## Module 1: Linear Differential Equations with constant coefficients.

| QNO | Questions |
|---|---|
| 1 | The Differential Equation $f\ D\ y = \emptyset\ x$ , where $\emptyset\ x\ = 0$ is known as _____ equation |
| 2 | The Differential Equation $f\ D\ y = \emptyset\ x$ , where $\emptyset\ x\ \neq 0$ is known as _____ equation |
| 3 | In the Differential Equation $f\ D\ y = \emptyset\ x$ , where $\emptyset\ x\ = 0$, then the _____ itself is a general Solution |
| 4 | The solution of $D^2 - a^2\ y = 0$ is _____ |
| 5 | The particular Integral of $D^2 - 6D + 9\ y = log 2$ is _____ |
| 6 | Given $f\ D\ \ y = \emptyset\ x$ if $m_1$ and $m_2$ are real and distinct roots of the Auxillary Equation, then the complimentary function is _____ |
| 7 | The Particular Integral of $x'''\ t\ - 8x\ t\ = 1$ is _____ |
| 8 | The value of $\frac{1}{D}\ f\ x$ is _____ |
| 9 | The phenomenon of the impressed frequency becoming equal to the natural frequency of the system is refered to as _____ |
| 10 | The Displacement in Simple Harmonic Motion $\frac{d^2x}{dt^2} = -\mu^2 x$ is |

## Module 2 :Variable Coefficients & Partial Differential Equations

| QNO | Question |
|---|---|
| 1. | The equation $a_0x^2y'' + a_1xy' + a_2y = \varphi(x)$ is called…… |
| 2. | The general solution of $[x^2D^2 + (3.5)xD + 1]y = 0$ is…… |
| 3. | If D = d/dz and z = logx, then the differential equation $x\frac{d^2y}{dx^2} + 2\frac{dy}{dx} = 6x$ becomes …… |
| 4. | The order and the degree of the P.D.E $\frac{\partial^2 z}{\partial x^2}^2 + \frac{\partial z}{\partial x}^2 + \frac{\partial z}{\partial y} = 3$ is…… and…… |
| 5. | The auxiliary equations of Lagrange's linear equation $Pp + Qq = R$ is…… |
| 6. | Find the general solution of Linear homogeneous differential equation $x^2y'' - 4xy' + 4y = 0$ |
| 7. | The partial differential equation obtained from $z = ax + by + ab$ by eliminating $a$ and $b$ is …… |
| 8. | Elimination of a function f from z = f(y/x) gives a partial differential equations |
| 9. | The general one dimensional heat equation is…… |
| 10. | The general one dimensional wave equation is…… |

## Module – 3 (Vector Differential Calculus)

1. Gradient of a scalar field is _____ Quantity.
2. Divergence of a vector field is_____ Quantity.
3. The directional derivative of a scalar function Ø at any point is --- along ⍰Ø.
4. If $div\vec{F} = 0$ then $\vec{F}$ is _____
5. If $curl\vec{F} = 0$ then $\vec{F}$ is called_____
6. If $\vec{r} = xi + yj + zk$ then curl$\vec{r}$ is_____
7. Any integral which is to be evaluated over a volume is called a_____
8. Green's Theorem formula is given by _____
9. Stoke's Theorem formula is given by _____
10. Gauss divergence Theorem Formula is given by----------

## Module – 4 Infinite Series

| Q. N. | Questions |
|---|---|
| **1** | In a series of positive terms $\sum u_n$ if $\log_{n\to\infty} u_n$ then $\sum u_n$ is _____. |
| **2** | Which one of the test does not give absolute convergence of a series? |
| **3** | State D'Alembart's ratio test. |
| **4** | The Bessel's Differential equation is given by _____ |
| **5** | Write the orthogonality relation for Bessel's function. |
| **6** | Show that $J_0'(x) = -J_1(x)$ . |
| **7** | What is the condition of convergence according to Cauchy's root test? |
| **8** | Test the convergence of the series $1 - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \cdots \ldots \ldots \ldots \ldots \ldots$ |
| **9** | Write Rodrigue's formula. |
| **10** | Write the values of $P_2(x)$ and $P_3(x)$. |

## Module 5 :Elementary Numerical Methods

<table>
<tr><th>Q.No</th><th>Question</th></tr>
<tr><td>1.</td><td>If $y_0, y_1, y_2 \ldots . y_n$ are the functional values of y corresponding to equally spaced $x_0, x_1, x_2 \ldots . x_n$ values then we can form a difference table up to _____</td></tr>
<tr><td>2.</td><td>For the given data, the value of $\Delta^2 y_1$ is _____
<table>
<tr><td>x</td><td>10</td><td>20</td><td>30</td><td>40</td></tr>
<tr><td>y</td><td>43</td><td>47</td><td>54</td><td>61</td></tr>
</table>
</td></tr>
<tr><td>3.</td><td>If $f(x)$ is a polynomial of degree n then $\Delta^n f(x)$ is a _____</td></tr>
<tr><td>4.</td><td>Let h be the finite difference, then the Forward difference operator $\Delta f\ x$ = _____</td></tr>
<tr><td>5.</td><td>“Method of False position ” is also known as _____</td></tr>
<tr><td>6.</td><td>In which case does Newton Raphson method is not applicable?</td></tr>
<tr><td>7.</td><td>In Numerical Integration, the area enclosed by the curve $f(x)$ between $x = a$ and $x = b$ is divided in to n equal parts of length h = _____</td></tr>
<tr><td>8.</td><td>When we divide the area enclosed by the curve $y = f(x)$ between $x = a$ to $x = b$ in to n equal parts we get _____ values of $y$</td></tr>
<tr><td>9.</td><td>Simpson’s 3/8$^{th}$ rule is applied when $n = \frac{b-a}{h}$ is multiple of _____</td></tr>
<tr><td>10.</td><td>In an Integral $I = \int_a^b f\ x\ dx$, if the interval (a,b) is divided into 8 equal parts then we use _____ numerical integration rule to evaluate the integral</td></tr>
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