

**(Multiple Integrals & applications of integration )**

1.  $\iint x^2 y^2 dx dy$  over the circle  $x^2 + y^2 = 1$  is

- a)  $\Pi/2$       b)  $\Pi/24$       c)  $\Pi/36$       d) None

2.  $\int_0^1 \int_0^{x^2} e^{y/x} dy dx =$

- a) 1      b)  $1/2$       c)  $1/4$       d) None

3.  $\int_{-1}^2 \int_{x^2}^{x+2} dy dx =$

- a)  $9/2$       b)  $9/4$       c)  $3/2$       d) None

4.  $\int_0^1 \int_0^1 \int_0^1 e^{x+y+z} dx dy dz =$

- a)  $(e-1)^2$       b)  $e^{-1}$       c)  $(e-1)/2$       d)  $e^{-1/2}$

5. The limits of integration after the change of order of integration of  $\int_0^2 \int_1^{x^2} f(x, y) dy dx$

- a)  $x=3$  to  $2$ ,  $y=0$  to  $8$       b)  $x=y^3$  to  $2$ ,  $y=0$  to  $2$       c)  $x=0$  to  $y^3$ ,  $y=0$  to  $2$       d) None

6.  $\iint x^2 y^3 dx dy$  over the rectangle  $0 \leq x \leq 1$  and  $0 \leq y \leq 3$  is

- a)  $81/4$       b)  $27/8$       c)  $29/4$       d) None

7.  $\iiint (z^5 + z) dx dy dz$  over the volume of cube bounded by the planes  $x=y=z=9$  is

- a) 0      b)  $4 \Pi$       c)  $8 \Pi/3$       d) None

8.  $\iint y dx dy$  over the area bounded by  $x=0, y=x^2, x+y=2$  in the first quadrant is

- a)  $8/15$       b)  $16/15$       c)  $4/15$       d) None

9. The value of the double integral  $\int_0^2 \int_0^2 (4 - y^2) dy dx$

- a) 16      b)  $16/3$       c)  $8/3$       d) None

10.  $\iint_A dA$ , where A is the region in first quadrant bounded by the lines  $y=x, y=2x, x=1$  and

$x=2$  is

- a) 3      b)  $3/2$       c)  $3/8$       d) None

11. The length of the curve  $y=x^{3/2}$  from  $x=0$  to  $x=4/3$  is

- a)  $26/27$       b)  $36/27$       c)  $46/27$       d)  $56/27$

12. The length of the arc  $x=t, y=t$  from  $t=0$  to  $t=4$  is

- a)  $\sqrt{2}$    b)  $2^{3/2}$    c)  $3\sqrt{2}$    d)  $4\sqrt{2}$

13. The length of the arc of the curve  $x = e^t \sin t, y = e^t \cos t$  from  $t=0$  to  $t = \pi/2$

- a)  $2e^{\pi/2}$    b)  $e^{\pi/2}-1$    c)  $2(e^{\pi/2}-1)$    d)  $\sqrt{2}(e^{\pi/2}-1)$

14. The perimeter of the loop of the curve  $3ay^2 = x(x-a)^2$  is

- a)  $2a/3$    b)  $4a/3$    c)  $4a/\sqrt{3}$    d)  $2a/\sqrt{3}$

15. The perimeter of the curve  $r = a(\sin t + \cos t)$ ,  $0 \leq t \leq \pi$  is

- a)  $2a\pi$    b)  $\sqrt{2}a\pi$    c)  $3a\pi$    d)  $\sqrt{3}a\pi$

16. The volume of a cone of height  $h$  and base radius  $r$  is

- a)  $4/3 \pi r^2 h$    b)  $2/3 \pi r^2 h$    c)  $1/3 \pi r^2 h$    d)  $\pi r^2 h$

17. The volume of the paraboloid generated by revolving the parabola  $y^2 = 4ax$  about the  $x$ -axis from  $x=0$  to  $x=h$

- a)  $\pi a h^2$    b)  $2 \pi a h^2$    c)  $3 \pi a h^2$    d)  $4 \pi a h^2$

18. The volume of the solid formed by revolving the ellipse  $x^2/a^2 + y^2/b^2 = 1$  about the major axis is

- a)  $2/3 \pi a^2 b$    b)  $2/3 \pi a b^2$    c)  $4/3 \pi a^2 b$    d)  $4/3 \pi a b^2$

19. The volume of the solid generated by revolving the cardioid  $r = a(1 + \cos t)$ ,  $0 \leq t \leq \pi$  is

- a)  $\pi/3 a^3$    b)  $2 \pi/3 a^3$    c)  $4 \pi/3 a^3$    d)  $8 \pi/3 a^3$

20. The volume of the solid generated by revolving the area enclosed by  $y=x, y=0$  and  $x=a$  about the  $x$ -axis is

- a)  $\pi a^3$    b)  $2 \pi a^3$    c)  $2/3 \pi a^3$    d)  $\pi/3 a^3$

Key : 1.b   2.b   3.a   4. c   5.a   6.d   7.a   8.b   9.d   10.b

11.d   12.d   13.d   14. c   15.b   16.c   17.b   18.c   19.b   20.d