MHT-CET QUESTIONS

1. **If** $\int_0^{\pi} f(\sin x)dx = k\int_0^{\pi/2} f(\sin x)dx$ **then k =**

a) 2 b) $\frac{1}{2}$

c) 4 d) 1

2. $\int_0^{\pi} \frac{x\,dx}{a^2\cos^2 x + b^2\sin^2 x} =$

a) $\frac{\pi^2}{2ab}$ b) $\frac{\pi^2}{4ab}$

c) $\frac{\pi}{2ab}$ d) $\frac{\pi}{ab}$

3. $\int_1^4 \frac{(3x-1)^2}{\sqrt{x}}dx =$

a) $\frac{428}{5}$ b) $\frac{427}{5}$

c) $\frac{457}{5}$ d) $\frac{438}{5}$

4. $\int_0^{\pi/2} |\sin x - \cos x|\,dx$

a) 0 b) $2(\sqrt{2}-1)$

c) $2\sqrt{2}-1$ d) $2(\sqrt{2}+1)$

5. **The value of** $\int_0^1 \frac{x^2}{1+x^2}dx$ **is**

a) $1-\frac{\pi}{4}$ b) $\frac{\pi}{4}-1$

c) $1-\frac{\pi}{2}$ d) 0

6. **The value of** $\int_0^{\pi/2} \cos x\, e^{\sin x}dx$ **is**

a) 0 b) 1

c) -1 d) e-1

7. $\int_{-1}^{1} (2x^2+3x+4)dx =$

a) $\frac{7}{3}$ b) $\frac{14}{3}$

c) $\frac{28}{3}$ d) $\frac{21}{3}$

8. $\int_{-\pi/4}^{\pi/4} \frac{dx}{1+\sin x}$

a) 0 b) 2

c) 1 d) $\sqrt{2}$

9. $\int_0^2 |x-1|\,dx =$

a) -1 b) 2

c) 3 d) 1

10. $\int_1^4 \frac{(3x-1)^2}{\sqrt{x}}dx =$

a) $\frac{214}{5}$ b) $\frac{428}{5}$

c) $\frac{412}{5}$ d) $\frac{824}{5}$

Ans -

(1 - a) **(2 - a)** **(3 - a)**

(4 - b) **(5 - a)** **(6 - d)**

(7 - c) **(8 - c)** **(9 - d)**

(10 - b)

11. $\int_{\pi/4}^{\pi/2} e^x[\log\sin x+\cot x]dx =$

a) $e^{\pi/2}\log 2$ b) $e^{-\pi/2}\log 2$

c) $\frac{1}{2}e^{\pi/4}\log 2$ d) $-\frac{1}{2}e^{\pi/2}\log 2$

12. $\int_1^e \frac{1+\log x}{2x}dx =$

a) $\frac{1}{4}$ b) e

c) $\frac{3}{4}$ d) $\frac{1}{e}$

13. **If** $\int_1^4 (3x^2+bx+5)dx = 93$ **then b is**

a) 1 b) 2

c) 3 d) 4

14. **If** $\int_0^k \frac{dx}{2+8x^2} = \frac{\pi}{16}$ **then k =**

a) **1** b) $\frac{1}{2}$

c) $\frac{1}{4}$ d) none of these

15. $\int_3^5 \frac{dx}{\sqrt{x+4}+\sqrt{x-2}} =$

a) $\frac{1}{9}\left(28-3\sqrt{3}-7\sqrt{7}\right)$

b) $\frac{1}{9}\left(28-3\sqrt{3}+7\sqrt{7}\right)$

c) $\frac{1}{9}\left(28+3\sqrt{3}-7\sqrt{7}\right)$

d) $\frac{1}{9}\left(28+3\sqrt{3}+7\sqrt{7}\right)$

16. $\int_{-2}^{1} \frac{dx}{x^2+4x+13} =$

a) $\frac{\pi}{2}$ b) $\frac{\pi}{3}$

c) π d) $\frac{\pi}{12}$

17. $\int_{-4}^{4} |x+2|\,dx =$

a) 50 b) 24

c) 20 d) 28

18. $\int_2^3 \frac{dx}{x^2-1} =$

a) $2\log\left(\frac{2}{3}\right)$ b) $2\log\left(\frac{3}{2}\right)$

c) $\frac{1}{2}\log\left(\frac{2}{3}\right)$ d) $\frac{1}{2}\log\left(\frac{3}{2}\right)$

