Dr. Babasaheb Ambedkar Technological University, Lonere

डॉ. बाबासाहेब आंबेडकर तंत्रशास्त्र विद्यापीठ, लोणेरे

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $F(t) = e^{bt}\, sinat$ is equal to |
| A | $\frac{a}{(s-b)^2+a^2}$ |
| B | $\frac{a}{(s+b)^2+a^2}$ |
| C | $\frac{b}{(s-b)^2-a^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = e^{-bt}\, coshat}$ is equal to |
| A | $\frac{s+b}{(s+b)^2+a^2}$ |
| B | $\frac{s+b}{(s+b)^2-a^2}$ |
| C | $\frac{s-b}{(s-b)^2+a^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | If $L\{f(t)\} = \overline{f}(s)$, then $L\{e^{-at}f(t)\}$ is equal to |
| A | $\overline{f}(s)$ |
| B | $\overline{f}(s-a)$ |
| C | $\overline{f}(s+a)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F}(\boldsymbol{t}) = \boldsymbol{e}^{2\boldsymbol{t}}\ \boldsymbol{t}^{3}$ is equal to |
| A | $\frac{12}{(s-4)^2}$ |
| B | $\frac{12}{(s+4)^2}$ |
| C | $\frac{12}{(s+4)^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = sinh3t}$ is equal to |
| A | $\frac{3}{s^2-9}$ |
| B | $\frac{3}{s^2+9}$ |
| C | $\frac{9}{s^2-9}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = t\,cosat}$ is equal to |
| A | $\frac{s^2 - a^2}{(s^2 - a^2)^2}$ |
| B | $\frac{s^2 - a^2}{(s^2 + a^2)^2}$ |
| C | $\frac{s^2 + a^2}{(s^2 + a^2)^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = erf\left(\sqrt{t}\right)}$ is equal to |
| A | $\frac{1}{s\sqrt{s^2+1}}$ |
| B | $\frac{1}{s\sqrt{s-1}}$ |
| C | $\frac{1}{s\sqrt{s+1}}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = e^{3t}\, erf\left(\sqrt{t}\right)}$ is equal to |
| A | $\frac{1}{(s-3)\ \sqrt{s+2}}$ |
| B | $\frac{1}{(s+3)\ \sqrt{s-2}}$ |
| C | $\frac{1}{(s+3)\ \sqrt{s+2}}$ |
| D | $\frac{1}{(s-3)\ \sqrt{s-2}}$ |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = e^{-t}\, erf\left(\sqrt{t}\right)}$ is equal to |
| A | $\frac{1}{(s+1)\sqrt{s}}$ |
| B | $\frac{1}{(s-1)\sqrt{s}}$ |
| C | $\frac{1}{(s+1)\sqrt{s+2}}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | If $L\{f(t)\} = \bar{f}(s)$, then $L\left(\frac{f(t)}{t}\right)$ is equal to |
| A | $\int_{\infty}^{s} \frac{\bar{f}(s)}{s}\, ds$ |
| B | $\int_{0}^{\infty} \frac{\bar{f}(s)}{s}\, ds$ |
| C | $\int_{s}^{\infty} \frac{\bar{f}(s)}{s}\, ds$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| **Id** | |
|---|---|
| Question | The Laplace transform of $\boldsymbol{F(t)} = (\boldsymbol{a} + \boldsymbol{bt})^2$ , where a & b are constants, is given by |
| A | $(a+bs)^2$ |
| B | $\frac{1}{(a+bs)^2}$ |
| C | $\frac{a^2}{s}+\frac{2ab}{s^2}+\frac{2b^2}{s^3}$ |
| D | $\frac{a^2}{s}+\frac{2ab}{s^2}+\frac{b^2}{s^3}$ |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | If $L\{f(t)\} = \overline{f}(s)$, then $L\{e^{at} \ f(t)\}$ is equal to |
| A | $\bar{f}\ (s+a)$ |
| B | $\bar{f}\ (s-a)$ |
| C | $e^{-st}\ \overline{f}(s)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| **Id** | |
|---|---|
| Question | The Laplace transform of $\boldsymbol{f(t)} = \boldsymbol{t}^{\frac{-1}{2}}$ is equal to |
| A | $\frac{\sqrt{\pi}}{\sqrt{s}}$ |
| B | $\frac{\sqrt{s}}{\sqrt{\pi}}$ |
| C | 0 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = e^{\propto t} \cos at}$ is equal to |
| A | $\frac{s-\propto}{(s-\propto)^2 + a^2}$ |
| B | $\frac{s+\propto}{(s-\propto)^2 + a^2}$ |
| C | $\frac{1}{(s-\propto)^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t)} = \int_0^{t} \frac{\boldsymbol{sint}}{\boldsymbol{t}}\, \boldsymbol{dt}$ is equal to |
