9. Analyse the current i into its constituent harmonics as far as the fifth harmonic, the values of i and θ^o being given as follows :

θ^o	0	30	60	90	120	150	180	210	240	270	300	330
i	0	24	33.5	27.5	18.2	13.0	0	– 24	–33.5	–27.5	–18.2	– 13

[Ans. $i = (5.7 \cos\theta + 26.85 \sin\theta) - (5.1 \cos 3\theta - 3.2 \sin 3\theta) - (0.6 \cos 5\theta - 0.4 \sin 5\theta)$]

10. Using tabulated values of x and y given in the table, obtain Fourier series upto third harmonic to represent the relation between and y.

x^o	0	30	60	90	120	150	180	210	240	270	300	330
y	0	1.0	1.732	2.0	1.732	1.0	0	0	0	0	0	0

[Ans. $y = 0.62 + \sin x - 0.46 \cos 2x$] **[Note :** $y = \frac{2}{\pi}\left[1 + \frac{\pi}{2}\sin x - \frac{2}{3}\cos 2x\right]$]

11. Find the harmonics $a_0, a_1, a_2, a_3, b_1, b_2, b_3$ of the Fourier series of the following data :

x	0	$\pi/3$	$2\pi/3$	π	$4\pi/3$	$5\pi/3$	2π
y	1.0	1.4	1.9	1.7	1.5	1.2	1.0

(May 2009)

[Ans. $a_0 = 2.9,\ a_1 = -0.37,\ a_2 = -0.1,\ a_3 = 0.03,\ b_1 = 0.17,\ b_2 = -0.06,\ b_3 = 0$]

12. A function f(x) is given by

$$f(x) = \begin{cases} x, & 0 \le x \le 1 \\ 2 - x, & 1 \le x \le 2 \end{cases}$$

Express f(x) as an approximate Fourier series upto fifth harmonic

(i) taking 12 ordinates

(ii) taking 24 ordinates.

[Hint : Given function is an even function of x].

[Ans. (i) $f(x) = \frac{1}{2} - 0.414 \cos \pi x - 0.056 \cos 3\pi x - 0.03 \cos 5\pi x$.

(ii) $f(x) = \frac{1}{2} - 0.4045 \cos \pi x - 0.0472 \cos 3\pi x$]

MULTIPLE CHOICE QUESTIONS

Fourier Series and Harmonic Analysis : **Marks**

1. A function f(x) is said to be periodic of period T if (1)

(A) $f(x + T) = f(x)$ for all x (B) $f(x + T) = f(T)$ for all x

(C) $f(-x) = f(x)$ for all x (D) $f(-x) = -f(x)$ for all x

2. If $f(x + nT) = f(x)$ where n is any integer then the fundamental period of f(x) is (1)

(A) 2T (B) $\frac{T}{2}$ (C) T (D) 3T

3. If f(x) is a periodic function with period T then f(ax), $a \neq 0$ is periodic function with fundamental period (1)

$f(x) = f(x+nT)$

$f(ax) = f(ax+T)$

$= f(x+T/a)$

(A) T (B) $\frac{T}{a}$ (C) aT (D) π

4. Fundamental period of sin 2x is $\sin 2n\pi = 0$ (1)

function repeat itself

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$ (C) 2π (D) π

5. Fundamental period of cos 2x is $\cos 2n\pi = 1$ (1)

(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$ (C) π (D) 2π

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6. Fundamental period of tan 3x is (1)

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{3}$ (C) π (D) $\frac{\pi}{4}$

7. Fourier series representation of periodic function f(x) with period 2π which satisfies the Dirichlet's conditions is (1)

(A) $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$

(B) $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos n\pi x + b_n \sin n\pi x)$

(C) $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx)(b_n \sin nx)$

(D) $\frac{a_0}{2} + (a_n \cos nx + b_n \sin nx)$

8. Fourier series representation of periodic function f(x) with period 2L which satisfies the Dirichlet's conditions is (1)

