18MAB102T - ADVANCED CALCULUS AND COMPLEX ANALYSIS - CLA T1 S K THAMILVANAN

DEPARTMENT OF MATHEMATICS
DATE OF THE EXAM: 19.05.2021

The respondent's email (**null**) was recorded on submission of this form.
* Required

1. Email *

ENTER YOUR DETAILS

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4. BRANCH AND SECTION *

ANSWER ALL THE QUESTIONS

MAX. MARKS: 25 MARKS
TIME : 60 MINUTES

5. *

The value of the double integral $\int_1^b \int_0^a x\,dx\,dy$.

(a) $\dfrac{a^2b^2}{2}$ (b) $\dfrac{a^2}{2}(1-b)$ (c) $\dfrac{a^2}{2}(b-1)$ (d) $\dfrac{a^2b^2}{3}$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

6. *

The curve $\dfrac{x^2}{a^2}+\dfrac{y^2}{b^2}=1$ is a

(a) Circle (b) hyperbola (c) ellipse (d) parabola

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

7. *

The value of the double integral $\int_0^{\pi}\int_0^{\pi} r\,dr\,d\theta$.

(a) $\frac{\pi^3}{2}$ (b) $\frac{\pi^2}{2}$ (c) $\frac{\pi^3}{3}$ (d) $\frac{\pi^2}{3}$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

8. *

The area of an ellipse is

(a) πa^2 (b) πab (c) $\pi a^2 b$ (d) $\pi a^2 b^2$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

9. *

Evaluate $\iint_R r^3 dr d\theta$ where R is the region between the circles $r = 2\cos\theta$ and $r = 4\cos\theta$.

(a) $\frac{45\pi}{3}$ (b) $\frac{45}{2}$ (c) $\frac{45\pi}{2}$ (d) $\frac{45}{3}$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

10. *

The value of $\int_0^a \int_0^b \int_0^c dx dy dz$ is equal to

(a) $\frac{a^2b^2c^2}{2}$ (b) abc (c) $\frac{abc}{2}$ (d) $(a+b+c)$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

11. is not a cardioid *

__________ is the curve for cardioids

(a) $r = (1+\cos\theta)$ (b) $r = a\cos\theta$ (c) $r = a(1-\cos\theta)$ (d) $r = (1-\cos\theta)$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

12. *

The region of integration of the integral $\int_{-b}^{b}\int_{-a}^{a} f(x,y)\,dx\,dy$ is

(a) Rectangle (b) square (c) circle (d) triangle

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

13. *

The limits of integration in the double integral $\iint_R f(x,y)\,dx\,dy$ where R is in the first quadrant bounded by y = x, x = 1 & y = 0 is given by -----.

(a) $\int_0^1\int_x^1 f(x,y)\,dx\,dy$ (b) $\int_0^1\int_0^y f(x,y)\,dx\,dy$ (c) $\int_0^1\int_0^x f(x,y)\,dx\,dy$ (d) $\int_0^1\int_y^1 f(x,y)\,dx\,dy$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

14. *

Change the order of integration in $\int_0^\infty\int_0^y f(x,y)\,dx\,dy$

(a) $\int_0^\infty\int_x^\infty f(x,y)\,dy\,dx$ (b) $\int_0^\infty\int_0^x f(x,y)\,dy\,dx$ (c) $\int_0^\infty\int_0^\infty f(x,y)\,dy\,dx$ (d) $\int_0^\infty\int_{-\infty}^x f(x,y)\,dy\,dx$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

15. *

. $\int_0^\infty \int_0^y \frac{e^{-y}}{y} dx dy$ is equal to

(a) 1 (b) 0 (c) – 1 (d) 2

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

16. *

Evaluate $\int_0^\pi \int_0^\pi d\theta d\phi$.

(a) 1 (b) 0 (c) $\frac{\pi}{2}$ (d) π^2

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

17. *

The value of the integral $\int_0^{\pi/2}\int_0^{\pi/2} \sin\phi \cos\phi \, d\theta \, d\phi$.