19. $\int_2^3 \frac{x\,dx}{(x+3)(x+2)}$

a) log 6 - log 5- log 16

b) 3log6 - 5 log 5 + 2log4

c) 6log3 - 5 log 5 - 2log4

d) log6 + 5 log 5 + log16

20. If $\int_2^e \left[\frac{1}{\log x}-\frac{1}{(\log x)^2}\right]dx = \alpha+\frac{B}{\log 2}$ then

a) α = e, B = -2

b) α = e , B = 2

c) α = -e, B = 2

d) α = -e, B = -2

Ans -

(11 - c) **(12 - c)** **(13 - b)**

(14 - b) **(15 - a)** **(16 - d)**

(17 - c) **(18 - d)** **(19 - b)**

(20 - a)

21. $\int_0^1 \frac{dx}{1+x+x^2} =$

a) $\frac{\pi}{3\sqrt{3}}$ b) $\frac{\pi}{2\sqrt{3}}$

c) $\frac{\pi}{6\sqrt{3}}$ d) $\frac{\pi}{4\sqrt{3}}$

22. $\int_0^1 x(1-x)^n dx =$

a) $\frac{1}{(n+1)(n+2)}$ b) $\frac{1}{n+1}$

c) $\frac{1}{n+2}$ d) $\frac{n+1}{n+2}$

23. $\int_2^3 \frac{dx}{x(x^3-1)} =$

a) $\frac{1}{3}\log\left(\frac{189}{208}\right)$ b) $\frac{1}{3}\log\left(\frac{208}{189}\right)$

c) 3 d) 1

24. $\int_0^{\pi/2} \sin^2 x \cos^3 x \, dx =$

a) $\frac{2}{3}$ b) $\frac{2}{5}$

c) $\frac{2}{15}$ d) $\frac{2}{10}$

25. $\int_0^{\pi/2} \frac{(\sin x \cos x)^2}{\sqrt{1+\sin 2x}} dx$

a) 0 b) 1

c) 2 d) 3

26. $\int_0^{\pi/2} \frac{\sin^2 x}{(1+\cos x)^2} dx$

a) $-\frac{\pi}{2}$ b) $\frac{4-\pi}{2}$

c) $4-\frac{\pi}{2}$ d) $\frac{\pi-4}{2}$

27. $\int_{-1}^{1} \frac{dx}{a^2e^x + b^2e^{-x}} =$

a) $\tan^{-1}\left(\frac{ae}{b}\right) - \tan^{-1}\left(\frac{a}{be}\right)$

b) $\frac{1}{ab}\left[\tan^{-1}\left(\frac{be}{a}\right) - \tan^{-1}\left(\frac{ae}{b}\right)\right]$

c) $\frac{1}{ab}\left[\tan^{-1}\left(\frac{ae}{b}\right) - \tan^{-1}\left(\frac{a}{be}\right)\right]$

d) None of these

28. $\int_0^{\pi/2} \frac{\sin x}{(1+\cos x)^2} dx$

a) $\frac{3}{4}$ b) $\frac{3}{2}$

c) $\frac{3}{8}$ d) $\frac{3}{16}$

29. $\int_0^{\pi/2} \frac{\cos x}{4 - \sin x^2} dx$

a) $\frac{1}{2}\log 3$ b) $\frac{1}{2}\log 9$

c) $\frac{1}{4}\log 3$ d) $\frac{1}{4}\log 9$

30. $\int_0^{\pi/2} \frac{dx}{5+3\cos x} =$

a) $\frac{1}{2}\tan^{-1}\left(\frac{1}{2}\right)$ b) $2\tan^{-1}\left(\frac{1}{2}\right)$

c) $2\tan^{-1}(2)$ d) $\tan^{-1}(2)$

Ans -

(21 - a) (22 - a) (23 - b)
(24 - c) (25 - c) (26 - c)
(27 - c) (28 - c) (29 - c)
(30 - a)