(a) $\frac{a_0}{2} + \sum_{n=1}^{\infty} [a_n \cos(n\pi x) + b_n \sin(n\pi x)]$

(B) $\frac{a_0}{2} + \sum_{n=1}^{\infty} \left[a_1 \cos\left(\frac{n\pi x}{L}\right) + b_1 \sin\left(\frac{n\pi x}{L}\right)\right]$

(C) $\frac{a_0}{2} + \sum_{n=1}^{\infty} \left[a_n \cos\left(\frac{n\pi x}{L}\right) \times b_n \sin\left(\frac{n\pi x}{L}\right)\right]$

(D) $\frac{a_0}{2} + \sum_{n=1}^{\infty} \left[a_n \cos\left(\frac{n\pi x}{L}\right) + b_n \sin\left(\frac{n\pi x}{L}\right)\right]$

9. If f(x) is periodic function with period 2L defined in the interval C to C + 2L then Fourier coefficient a_0 is (1)

(A) $\int_{C}^{C+2L} f(x)\, dx$

(B) $\frac{1}{L}\int_{C}^{C+2L} f(x) \sin\left(\frac{n\pi x}{L}\right) dx$

(C) $\frac{1}{L}\int_{C}^{C+2L} f(x) \cos\left(\frac{n\pi x}{L}\right) dx$

(D) $\frac{1}{L}\int_{C}^{C+2L} f(x)\, dx$

10. If f(x) is periodic function with period 2L defined in the interval C to C + 2L then Fourier coefficient a_n is (1)

(A) $\int_{C}^{C+2L} f(x) \cos\left(\frac{n\pi x}{L}\right) dx$

(B) $\frac{1}{L}\int_{C}^{C+2L} f(x) \sin\left(\frac{n\pi x}{L}\right) dx$

(C) $\frac{1}{L}\int_{C}^{C+2L} f(x) \cos\left(\frac{n\pi x}{L}\right) dx$

(D) $\frac{1}{L}\int_{C}^{C+2L} f(x)\, dx$

11. If f(x) is periodic function with period 2L defined in the interval C to C + 2L then Fourier coefficient b_n is (1)

(A) $\int_{C}^{C+2L} f(x) \sin\left(\frac{n\pi x}{L}\right) dx$

(B) $\frac{1}{L}\int_{C}^{C+2L} f(x) \sin\left(\frac{n\pi x}{L}\right) dx$

(C) $\frac{1}{L}\int_{C}^{C+2L} f(x) \cos\left(\frac{n\pi x}{L}\right) dx$

(D) $\frac{1}{L}\int_{C}^{C+2L} f(x)\, dx$

12. A function f(x) is said to be even if (1)

(A) $f(-x) = f(x)$ (B) $f(-x) = -f(x)$ (C) $f(x + 2\pi) = f(x)$ (D) $f(-x) = [f(x)]^2$

13. A function f(x) is said to be odd if (1)

(A) $f(-x) = f(x)$ (B) $f(-x) = -f(x)$ (C) $f(x + 2\pi) = f(x)$ (D) $f(-x) = [f(x)]^2$

14. Which of the following is an odd function ? (1)

(A) $\sin x$ (B) $e^x + e^{-x}$ (C) $e^{|x|}$ (D) $\pi^2 - x^2$

15. Which of the following is an even function ? (1)

(A) $\sin x$ (B) $e^x - e^{-x}$ (C) $x \cos x$ (D) $\cos x$

16. Which of the following is neither an even function nor an odd function ?

(A) $x \sin x$ (B) x^2 (C) e^{-x} / e^x (D) $x \cos x$

17. For an even function f(x) defined in the interval $-\pi \le x \le \pi$ and $f(x + 2\pi) = f(x)$ the Fourier series is

(A) $\sum_{n=1}^{\infty} b_n \sin nx$ (B) $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos \frac{n\pi x}{L}$

even =

(C) $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx$ (D) $\sum_{n=1}^{\infty} b_n \sin \frac{n\pi x}{L}$