(a) $\frac{\pi}{4}$ (b) $\frac{\pi}{8}$ (c) $\frac{\pi}{2}$ (d) 0

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

18. *

$r = 2\sin\theta$ is a circle with center as ________ and radius __________

(a) C = (1, 0) & R = 2 (b) C = (0, 1) & R = 1

(c) C = (1, 0) & R = 1 (d) C = (0, 1) & R = 2

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

19. *

The volume integral in Cartesian coordinates is equal to

(a) $\iiint\limits_V dxdydz$ (b) $\iiint\limits_V rdrd\theta d\phi$ (c) $\iiint\limits_V xyzdxdydz$ (d) $\iiint\limits_V drd\theta d\phi$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

20. *

Change the order of integration in $\int_0^a\int_0^x dxdy$.

(a) $\int_0^a\int_0^x dxdy$ (b) $\int_0^a\int_0^x xdydx$ (c) $\int_0^a\int_0^y dxdy$ (d) $\int_0^a\int_y^a dxdy$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

21. *

$\int_1^b \int_1^a \frac{dxdy}{xy}$ is equal to

(a) $\log a$ (b) $\log b$ (c) $\log a + \log b$ (d) $\log a \log b$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

22. *

After changing the double integral $\int_0^a \int_y^a x\,dx\,dy$ into polar coordinates, we have

(a) $\int_0^{\pi/2} \int_0^{a/\cos\theta} r^2 \cos\theta\, dr\, d\theta$ (b) $\int_0^{\pi/4} \int_0^{a/\cos\theta} r^2 \cos\theta\, dr\, d\theta$ (c) $\int_0^{\pi/4} \int_0^{a\cos\theta} r^2 \cos\theta\, dr\, d\theta$

(d) $\int_0^{\pi/2} \int_0^{a\cos\theta} r^2 \cos\theta\, dr\, d\theta$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

23. *

. $\int_0^1\int_0^2\int_0^3 dxdydz$ is equal to

(a) 6 (b) 3 (c) 2 (d) 24

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

24. *

. Area in polar coordinates is given by _________

(a) $\iint_R x dx dy$ (b) $\iint_R r dr d\theta$ (c) $\iint_R dr d\theta$ (d) $\iint_R dx dy$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

25. *

$$\int_0^4 \int_0^3 \int_1^2 dxdydz$$ is equal to

(a) 24 (b) 0 (c) 12 (d) 48

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

26. *

$$\int_0^{\pi} \int_0^{\pi/2} \int_0^1 r dr d\theta d\phi$$ is equal to

(a) $\frac{\pi^2}{2}$ (b) π^2 (c) $\frac{\pi^2}{8}$ (d) $\frac{\pi^2}{4}$

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

27. *

Limits to evaluate the volume of the tetrahedron bounded by the coordinate planes and $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$ is --------

(a) $z=0$ to $\left(1-\frac{x}{a}-\frac{y}{b}\right)$; $y=0$ to $\left(1-\frac{x}{a}\right)$; x =0 to a

(b) $z=0$ to $c\left(1-\frac{x}{a}-\frac{y}{b}\right)$; $y=0$ to $b\left(1-\frac{x}{a}\right)$; x =0 to a

(c) $z=0$ to $c\left(1-\frac{x}{a}-\frac{y}{b}\right)$; $y=0$ to $\left(1-\frac{x}{a}\right)$; x =0 to a

(d) $z=0$ to $c\left(1-\frac{x}{a}-\frac{y}{c}\right)$; $y=0$ to $b\left(1-\frac{x}{a}\right)$; x =0 to a

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

28. *

The name of the curve $r^2 = a^2 \cos 2\theta$ is

(a) cardioid (b) cycloid (c) circle (d) lemniscate

Mark only one oval.

- (a)
- (b)
- (c)
- (d)

29. *

The curve $y^2 = 4x$ is a

(a) parabola (b) hyperbola (c) straight line (d) ellipse

Mark only one oval.

- (a)
- (b)
- (c)
- (d)