| A | $\frac{\cot^{-1} s}{s}$ |
| B | $\frac{\tan^{-1} s}{s}$ |
| C | $\frac{\pi}{2} - \tan^{-1} s$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| **Id** | |
|---|---|
| Question | $L\{\, coshat - coshbt\,\}$ is equal to |
| A | $\frac{s}{s^2+a^2} - \frac{s}{s^2+b^2}$ |
| B | $\frac{s}{s^2-a^2} - \frac{s}{s^2-b^2}$ |
| C | $\frac{a}{s^2-a^2} - \frac{b}{s^2-b^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| **Id** | |
|---|---|
| Question | If $L\{f(t)\} = \overline{f}(s)$ , then $L\{\, t\, f(t)\}$ is equal to |
| A | $-\dfrac{d\overline{f}(s)}{ds}$ |
| B | $\int_s^\infty \overline{f}(s)\, ds$ |
| C | $s\,\overline{f}(s) - f(0)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | If $L\{f(t)\} = \overline{f}(s),$ then $L\left\{\frac{f(t)}{t}\right\}$ is equal to |
| A | $-\frac{d\overline{f}(s)}{ds}$ |
| B | $\int_{s}^{\infty} \overline{f}(s)\ ds$ |
| C | $\frac{1}{s}\overline{f}(s)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | If $L\{f(t)\} = \overline{f}(s)$, then $L\{f(at)\}$ is equal to |
| A | $e^{-as}\overline{f}(s)$ |
| B | $f(s+a)$ |
| C | $\frac{1}{a}\overline{f}\left(\frac{s}{a}\right)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | $L\{e^{-2t} sint\}$ is equal to |
| A | $\frac{1}{s^2+1}$ |
| B | $\frac{s+2}{(s+2)^2+1}$ |
| C | $\frac{1}{(s+2)^2+1}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| **Id** | |
|---|---|
| Question | $L\{e^{-3t}\cos 2t\}$ is equal to |
| A | $\frac{s+3}{(s+3)^2+4}$ |
| B | $\frac{1}{(s+3)^2+4}$ |
| C | $\frac{3}{(s+3)^2+4}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| **Id** | |
|---|---|
| Question | If $L\{f(t)\} = \overline{f}(s)$, then $L\left\{\frac{df}{dt}\right\}$ is equal to |
| A | $e^{-as}\overline{f}(s)$ |
| B | $s\,\overline{f}(s) - f(0)$ |
| C | $s\,\overline{f}(s) + f(0)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | $L\{\cosh at\}$ is equal to |
| A | $\frac{1}{s^2 - a^2}$ |
| B | $\frac{a}{s^2 - a^2}$ |
| C | $\frac{s}{s^2 - a^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | The Laplace transform of $\boldsymbol{F(t) = e^{-3t}\, sin 2t}$ is equal to |
| A | $\frac{2}{(s+3)^2-4}$ |
| B | $\frac{2}{(s+3)^2+4}$ |
| C | $\frac{2}{(s-3)^2-4}$ |
| D | $\frac{2}{(s+3)^2+4}$ |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | If $L\left\{\frac{\sin t}{t}\right\} = \cot^{-1} s$, then $L\left\{\frac{d}{dt}\left(\frac{\sin t}{t}\right)\right\}$ is equal to |
| A | $s\cot^{-1} s - 1$ |
| B | s $\cot^{-1} s$ |
| C | $s\cot^{-1} s + 1$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | I |

| | |
|---|---|
| **Id** | |
| Question | $\boldsymbol{L}^{-1}\left\{\frac{1}{\sqrt{s+3}}\right\}$ is equal to |
| A | $\frac{e^{-3t}}{\sqrt{\pi t}}$ |
| B | $\frac{e^{3t}}{\sqrt{\pi t}}$ |
| C | $\frac{e^{t}}{\sqrt{\pi t}}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{\boldsymbol{f}}(\boldsymbol{s}) = \frac{1}{\boldsymbol{s}^2+2\boldsymbol{s}}$ is given by |
| A | $1 - e^{2t}$ |
| B | $1 + e^{2t}$ |
| C | $\frac{1 - e^{2t}}{2}$ |
| D | $\frac{1 - e^{-2t}}{2}$ |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{\boldsymbol{f}}(\boldsymbol{s}) = \mathbf{log}\left(\frac{s+1}{s-1}\right)$ is given by |
| A | $\frac{2cosht}{t}$ |
| B | $2tcost$ |
| C | $\frac{2sinht}{t}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| **Id** | |