18. For an odd function f(x) defined in the interval $-\pi \le x \le \pi$ and $f(x + 2\pi) = f(x)$ the Fourier series is

(A) $\sum_{n=1}^{\infty} b_n \sin nx$ (B) $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos \frac{n\pi x}{L}$

(C) $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx$ (D) $\sum_{n=1}^{\infty} b_n \sin \frac{n\pi x}{L}$

19. Fourier coefficients for an even function f(x) defined in the interval $-\pi \le x \le \pi$ and $f(x + 2\pi) = f(x)$ are

(A) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{\pi}\int_0^{\pi} f(x) \sin nx dx$ (B) $a_0 = \frac{2}{\pi}\int_0^{\pi} f(x)\, dx,\ a_n = \frac{2}{\pi}\int_0^{\pi} f(x) \cos nx\, dx,\ b_n = 0$

(C) $a_0 = 0,\ a_n = 0,\ b_n = 0$ (D) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{\pi}\int_0^{\pi} f(x) \cos nx\, dx$

20. Fourier coefficients for an odd function f(x) defined in the interval $-\pi \le x \le \pi$ and $f(x + 2\pi) = f(x)$ are (1

(A) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{\pi}\int_0^{\pi} f(x) \cos nx dx$ (B) $a_0 = \frac{2}{\pi}\int_0^{\pi} f(x)\, dx,\ a_n = \frac{2}{\pi}\int_0^{\pi} f(x) \cos nx\, dx,\ b_n = 0$

(C) $a_0 = 0,\ a_n = 0,\ b_n = 0$ (D) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{\pi}\int_0^{\pi} f(x) \sin nx\, dx$

21. Fourier coefficients for an even function f(x) defined in the interval $-L \le x \le L$ and $f(x + 2L) = f(x)$ are (1)

(A) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{L}\int_0^{L} f(x) \sin \frac{n\pi x}{L} dx$ (B) $a_0 = \frac{2}{L}\int_0^{L} f(x)\, dx,\ a_n = \frac{2}{L}\int_0^{L} f(x) \cos \frac{n\pi x}{L} dx,\ b_n = 0$

(C) $a_0 = 0,\ a_n = 0,\ b_n = 0$ (D) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{L}\int_0^{L} f(x) \cos \frac{n\pi x}{L} dx$

22. Fourier coefficients for an odd function f(x) defined in the interval $-L \le x \le L$ and $f(x + 2L) = f(x)$ are (1)

(A) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{L}\int_0^{L} f(x) \cos \frac{n\pi x}{L} dx$ (B) $a_0 = \frac{2}{L}\int_0^{L} f(x)\, dx,\ a_n = \frac{2}{L}\int_0^{L} f(x) \cos \frac{n\pi x}{L} dx,\ b_n = 0$

(C) $a_0 = 0,\ a_n = 0,\ b_n = 0$ (D) $a_0 = 0,\ a_n = 0,\ b_n = \frac{2}{L}\int_0^{L} f(x) \sin \frac{n\pi x}{L} dx$

23. Half range Fourier cosine series for f(x) defined in the interval $0 \le x \le L$ is (1)

(A) $\sum_{n=1}^{\infty} b_n \sin \frac{n\pi x}{L}$ (B) $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos \frac{nx}{L}$

(C) $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos \frac{n\pi x}{L}$ (D) $\frac{a_0}{2} + \sum_{n=1}^{\infty} \left(a_n \cos \frac{n\pi x}{L} + b_n \sin \frac{n\pi x}{L}\right)$

24. Half range Fourier sine series for f(x) defined in the interval $0 \le x \le L$ is (1)

(A) $\sum_{n=1}^{\infty} b_n \sin \frac{nx}{L}$ (B) $\sum_{n=1}^{\infty} b_n \sin \frac{n\pi x}{L}$

(C) $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos \frac{n\pi x}{L}$ (D) $\frac{a_0}{2} + \sum_{n=1}^{\infty} \left(a_n \cos \frac{n\pi x}{L} + b_n \sin \frac{n\pi x}{L}\right)$