31. If $\int_0^{\pi} xf(\cos^2 x + \tan^4 x)dx = k$

$\int_0^{\pi/2} f(\cos^2 x + \tan^4 x)dx$ then $k =$

a) $\frac{\pi}{2}$ b) π

c) $-\frac{\pi}{2}$ d) 0

32. $\int_0^1 f(x)dx =$

a) $\lim_{h \to 0} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$

b) $\lim_{h \to \infty} \frac{1}{n} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$

c) $\lim_{h \to \infty} \sum_{r=1}^{n} f\left(\frac{r}{n}\right)$

d) none of these

33. $\int_2^4 3^x dx$ **can be expressed as the limit of a sum as**

a) $\lim_{h \to 0} h[3^h + 3^{2h} + ... + 3^{nh}]$

b) $\lim_{h \to 0} 9h[3^h + 3^{2h} + ... + 3^{nh}]$

c) $\lim_{h \to 0} 3h[3^h + 3^{2h} + ... + 3^{nh}]$

d) none of these

34. $\int_0^{\pi/4} \frac{\sin 2\theta}{\sin^4\theta + \cos^4\theta} dx$

a) $\frac{\pi}{2}$ b) $\frac{\pi}{4}$

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

35. $\int_{-1}^{1} \left[\sqrt{1+x+x^2} - \sqrt{1-x+x^2}\right] dx =$

a) 1 b) 2

c) π d) 0

36. $\int_0^{\pi} \frac{x}{1+\sin x} dx$

a) π b) $\frac{\pi}{4}$

c) $\frac{\pi}{2}$ d) 2π

37. **If $f(y) = e^y$, $g(y) = y$ $y > 0$ & $F(t) =$**

$\int_0^t f(t-y)\, g(y)dy$

a) $F(t) = 1 - e^{-t}(1+t)$

b) $F(t) = e^t - (1+t)$

c) $F(t) = te^t$

d) $F(t) = te^{-t}$

38. $\int_{-8}^{8} (\sin^{93} x + x^{295})dx =$

a) 0

b) a number different from 0

c) $2[8^{295}+1]$

d) $8^{295}+2$

Ans -

(31 - b) **(32 - b)** **(33 - b)**

(34 - b) **(35 - d)** **(36 - a)**

(37 - b) **(38 - a)**

39. **Let** $\frac{d}{dx}F(x)=\frac{e^{\sin x}}{x};\ x>0$

If $\int_1^4 \frac{3}{x}e^{\sin x^3}dx = F(k)-F(1)$ **then one of the possible values of k is.**

a) 15 b) 16
c) 63 d) 64

40. $\int_1^3 \sin(\log x)+\cos(\log x)dx$

a) 3 sin (log3) b) 3 cos (log 3)
c) 0 d) 1

41. **If** $f(x)=\frac{e^x}{1+e^x};\ I_1=\int_{f(-a)}^{f(a)} x\, g[x(1-x)]dx$

& $I_2=\int_{f(-a)}^{f(a)} g(x(1-x)dx$ **then the value of** $\frac{I_2}{I_1}$ **is**

a) 2 b) -3
c) -1 d) 1

42. $\int_0^{\pi/2}\frac{\sin 2x+\cos x}{1+\cos^2 x}dx$

a) π b) 0
c) $\frac{\pi}{2}$ d) 2π

43. **The value of** $\int_{-\Pi}^{n}\frac{\cos^2 x}{1+a^x}dx$ **a > 0 is**

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

44. $\int_0^{\pi}\frac{x\tan x}{\sec x+\cos x}dx=$

a) $\frac{\pi^2}{4}$ b) $\frac{\pi^2}{2}$
c) $\frac{3\pi^2}{2}$ d) $\frac{\pi^2}{3}$