|---|---|
| Question | The inverse Laplace transform of $\bar{f}(s) = \frac{1}{(s+3)^5}$ is equal to |
| A | $\frac{e^{-3t}t^4}{24}$ |
| B | $\frac{e^{3t}t^4}{24}$ |
| C | $e^{-3t}t^4$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{\boldsymbol{f}}(\boldsymbol{s}) = \frac{1}{\boldsymbol{s}^2+4\boldsymbol{s}+13}$ is equal to |
| A | $\frac{1}{3}e^{-2t}\sin 3t$ |
| B | $\frac{1}{3}e^{2t}\sin 3t$ |
| C | $e^{-2t}\sin 3t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{\boldsymbol{f}}(\boldsymbol{s}) = \frac{1}{(s-4)^5} + \frac{5}{(s-2)^2+5^2}$ is equal to |
| A | $e^{4t}\frac{t^4}{24} + e^{2t}\ sin5t$ |
| B | $e^{4t}\frac{t^4}{24} - e^{2t}\ sin5t$ |
| C | $e^{4t}\frac{t^3}{24} - e^{2t}\ sin5t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{\boldsymbol{f}}(\boldsymbol{s}) = \frac{3\boldsymbol{s}+4}{\boldsymbol{s}^2+9}$ is equal to |
| A | $3cos3t - \frac{4}{3}sin3t$ |
| B | $3cos3t + \frac{4}{3}sin3t$ |
| C | $3cos3t + sin3t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| **Id** | |
|---|---|
| Question | The inverse Laplace transform of $\bar{\boldsymbol{f}}(\boldsymbol{s}) = \frac{\boldsymbol{s}^2 - 3\boldsymbol{s} + 4}{\boldsymbol{s}^3}$ is equal to |
| A | $1 - 3t - 2t^2$ |
| B | $1 + 3t + 2t^2$ |
| C | $1 - 3t + 2t^2$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| **Id** | |
|---|---|
| Question | The inverse Laplace transform of $\boldsymbol{\bar{f}(s) = \log \frac{s+a}{s+b}}$ is equal to |
| A | $\frac{1}{t}(e^{at} - e^{bt})$ |
| B | $\frac{1}{t}(e^{-at} + e^{-bt})$ |
| C | $\frac{1}{t}(e^{-at} - e^{-bt})$ |
| D | $-\frac{1}{t}(e^{-at} - e^{-bt})$ |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| **Id** | |
|---|---|
| Question | The inverse Laplace transform of $\overline{f}(\boldsymbol{as})$ is equal to |
| A | $\frac{1}{a} f\left(\frac{t}{a}\right)$ |
| B | $\frac{1}{a} f\left(\frac{a}{t}\right)$ |
| C | $f\left(\frac{t}{a}\right)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| **Id** | |
|---|---|
| Question | The inverse Laplace transform of $\bar{\boldsymbol{f}}(\boldsymbol{s}) = \mathbf{cot}^{-1}(\boldsymbol{s})$ is equal to |
| A | $\frac{sint}{t}$ |
| B | $\frac{cost}{t}$ |
| C | $sint$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{\boldsymbol{f}}(\boldsymbol{s}) = \mathbf{tan}^{-1}\left(\frac{2}{s}\right)$ is equal to |
| A | $\frac{-1}{t}\ sin2t$ |
| B | $sin2t$ |
| C | $\frac{1}{t}\ sin2t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{\boldsymbol{f}}(\boldsymbol{s}) = \frac{s+3}{(s+3)^2+4}$ is equal to |
| A | $e^{-3t}\ sin2t$ |
| B | $e^{3t}\ sin2t$ |
| C | $e^{-3t}\ cos2t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{\boldsymbol{f}}(\boldsymbol{s}) = \frac{\lfloor\left(\frac{3}{2}\right)}{s^{\frac{3}{2}}}$ is equal to |
| A | $t^{\frac{3}{2}}$ |
| B | $t^{\frac{-3}{2}}$ |
| C | $t^{\frac{1}{2}}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{f}(s) = \frac{1}{(s+3)^2}$ is equal to |
| A | $t\, e^{-3t}$ |
| B | $e^{-3t}$ |
| C | $\frac{t}{2} e^{-3t}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{f}(s) = \frac{4s}{s^2+16}$ is equal to |
| A | $\cos 4t$ |
| B | $4\cos 4t$ |
| C | $4\, sin\, 4t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| **Id** | |
|---|---|
| Question | The inverse Laplace transform of $\overline{f}(s) = \frac{3}{s^2+25}$ is equal to |
