Multiple Integral

Question Bank
Engineering Mathematics-II (B.tech)

1. Evaluate : $\int_0^{2a}\int_0^{\sqrt{2ax-x^2}} (x^2+y^2)\,dx\,dy$

2. Evaluate : $\int_0^{x/2}\int_0^{a\sin\theta}\int_0^{\frac{a^2-r^2}{a}} r\,dz\,dr\,d\theta$

3. Change the order of integration and evaluate : $\int_0^1\int_y^{\sqrt{y}} xy\,dx\,dy$

4. Evaluate: $\int_0^{4a}\int_{\frac{y^2}{4a}}^{y} dx\,dy$ by changing to polar coordinates.

5. Evaluate: $\int_0^1\int_0^{\sqrt{1-x^2}} \frac{dx\,dy}{1+x^2+y^2}$

6. Evaluate : $liint¿\,A¿\,(x+y)dx\,dy$ where domain A is the area between $y=x^2$ and $y=x.$

7. Change the order of integration by showing the region of integration and evaluate it : $\int_0^1\int_0^{\sqrt{1-y^2}} y^2\,dx\,dy$

8. Evaluate : $\int_0^1\int_0^{1-x}\int_0^{x+y} e^x\,dz\,dy\,dx$

9. Find by double integration the area bounded between the curves $y^2=4x$ and $2x-3y+4=0.$

10. Evaluate : $\int_0^1\int_0^{1-x} (x^2+y^2)\,dx\,dy$

11. Evaluate : $\int_0^{\pi/2}\int_0^{2a\cos\theta} r\,dr\,d\theta$

12. Evaluate : $liint\,xy(x+y)dx\,dy$ over the region enclosed by the parabolas $x^2=y\,,y^2=-x$

13. Change the order of integration by showing the region of integration :

$$\int_{-a}^{a}\int_{0}^{y^2/a} f(x,y)\,dx\,dy$$

14. Evaluate : $liiint \frac{dx\,dy\,dz}{(x+y+z+1)^3}$ over the region bounded by the coordinate plane $x+y+z=1.$

15. Find by double integration the area enclosed by the ellipse: $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$.

16. Evaluate : $liint\, e^{y^2}\,dx\,dy$ over the region bounded the triangle with vertices $(0,0),(2,1),(0,1).$

17. Change the order of integration : $\int_{0}^{8}\int_{\frac{y-8}{4}}^{y/4} f(x,y)\,dx\,dy$

18. Evaluate: $liint \sqrt{\frac{1-x^2-y^2}{1+x^2+y^2}}\,dx\,dy$ over the first quadrant of the circle $x^2+y^2=1$ by changing to polar coordinates.

19. Evaluate : $\int_{0}^{4}\int_{0}^{2\sqrt{z}}\int_{0}^{\sqrt{4z-x^2}} dx\,dy\,dz$

20. Find the area common to the circles $x^2+y^2-4y=0$ and $x^2+y^2-4x-4y+4=0$

21. Evaluate : $\int_{0}^{1}\int_{x}^{\sqrt{x}} (x^2+y^2)\,dx\,dy$

22. Evaluate : $liint\, e^{\frac{y}{x}}\,dx\,dy,$ over the area bounded by the curves $y=x^2, y=0$ and $x=1.$

23. Evaluate : $\int_{0}^{\pi/2}\int_{x}^{\pi/2}\int_{0}^{xy} \cos\frac{z}{x}\,dz\,dxy\,dx$

24. Find by double integration the area bounded by the parabola $y^2=4ax$ and $x^2=4ay$

25. Evaluate: $\int_{1}^{log8}\int_{0}^{logy} e^{x+y}\,dx\,dy$

26. Evaluate : $liint\, y\,dx\,dy$ over the area bounded by $y=x^2$ and $x+y=2$

27. Change the order of integration by showing the region of integration :

$$\int_0^a \int_{x^2/a}^{2a-x} f(x,y)\,dx\,dy$$

28. Evaluate : $\int_0^3 \int_{1/x}^{1} \int_0^{\sqrt{xy}} xyz\,dz\,dy\,dx$

29. Find the area between: $y^2 = \frac{x^3}{a-x}$ and its asymptotes.

30. Evaluate: $liint\, xy\,dx\,dy$ over the region bounded by the parabola $x^2 = y \wedge y^2 = -x$

31. Find the double integration the area included between the cardioids :
$r = a(1+cos\theta)$ and $r = a(1-cos\theta)$

32. Change the order of integration by showing the region of integration :

$$\int_0^a \int_{\sqrt{a^2-y^2}}^{y+a} f(x,y)\,dx\,dy$$

33. Change to polar coordinates and evaluate : $liint ¿ R ¿ \frac{1}{\sqrt{xy}}\,dx\,dy$ where R is the region bounded by $x^2 + y^2 - x = 0,\ y = 0,\ y > 0.$

34. Change the order of integration and evaluate: $\int_0^1 \int_x^{1/x} \frac{y\,dxdy}{(1+xy)^2(1+y^2)}$

35. Evaluate : $liint ¿ A ¿ x^{m-1} y^{n-1}\,dx\,dy$ where A is bounded by $x + y = h,\ x = 0,\ y = 0.$

36. Evaluate : $\int_0^1 \int_0^{\sqrt{1-x^2}} \int_0^{\sqrt{1-x^2-y^2}} x^2 yz\,dx\,dy\,dz$

37. Evaluate : $liiint \frac{dx\,dy\,dz}{(x+y+z+1)^3}$ over the region bounded by the coordinate plane $x + y + z = 7.$

38. Evaluate by changing to polar form : $\int_0^{\frac{a}{\sqrt{2}}} \int_y^{\sqrt{a^2-y^2}} \log(x^2+y^2)\,dx\,dy, (a>0)$

39. Change the order of integration : $\int_0^3 \int_y^{9/y} f(x,y)\,dxdy$

40. Evaluate : $liint\, x\, y^2\,dxdy$ over the region bounded by $x = y^2, y = 1 \wedge Y - axis$

41. Evaluate : $\int_0^3 \int_{y^2/9}^{\sqrt{10-y^2}} dy\,dx$

42. Change to polar coordinate and evaluate : $liint \frac{(x^2+y^2)^2}{x^2y^2} dxdy$ over the region common to the circles $x^2+y^2=ax$ and $x^2+y^2=by(a,b>0)$

43. Evaluate: $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} \frac{dx\,dy\,dz}{(x+y+z+1)^3}$

44. Change to polar coordinate $liint ¿ R ¿ \sqrt{x^2+y^2}\,dxdy,$ where R is the circle $x^2+y^2=4$.

45. Evaluate : $\int_0^1 \int_1^2 xy\,dy\,dx$

46. Change the order of integration and evaluate : $\int_0^{\pi} \int_x^{\pi} \frac{siny}{y} dx\,dy$

47. Evaluate : $\int_0^1 \int_0^{1+x} (x-y)\,dxdy$

48. Change the order of integration by showing the region of integration :
$\int_0^1 \int_{x^2}^{\sqrt{2-x^2}} f(x,y)\,dxdy$

49. Evaluate : $liint\, r^2 dr\,d\theta$ over the area included between $r=2\sin\theta, r=4\sin\theta.$

50. Evaluate : $\int_{-1}^1 \int_0^2 \int_{x-z}^{x+z} (x+y+z)\,dx\,dy\,dz$

Mr.Shaikh Zameer H