45. $\int_0^1 \tan^{-1}(1-x+x^2)dx=$

a) log 2 b) $\log\frac{1}{2}$
c) π log2 d) $\frac{\pi}{2}\log\frac{1}{2}$

46. **The function L(x) =** $\int_1^x\frac{dt}{t}$ **satisfies the equation**

a) L (x+y) = L(x) + L(y)
b) $L\left(\frac{x}{y}\right)=L(x)+L(y)$
c) L(xy) = L(x) + L(y)
d) none of these

47. **If** $\int_0^x f(x)dt = x+\int_x^1 t\, f(t)$ **dt then the values of f(1) is**

a) $\frac{1}{2}$ b) 0
c) 1 d) $-\frac{1}{2}$

Ans -

(39 - d) (40 - a) (41 - a)
(42 - c) (43 - c) (44 - a)
(45 - a) (46 - c) (47 - a)

48. **The value of the integral** $\int_0^{\pi/2} \sin 2x \log \tan x \, dx =$

a) 0 b) $\frac{\pi}{8}\log 2$

c) $\frac{\pi}{4}$ d) $\frac{\pi}{6}\log 2$

49. **Let** $f(x) = \int_1^x \sqrt{2 - t^2}\,dt$ **. Then the real roots of the equation** $x^2 - f'(x) = 0$

a) ± 1 b) $\pm 1/\sqrt{2}$

c) $\pm\frac{1}{2}$ d) 0 & 1

50. $\lim_{n \to \infty}\left(\frac{1}{2n+1}+\frac{1}{2n+2}+....+\frac{1}{2n+n}\right) =$

a) $\log_e\left(\frac{1}{3}\right)$ b) $\log_e\left(\frac{2}{3}\right)$

c) $\log_e\left(\frac{3}{2}\right)$ d) $\log_e\left(\frac{4}{3}\right)$

51. **Let f: (0, ∞) →R &** $F(x^2) = \int_0^{x^2} f(t)\,dt$

If $F(x^2) = x^2(1+x)$ **then f(4) equals**

a) $\frac{5}{4}$ b) 7

c) 4 d) 2

52. $\int_0^{1\sqrt{2}} \frac{\sin^{-1}x}{(1-x^2)\sqrt{1-x^2}}\,dx =$

a) $\frac{\pi}{4}-\frac{1}{2}\log 2$ b) $\frac{\pi}{4}+\frac{1}{2}\log 2$

c) $\frac{\pi}{4}+\log 2$ d) $\frac{\pi}{4}-\log 2$

53. **If** $\int_{\sin x}^{I} f^2 f(t) = 1 - \sin x$ **then** $f\left(\frac{1}{\sqrt{3}}\right) =$

a) $\frac{1}{3}$ b) $\frac{1}{\sqrt{3}}$

c) $\sqrt{3}$ d) 3

54. **If f(a + b - x) = f(x) then** $\int_a^b x\, f(x)dx =$

a) $\frac{a-b}{2}\int_a^b f(a+b-x)dx$

b) $\frac{a+b}{2}\int_a^b f(b-x)dx$

c) $\frac{a+b}{2}\int_a^b f(x)dx$

d) $\frac{b-a}{2}\int_a^b f(x)dx$

55. **If** $f(x) = \int_{\pi^2/16}^{x^2} \frac{(\cos x)\cos\sqrt{\theta}}{1+\sin^2\sqrt{\theta}}\,d\theta$ **then** $f(\pi) =$

a) π b) 2n

c) 0 d) none of these

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Ans -

(48 - a) (49 - a) (50 - c)

(51 - c) (52 - a) (53 - d)

(54 - c) (55 - b)