25. In Harmonic analysis for a function with period 2π, the term $a_1 \cos x + b_1 \sin x$ is called (1)

(A) second harmonic (B) first harmonic

(C) third harmonic (D) none of these

26. In Harmonic analysis for a function with period 2π, the amplitude of first harmonic $a_1 \cos x + b_1 \sin x$ is (1)

(A) $\sqrt{a_1^2 - b_1^2}$ (B) $a_1^2 + b_1^2$ (C) $\sqrt{a_1^2 + b_1^2}$ (D) $\left(a_1^2 + b_1^2\right)^2$

27. The value of a_0 in Fourier series of y with period 6 for the following tabulated data (1)

x	0	1	2	3	4	5
y	9	18	24	28	26	20

(A) 17.85 (B) 20.83 (C) 35.71 (D) 41.66

28. The value of a_0 in Fourier series of y with period 180° for the following tabulated data is (1)

x^0	0	30	60	90	120	150
y	0	9.2	14.4	17.8	17.3	11.7

(A) 23.46 (B) 20.11 (C) 11.73 (D) 10.50

29. The values of a_0 in Fourier series of y with period 6 for the following tabulated data is (1)

x	0	1	2	3	4	5
y	4	8	15	7	6	2

(A) 3.5 (B) 14 (C) 6 (D) 7

30. The value of a_0 in Fourier series of y with period 360° for the following tabulated data is (1)

x^0	0	60	120	180	240	300
y	1.0	1.4	1.9	1.7	1.5	1.2

(A) 1.45 (B) 5.8 (C) 2.9 (D) 2.48

31. Fourier coefficient a_0 in the Fourier series expansion of $f(x) = e^{-x}$; $0 \le x \le 2\pi$ and $f(x + 2\pi) = f(x)$ is (2)

(a) $\frac{1}{\pi}(1 - e^{-2\pi})$ (B) $\frac{1}{2\pi}(1 - e^{2\pi})$ (C) $\frac{2}{\pi}(e^{-2\pi} - 1)$ (D) $\frac{1}{\pi}(1 + e^{2\pi})$

32. Fourier coefficient a_0 in the Fourier series expansion of $f(x) = \left(\frac{\pi - x}{2}\right)^2$; $0 \le x \le 2\pi$ and $f(x + 2\pi) = f(x)$ is (2)

(A) $\frac{\pi^2}{3}$ (B) $\frac{\pi^2}{6}$ (C) 0 (D) $\frac{\pi}{6}$

33. Fourier coefficient a_0 in the Fourier series expansion of $f(x) = x \sin x$; $0 \le x \le 2\pi$ and $f(x + 2\pi) = f(x)$ is (2)

(A) +2 (B) 0 (C) –2 (D) –4

34. $f(x) = \begin{cases} x, & 0 \le x \le \pi \\ 0, & \pi < x \le 2\pi \end{cases}$ and $f(x + 2\pi) = f(x)$. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$, then Fourier coefficient a_0 is (2)

(A) 2π (B) $\frac{\pi}{3}$ (C) 0 (D) $\frac{\pi}{2}$

35. $f(x) = \begin{cases} 0, & 0 \le x \le \pi \\ x, & \pi < x \le 2\pi \end{cases}$ and $f(x + 2\pi) = f(x)$. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$, then Fourier coefficient a_0 is (2)

(A) $\frac{3\pi}{2}$ (B) $\frac{3\pi}{8}$ (C) $\frac{\pi}{4}$ (D) $\frac{\pi}{2}$

36. $f(x) = 2x - x^2$, $0 \le x \le 3$ and period is 3. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} \left(a_n \cos \frac{2n\pi x}{3} + b_n \sin \frac{2n\pi x}{3}\right)$, then Fourier coefficient a_0 is (2)

