Started on	Wednesday, 17 January 2024, 4:45 PM
State	Finished
Completed on	Wednesday, 17 January 2024, 5:30 PM
Time taken	44 mins 38 secs
Grade	9 out of 10 (90%)

Question **1** Correct

Mark 1 out of 1

Using the method of undetermined coefficients, let Y(t) be a particular solution of the differential equation  $y^{(4)}-y^{(3)}=-24t$ , then Y(2)=

Select one:

- 48 ✔
- 0 16
- 0 32
- $\bigcirc 24$

The correct answer is: 48

Question 2
Correct
Mark 1 out of 1

```
A particular solution of the differential equation y'' + y = \sec^2 t has the form

Y(t) = u_1(t) \cos t + u_2(t) \sin t where u_1(t) =

Select one:

• -\sec t \checkmark

• \ln |\csc t + \cot t|

• \ln |\sec t + \tan t|

• \sec t

The correct answer is: -\sec t
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## Question $\mathbf{3}$

Correct Mark 1 out of 1

A particular solution of the differential equation  $y'' - 2y' + y = \frac{e^t}{t}$ , t > 0, has the form  $Y(t) = v_1(t)e^t + v_2(t)te^t$  where  $v_1(t) =$ Select one:  $-t \checkmark$   $\ln t$   $t \ln t$  t

The correct answer is: -t

### Question 4

Correct

Mark 1 out of 1

The characteristic polynomial of the differential equation  $y^{(4)} + 4y''' + 8y'' + 8y' + 4y = 0$  has roots  $-1 \pm i$ ,  $-1 \pm i$ . The general form of a particular solution of the equation  $y^{(4)} + 4y''' + 8y'' + 8y' + 4y = e^{-t} \cos t$  is

Select one:

$$\bigcirc At^3e^{-t}\cos t + Bt^3e^{-t}\sin t$$

- $At^2e^{-t}\cos t + Bt^2e^{-t}\sin t$
- $\bigcirc Ate^{-t}\cos t + Bte^{-t}\sin t$
- $\bigcirc Ae^{-t}\cos t + Be^{-t}\sin t$

The correct answer is:  $At^2e^{-t}\cos t + Bt^2e^{-t}\sin t$ 

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Question **5** Correct

Mark 1 out of 1

The general solution of the differential equation  $y^{(4)}+2y^{(3)}+4y^{\prime\prime}-2y^{\prime}-5y=0$  is

Select one:

The correct answer is:  $y(y) = c_1 e^t + c_2 e^{-t} + c_3 e^{-t} \cos(2t) + c_4 e^{-t} \sin(2t)$ 

#### Question 6

Correct

Mark 1 out of 1

The general form of a particular solution of the differential equation  $y^{(4)}+2y^{(3)}+y''=1+t\sinh t$ 

Select one:

 $\bigcirc Y(t) = At^2 + (Bt + C)\sinh t + (Dt + E)\cosh t$ 

$$\bigcirc Y(t) = (At + B)e^{t} + (Ct + D)e^{-t}$$

- $\bigcirc Y(t) = A + (Bt + C)\cosh t + (Dt + E)\sinh t$
- $Y(t) = At^2 + (Bt + C)e^t + (Dt^3 + Et^2)e^{-t}$

The correct answer is:  $Y(t) = At^2 + (Bt + C)e^t + (Dt^3 + Et^2)e^{-t}$ 

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## Question **7** Correct

Mark 1 out of 1

The general form of a particular solution of the differential equation  $y^{\prime\prime}-2y^{\prime}+y=te^t$  is

Select one:

$$\bigcirc Y(t) = (At^2 + Bt)e^t$$

• 
$$Y(t) = (At^3 + Bt^2)e^t \checkmark$$

$$\bigcirc Y(t) = (At+B)e^{t}$$

 $\bigcirc Y(t) = (At^2 + Bt + C)e^t$ 

The correct answer is:  $Y(t) = (At^3 + Bt^2)e^t$ 

# Question 8

Incorrect

Mark 0 out of 1

If  $Y_1 = 1 + 2t$ ,  $Y_2(t) = 1 + t + e^t$  are solutions of a second order nonhomogeneous differential equation then one of the following is a solution of the corresponding homogeneous equation

Select one:

- $igcedown 2t+e^t$  $igcedown t-e^t$
- $\circ te^t$
- $\odot$   $1 + e^t$  X

The correct answer is:  $t-e^t$ 

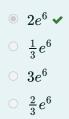
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Question	Y	
Correct		

Mark 1 out of 1

Using the method of undetermined coefficients, let Y(t) be a particular solution of the differential equation  $y^{\prime\prime\prime}-y=e^t$  , then Y(6)=

Select one:



The correct answer is:  $2e^6$ 

## Question 10

Correct

Mark 1 out of 1

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Using the method of undetermined coefficients, let Y(t) be a particular solution of the differential equation y'' + y' = t^2, then Y(3) =
Select one:
9

6 \checkmark

3

27
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The correct answer is: 6

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