

Q. (1) What will be the required solution of

$$\frac{d^2y}{dx^2} - 3 \frac{dy}{dx} + 4y = 0 ?$$

- (A) $Ae^{-4x} + Be^{-x}$
- (B) $Ae^{4x} - Be^{-x}$
- (C) $Ae^{4x} + Be^{-x}$
- (D) $Ae^{4x} + Be^x$

Q. (2) Find the particular integral of

$$(D^2 - 3D + 2)y = e^{3x}$$

- (A) $\frac{e^{3x}}{2}$ (C) $\frac{e^{3x}}{4}$
- (B) $\frac{e^{3x}}{3}$ (D) $\frac{e^{3x}}{5}$

Q. (3) If $y_1(x)$ and $y_2(x)$ are solution of $y'' + x^2y' + (1-x)y = 0$
such that $y_1(0) = 0, y_1'(0) = 1$
 $y_2'(0) = 1, y_2(0) = 1$

then the wronskian $w(y_1, y_2)$ on R^2 's

- (A) 0 ~~(C) -1~~
- (B) 1 (D) 2

Q. (4) What will be the required solution

$$\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} + y = 0 ?$$

Q. (a) $(C_1 + C_2 x) e^{-x}$

~~(b)~~ $(C_1 + C_2 x) e^x$

(c) $(C_1 + C_2 x) e^{5x}$

(d) $(C_1 - C_2 x) e^x$

Q. (5) The general solution of the differential equation $y'' - 4y = 0$ is

(a) $A \cos 2x + B \sin 2x$

(b) $A e^{-2x} + B x e^{-2x}$

(c) $A e^{-2x} + B x^2 e^{-2x}$

~~(d)~~ $A e^{-2x} + B e^{2x}$

Q. (6) The differential equation of $(D^2 + 6D + 9)y = 50e^{2x}$

has P.I.

(a) $\frac{2}{3} e^{2x}$ (c) e^{2x}

~~(b)~~ $2 e^{2x}$ (d) none of these

Q. (7) By variation of parameters $y'' + 4y = \cos 2x$

the value of Wronskian is

(a) 1 (c) 4

~~(b)~~ 2 (d) None of these

Q: (8) By method of undetermined co-efficients,
the choice of particular integral for

$$y'' - 4y = 5e^{-2x} \text{ is}$$

(A) $A e^{-2x}$ (C) $A x^2 e^{-2x}$
 (B) $A x e^{-2x}$ (D) $A x^3 e^{-2x}$

Q: (9) If D is a linear differential operator

$$\frac{1}{f(D)} \cdot e^{-ax} =$$

(A) $\frac{1}{f(-a^2)} \cdot e^{-ax}; f(-a^2) \neq 0$
 (B) $\frac{1}{f(D-a)} \cdot e^{-ax}$
 (C) $\frac{1}{f(a^2)} \cdot e^{-ax}; f(a^2) \neq 0$
 (D) $\frac{1}{f(-a)} \cdot e^{-ax}; f(-a) \neq 0$

Q: (10) If D is a differential operator then

Q: (10) If D is a differential operator then
value of $\frac{1}{D} (e^{-2x} + \sin 2x + 4)$ is

- (A) $-\frac{e^{-2x}}{2} - \frac{\cos 2x}{2}$
 (B) $-\frac{e^{-2x}}{2} + \frac{\cos 2x}{2} + 4x$
 (C) ~~$-\frac{e^{-2x}}{2} - \frac{\cos 2x}{2} + 4x$~~
 (D) $-\frac{e^{-2x}}{2} - \frac{\cos 2x}{2} + 4$

Hints : $\frac{1}{D} = \text{Integration}$

Q.(1) The working of the functions $f(x)$ & $g(x)$
and $g(x) = \tan x$ is

- (a) 1 ~~(c) sec x~~
 (b) -1 (d) $\tan x$

Q.(1a) In method of undetermined coefficients.

If complementary function $y_c = A \cos 2x + B \sin 2x$
of equation $y'' + 4y = \sin 2x$ then choice of
particular integral

- (a) $C_1 x \cos 2x + C_2 \sin 2x$
 (b) $C_1 \cos 2x + C_2 x \sin 2x$
~~(c) $x [C_1 \cos 2x + C_2 \sin 2x]$~~
 (d) $C_1 \cos 2x - C_2 \sin 2x$

Hints: C.F. = trial solution. So we multiply.
trial solution by x .