(A) $\frac{3}{2}$ (B) 0 (C) 12 (D) $\frac{3}{4}$

37. $f(x) = 4 - x^2$, $0 \le x \le 2$ and period is 2. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos n\pi x + b_n \sin n\pi x)$, then Fourier coefficient a_0 is (2)

(A) $\frac{11}{3}$ (B) 0 (C) $\frac{16}{3}$ (D) $\frac{8}{5}$

38. $f(x) = \begin{cases} -x, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$ and $f(x + 2\pi) = f(x)$. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$, then Fourier coefficient a_0 is (2)

(A) $\frac{\pi}{3}$ (B) $\frac{2}{\pi}$ (C) $\frac{\pi}{4}$ (D) π

39. $f(x) = x \cos x$, $-\pi \le x \le \pi$ and period is 2π. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$, then Fourier coefficient a_0 is (2)

(A) $-\frac{2}{\pi}$ (B) 0 (C) $\frac{4}{\pi}$ (D) $-\frac{4}{\pi}$

40. $f(x) = 2$, $-\pi \le x \le \pi$ and period is 2π. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$, then Fourier coefficient a_0 is (2)

(A) 4 (B) 2 (C) $\frac{4}{\pi}$ (D) $\frac{2}{\pi}$

41. $f(x) = x$, $-\pi \le x \le \pi$ and period is 2π. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos nx + b_n \sin nx)$, then Fourier coefficient b_1 is (2)

(A) 2 (B) −1 (C) 0 (d) $\frac{2}{\pi}$

42. $f(x) = \begin{cases} 1, & -1 < x < 0 \\ \cos \pi x, & 0 < x < 1 \end{cases}$ and period 2. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos n\pi x + b_n \sin n\pi x)$, then Fourier coefficient a_0 is (2)

(A) 2 (B) 0 (C) 1 (D) −1

43. $f(x) = x - x^3$, $-2 < x < 2$ and period 4. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} (a_n \cos n\pi x + b_n \sin n\pi x)$, then Fourier coefficient a_0 is (2)

(A) 1 (B) 0 (C) −2 (D) −1

44. For half range cosine series of $f(x) = \sin x$, $0 \le x < \pi$ and period is 2π. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx$, then Fourier coefficient a_0 is (2)

(A) 4 (B) 2 (C) $\frac{2}{\pi}$ (D) $\frac{4}{\pi}$

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45. For half range sine series of $f(x) = \cos x,\ 0 \le x \le \pi$ and period is 2π. Fourier series is represented by $\sum_{n=1}^{\infty} b_n \sin nx$, then Fourier coefficient b_1 is (2)

(A) $\frac{1}{\pi}$ (B) 0 (C) $\frac{2}{\pi}$ (D) $-\frac{2}{\pi}$

46. For half range cosine series of $f(x) = lx - x^2,\ 0 \le x \le l$ and period is $2l$. Fourier series is represented by $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos \frac{n\pi x}{l}$, then Fourier coefficient a_0 is (2)

(A) $\frac{l^2}{3}$ (B) $\frac{2l^2}{3}$ (C) $\frac{l^2}{6}$ (D) 0

47. For half range sine series of $f(x) = x,\ 0 \le x \le 2$ and period is 4. Fourier series is represented by $\sum_{n=1}^{\infty} b_n \sin \frac{n\pi x}{2}$, then Fourier coefficient b_1 is (2)

(A) 4 (B) 2 (C) $\frac{2}{\pi}$ (D) $\frac{4}{\pi}$

48. Fourier series representation of periodic function $f(x) = \left(\frac{\pi - x}{2}\right)^2,\ 0 \le x \le 2\pi$ is $\left(\frac{\pi - x}{2}\right)^2 = \frac{\pi^2}{12} + \sum_{n=1}^{\infty} \frac{1}{n^2} \cos nx$, then value of $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots =$ (2)

