\pi$ c) $-\frac{3584}{3}\pi$ d) None of these

Q56. The value of $\oint_c x^2z\,dx + 3xdy - y^3dz,\ where\ c\ is\ x^2+y^2 = 1$

a) 3π b) -3π c) π d) None of these

Q57. By using stock's theorem the value of the $\int_c x^2dx + y^2dy + z^2dz$ is, where c is x>0,y>0, $x+y=1$

a) 2 b) 1 c) -1 d) None of these.

Q58. The value of line integral $\int_C (2ydx+3xdy)$, where C is the region bounded by $0\le x\le 1, 0\le y\le 1$ (By green's theorem) is

a) 2
b) 1
c) 0
d) None of these

Q59. If $\phi(x,y), \psi(x,y), \frac{\partial\phi}{\partial y}, \frac{\partial\psi}{\partial x}$ are continuous function over a region R bounded by simple closed curve C in x-y plane, then according to Greens theorem

a) $\oint_C (\psi dx+\phi dy) = \iint_R \left(\frac{\partial\psi}{\partial x}-\frac{\partial\phi}{\partial y}\right)dxdy$

b) $\oint_C (\psi dx-\phi dy) = \iint_R \left(\frac{\partial\psi}{\partial x}-\frac{\partial\phi}{\partial y}\right)dxdy$

c) $\oint_C (\phi dx+\psi dy) = \iint_R \left(\frac{\partial\psi}{\partial x}-\frac{\partial\phi}{\partial y}\right)dxdy$

d) $\oint_C (\phi dx-\psi dy) = \iint_R \left(\frac{\partial\psi}{\partial x}-\frac{\partial\phi}{\partial y}\right)dxdy$

Q60. By using stoke's theorem the value of the $\int_c (2x-y)dx - yz^2dy - y^2zdz$ is, where c is $x^2+y^2=1$

a) $-\pi$
b) π
c) $\pi/2$
d) None of these

Q61. If $\iint_s (\vec{F}.\vec{n})ds = 0$ than $\vec{F}$ is ………

a) Irrotational vector
b) Solenoidal vector
c) Both solenoidal and irrotational
d) None of these

Q62. By using stoke's theorem the value of the $\int_c xdx+ydy+zdz$ is, where c is $x^2+y^2=1$

a) 0
b) 1
c) -1
d) None of these

Q63. The value of line integral $\int_C (xdx+ydy)$, where C is the region bounded by $0\le x\le 1, 0\le y\le 1$ (By green's theorem) is

a) 1
b) -1
c) 0
d) None of these

Q64. Which of the following is the mathematical expression of stokes' theorem

a) $\oint \vec{F}.d\vec{r} = \iint_S Curl\,\vec{F}.d\vec{s}$
b) $\oint \vec{F}.d\vec{r} = \iint_S Curl\,\vec{F}.\vec{n}\;ds$
c) $\oint \vec{F}.\vec{n}\;d\vec{r} = \iint_S Curl\,\vec{F}\;ds$
d) None of these

Q65. The $\iint_s curl\,\bar{v}.\hat{n}\;ds$, where $\bar{v} = y\hat{i}+z\hat{j}+x\hat{k}$ and s is the surface $z=1-x^2-y^2, z\ge 0$, is

a) $-\pi$
b) π
c) $\pi/2$
d) None of these

Q66. Green's Theorem is a special case of ;

a) Stoke's Theorem
b) Gauss Theorem
c) All of the above
d) None of these

Q67. The mathematical form of Gauss divergence theorem is

a) $\oint \vec{F}.d\vec{r} = \iint_S Curl\, \vec{F}\, ds$

b) $\oint \vec{F}.d\vec{r} = \iint_S Curl\, \vec{F}.\hat{n}\, ds$

c) $\oint_S \vec{F}.\hat{n}\, ds = \iiint_v div\, \vec{F}\, dv$

d) None of these

Q68. The work done in moving a particle by the force field $\vec{A} = 3x^2\hat{i} - y\hat{j} + z\hat{k}$ along (0,0,0) to (2,1,3) is

a) 10 b) 11 c) 12 d) 13

Q69. Stoke's Theorem gives the relationship between ;

a) Surface and volume integral
b) Line and volume integral
c) Line and surface integral
d) None of these

Q70. The value of $\iiint_v Div\ \vec{A}\ dv,\ where\ \vec{A} = 3y^3\hat{i} + 4z^3\hat{j} + 5x^3\hat{k}$ over the region bounded by the sphere $x^2 + y^2 + z^2 = 1$ is

a) 1 b) 0 c) -1 d) None of these