Questions 7 to 10

Consider the Fourier series

$$f(t) = M + \sum_{n=1}^{\infty} (A_n \sin 2nt + B_n \cos 2nt)$$

for a continuous periodic function $f(t)$ which is defined for all values of t.

7 If none of the Fourier coefficients M, A_n and B_n $(n = 1, 2, 3, \ldots)$ is zero, what is the smallest period of the function?

8 If none of the Fourier coefficients M, A_n and B_n is zero, what is the fundamental angular frequency of the function?

Options for Questions 7 and 8

A 1 **B** 2 **C** 4 **D** π

E 2π **F** 4π **G** $1/\pi$ **H** $1/(4\pi)$

9 If the Fourier coefficient M is equal to zero, which of the following statements must necessarily be TRUE?

10 If the Fourier coefficients A_n $(n = 1, 2, 3, \ldots)$ are all zero, which of the following statements must necessarily be TRUE?

Options for Questions 9 and 10

A The function $f(t)$ is odd.

B The function $f(t)$ is even.

C The integral of the function $f(t)$ over a complete period is zero.

Questions 11 and 12

11 Select the two functions which are even.

12 Select the two functions which are odd.

Options for Questions 11 and 12

A $\sin(x^2)$ **B** $\exp(\sin x)$ **C** $x^3 \cos x$ **D** $\cos(x^2 + x^3)$

E $x + \sin x$ **F** $x + \cos(x^2)$ **G** $x^2 + \sin(2x)$ **H** $e^x + e^{-x}$

[There are TWO correct options for each of Questions 11 and 12.]

Questions 13 to 15

13 Select the partial differential equation which is non-linear.

14 Select the partial differential equation which is homogeneous.

15 Select the TWO partial differential equations which are constant-coefficient.