put $x = 0$

(A) $\frac{\pi^2}{6}$ (B) $\frac{\pi^2}{12}$ (C) $\frac{\pi^2}{3}$ (D) 0

49. Fourier series representation of periodic function $f(x) = \begin{cases} 1 + \frac{2x}{\pi}, & -\pi \le x \le 0 \\ 1 - \frac{2x}{\pi}, & 0 \le x \le \pi \end{cases}$ is $f(x) = \frac{8}{\pi^2}\left[\frac{1}{1^2}\cos x + \frac{1}{3^2}\cos 3x + \frac{1}{5^2}\cos 5x + \ldots\right]$, then value of $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots =$ (2)

put $x = \pi$

(A) $\frac{\pi^2}{4}$ (B) $\frac{\pi^2}{8}$ (C) $\frac{\pi^2}{16}$ (D) $\frac{8}{\pi^2}$

50. Fourier series representation of periodic function $f(x) = \pi^2 - x^2,\ -\pi \le x \le \pi$ is $\pi^2 - x^2 = \frac{2\pi^2}{3} + 4\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2} \cos nx$, then value of $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \ldots =$ (2)

(A) $\frac{\pi^2}{3}$ (B) $\frac{\pi^2}{4}$ (C) $\frac{\pi^2}{6}$ (D) $\frac{\pi^2}{12}$

51. Fourier series representation of periodic function $f(x) = \pi^2 - x^2,\ -\pi \le x \le \pi$ is $\pi^2 - x^2 = \frac{2\pi^2}{3} + 4\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^2} \cos nx$, then value of $\frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots =$ (2)

(A) $\frac{\pi^2}{3}$ (B) $\frac{\pi^2}{12}$ (C) $\frac{\pi^2}{6}$ (D) 0

52. The value of a_1 in Fourier series of y with period 6 for the following tabulated data is : (2)

x	0	1	2	3	4	5
y	9	18	24	28	26	20
$\cos \frac{\pi x}{3}$	1	$\frac{1}{2}$	$-\frac{1}{2}$	−1	$-\frac{1}{2}$	$\frac{1}{2}$

(A) −8.33 (B) −7.14 (C) −4.16 (D) 0

53. The value of b_1 in Fourier series of y with period π for the following tabulated data is :

x^0	0	30	60	90	120	150
y	0	9.2	14.4	17.8	17.3	11.7
sin 2x	0	0.866	0.866	0	–0.866	–0.866

(A) –3.116 (B) –1.558 (C) –4.16 (D) –1.336

54. The value of a_1 in Fourier series of y with period 6 for the following tabulated data is :

x	0	1	2	3	4	5
y	4	8	15	7	6	2
$\cos\frac{\pi x}{3}$	1	$\frac{1}{2}$	$-\frac{1}{2}$	–1	$-\frac{1}{2}$	$\frac{1}{2}$

(A) –2.83 (B) –8.32 (C) –3.57 (D) –10.98

55. The value of b_1 in Fourier series of y with period 2π for the following tabulated data is :

x^0	0	60	120	180	240	300
y	1.0	1.4	1.9	1.7	1.5	1.2
sin x	0	0.866	0.866	0	–0.866	–0.866

(A) 0.0989 (B) 0.3464 (C) 0.1732 (D) 0.6932

ANSWERS

1. (A)	2. (C)	3. (B)	4. (D)	5. (C)	6. (B)	7. (A)	8. (D)
9. (D)	10. (C)	11. (B)	12. (A)	13. (B)	14. (A)	15. (D)	16. (C)
17. (C)	18. (A)	19. (B)	20. (D)	21. (B)	22. (D)	23.(C)	24. (B)
25. (B)	26. (C)	27. (D)	28. (A)	29. (B)	30. (C)	31. (A)	32. (B)
33. (C)	34. (D)	35. (A)	36. (B)	37. (C)	38. (D)	39. (B)	40. (A)
41. (A)	42. (C)	43. (B)	44. (D)	45. (B)	46. (A)	47. (D)	48. (A)
49. (B)	50. (D)	51. (C)	52. (A)	53. (B)	54. (D)	55. (C)	

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