

# Questions 17 and 18

The complementary function of the differential equation

$$\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 8y = f(x)$$

is

$$y = Ae^{2x} + Be^{4x}$$

In each of the following cases, choose the option which is the best function to use as a trial solution in the method of Unit 6 for finding a particular solution of the differential equation.

17  $f(x) = 3e^{2x}$

Options

A  $ae^{2x}$

B  $axe^{2x}$

C  $(ax + b)e^{2x}$

D  $ax^2e^{2x}$

E  $(ax^2 + b)e^{2x}$

F  $(ax^2 + bx)e^{2x}$

G  $(ax^2 + bx + c)e^{2x}$

18  $f(x) = 3\cos 2x$

Options

A  $a\cos 2x$

B  $a\sin 2x$

C  $a\cos 2x + b\sin 2x$

D  $ax\cos 2x$

E  $ax\sin 2x$

F  $ax\cos 2x + b\sin 2x$

G  $a\cos 2x + bx\sin 2x$

H  $ax\cos 2x + bx\sin 2x$

## Unit 7

### Questions 19 to 21

The motion of an oscillating particle is given by

$$x(t) = 12\cos 2t - 5\sin 2t.$$

19 Choose the option which is the amplitude of the oscillations.

Options

A 5

B 7

C 12

D 13

E 17

F 169

G  $\sqrt{7}$

H  $\sqrt{17}$

20 Choose the option which is the phase of the oscillations.

Options

A  $\arccos\left(\frac{5}{13}\right)$

B  $-\arccos\left(\frac{5}{13}\right)$

C  $\arccos\left(\frac{5}{13}\right)$

D  $-\arccos\left(\frac{5}{13}\right)$

E  $\arccos\left(\frac{12}{13}\right)$

F  $-\arccos\left(\frac{12}{13}\right)$

21 Choose the option which is the period of the oscillations.

Options

A 2

B  $\frac{1}{2}$

C  $\pi$

D  $2\pi$

E  $\frac{1}{2}\pi$

F  $\frac{1}{\pi}$

G  $\frac{2}{\pi}$

H  $\frac{1}{2\pi}$

$$T = \frac{2\pi}{2} = \pi$$