Q.(1b) General solution of $y'' + 16y = 12e^{-2x}$

- (a) $A e^{-4x} + B e^{4x} + \frac{3}{5} e^{-2x}$
~~(b) $A \cos 4x + B \sin 4x + e^{-2x}$~~
 (c) $A e^{4x} + B x e^{4x} + e^{-2x}$
 (d) None of these

Q: (14) The auxiliary equation of $4x^2y'' + y = 0$ is

- (A) $4m^2 + 4m + 1 = 0$
- (B) $4m^2 + 1 = 0$
- (C) $4m^2 - 4m + 1 = 0$
- (D) $4m^2 - 4m - 1 = 0$

Q: (15) If $\frac{d^2y}{dx^2} + p \frac{dy}{dx} + qy = e^{ax} v$, where v is a function of x ,

then particular integral will be written as

- (A) $\frac{1}{f(D+a)} \cdot v$
- (B) ~~$e^{ax} \frac{1}{f(D+a)} \cdot v$~~
- (C) $e^{ax} \frac{1}{f(D-a)} \cdot v$
- (D) $e^{ax} \frac{1}{f(D^2+a^2)} \cdot v$

Q: (16) The characteristic equation of $4x^2y'' + y = 0$ has double root $\frac{1}{2}$. What is its general solution?

- (A) $(A+3x)x^{\frac{1}{2}}$
- (B) $(A+3)e^{x^{\frac{1}{2}}}$
- (C) $Ax^{\frac{1}{2}}$
- (D) $Ae^{x^{\frac{1}{2}}}$

Q: (17) Find a general solution to the following ODE

$$y'' + y = \tan t$$

- (A) $y(t) = C_1 \cos t + C_2 \sin t - (\sin t) \ln |\cos t + \tan t|$
- (B) ~~$y(t) = C_1 \cos t + C_2 \sin t - (\cos t) \ln |\sec t + \tan t|$~~
- (C) $y(t) = C_1 \cos t - C_2 \sin t - (\cos t) \ln |\sec t - \tan t|$
- (D) None of these

Q.(18) If $y = e^{mx}$ is a solution of $(D^2 + PD + Q)y = 0$ then

- (a) $(m^2 - pm - Q)e^{mx}$
- ~~(b) $(m^2 - pm - Q)e^{mx}$~~
- (c) $(m^2 + pm - Q)e^{mx}$
- (d) $(m^2 + pm + Q)e^{mx}$
- (e) $(m^2 - pm + Q)e^{mx}$
- (f) $(m^2 + pm + Q)e^{mx}$

Q.(19) The algebraic sum of voltages around any closed path in a network is equal to _____.

- (a) Infinity ~~zero~~
- (b) 1
- (c) negative polarity

Q.(20) All _____ are loops but _____ are not meshes.

- (a) Loops, meshes
- ~~(b) meshes, loops~~
- (c) Branches, loops
- (d) nodes, branches

Q.(21) The basic laws for analyzing an electric circuit are:-

- (a) Einstein's theory
- (b) Newton's Law
- ~~(c) Kirchhoff's Laws~~
- (d) Faraday's Law

Q.(22) A junction where two or more than two network elements meet is known as a _____.

- (a) Branch
- (b) Loop
- ~~(c) mesh~~
- ~~(d) node~~

P: (Q3) The capacitor does not allow sudden changes
 (a) current (b) resistance
 (c) voltage (d) capacitance

P: (Q4) The expression for energy of an inductor
 (a) $\frac{1}{2}LI$ (b) $\frac{1}{2}C^2I$
 (c) $\frac{L}{2I}$ (d) $\frac{1}{2}LI^2$

P: (Q5) The units for inductance is _____ and
 Capacitance is _____

- (a) faraday, Henry
- (b) coulomb, faraday
- (c) Henry, faraday
- (d) Henry, coulomb

P: (Q6) Solution of the D.E. $y'' - 4y' + 4y = e^x$ when
 solving using method of undetermined coefficients
 is _____.

- (a) $y = (C_1 + C_2)x e^{2x} + 2e^x - 1$
- (b) $y = (C_1 + C_2 x)e^{2x} + 4e^x - 4$
- (c) $y = (C_1 + C_2 x)e^{2x} + x$
- (d) $y = (C_1 + C_2 x)e^x + 4e^x$

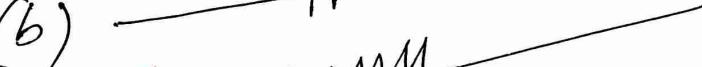
Q:- (Q7) A component which provides resistance
it's called _____

- (a) circuit (c) cell
~~(b) resistor~~ (d) field

Q:- (Q8) Which of the following is the S.I. Unit of Electric current?

- (a) watt (c) Ampere
(b) Joules (d) volt

Q:- (Q9) The Resistor symbol is _____

- (a) 
(b) 
~~(c) ~~

(d) None

Q:- (Q10) Voltage drop across resistor

- ~~(a) R^2~~ (c) Ω/c
~~(b) R^2~~ (d) None
(b) $L \frac{dI}{dt}$