| A | $3\, sin\, 5t$ |
| B | $\frac{3}{5} sin\, 5t$ |
| C | $\frac{3}{5} \cos 5t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{f}(s) = \frac{1}{3s-4}$ is equal to |
| A | $\frac{1}{3}e^{-\frac{4}{3}t}$ |
| B | $e^{-\frac{4}{3}t}$ |
| C | $\frac{1}{3}e^{\frac{4}{3}t}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{f}(s) = \frac{2}{s+2}$ is equal to |
| A | $2\,e^{2t}$ |
| B | $e^{-2t}$ |
| C | $2\,e^{-2t}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | If $L^{-1}\{\overline{f}(s)\} = f(t)$, then $L^{-1}\left\{\frac{\overline{f}(s)}{s}\right\}$ is equal to |
| A | $\int_0^t f(t)\, dt$ |
| B | $-t\, f(t)$ |
| C | $\frac{1}{t}\, f(t)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{f}(s) = \log\left(\frac{s+a}{s+b}\right)$ is equal to |
| A | $\frac{e^{-at} - e^{-bt}}{t}$ |
| B | $\frac{e^{-bt} - e^{-at}}{t}$ |
| C | $\frac{e^{-bt} + e^{-at}}{t}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{f}(s) = \frac{3}{s^4}$ is equal to |
| A | $t^3$ |
| B | $\frac{t^3}{3}$ |
| C | $\frac{t^3}{2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{f}(s) = \frac{2s+1}{s^3}$ is equal to |
| A | $2t - \frac{t^2}{2}$ |
| B | $2t + \frac{t^2}{3}$ |
| C | $2t + \frac{t^2}{2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\overline{f}(s) = \frac{1}{3s^2+27}$ is equal to |
| A | $\frac{1}{3} sin\ 3t$ |
| B | $\frac{1}{3} \cos 3t$ |
| C | $\frac{1}{9} sin\ 3t$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The inverse Laplace transform of $\bar{\boldsymbol{f}}(\boldsymbol{s}) = \frac{1}{(\boldsymbol{s}+2)(\boldsymbol{s}-1)}$ is equal to |
| A | $\frac{1}{3}(e^t - e^{-2t})$ |
| B | $\frac{1}{3}(e^t + e^{-2t})$ |
| C | $\frac{1}{3}(e^t - e^{-2t})$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | II |

| | |
|---|---|
| **Id** | |
| Question | The Fourier cosine transform of $\boldsymbol{f}(\boldsymbol{x}) = 2\boldsymbol{e}^{-5\boldsymbol{x}} + 5\boldsymbol{e}^{-2\boldsymbol{x}}$ is |
| A | $\frac{10}{s^2+25} + \frac{10}{s^2+4}$ |
| B | $\frac{10}{s^2+25} - \frac{10}{s^2+4}$ |
| C | $\frac{10}{s^2-25} - \frac{10}{s^2-4}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | If $F(s)$ is the Fourier transform of $f(x)$, then the Fourier transform of $f(ax)$ is |
| A | $\frac{1}{a}F\left(\frac{s}{a}\right)$ |
| B | $F\left(\frac{s}{a}\right)$ |
| C | $\frac{1}{a}F(s)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Fourier cosine transform of the function $f(t)$ is |
| A | $F_c(s) = \int_0^\infty f(t) \cos st$ |
| B | $F_c(s) = \int_0^\infty f(t) \cos t \; dt$ |
| C | $F_c(s) = \int_0^\infty f(st) \cos t \; dt$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | Which of the following is correct representation of Fourier transform |
| A | $F(s) = \int_{-\infty}^{\infty} f(x)e^{isx} \, dx$ |
| B | $F(s) = \frac{1}{2\pi} \int_{-\infty}^{\infty} f(s)e^{isx} \, ds$ |
| C | $F(s) = \frac{1}{2\pi} \int_{0}^{\infty} f(s)e^{isx} \, ds$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Fourier sine transform is represented by |
| A | $F_s(s) = \int_{-\infty}^{\infty} f(t)\cos(st)\ dt$ |
| B | $F_s(s) = \int_{0}^{\infty} f(t)\sin(st)\ dt$ |
| C | $F_s(s) = \int_{-\infty}^{\infty} f(t)\ sin(st)\ dt$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | If $F\{f(x)\} = F(s)$, then $F\{f(x-a)\}$ is equal to |
| A | $e^{isa}$ |
| B | $e^{isa}\, F(s)$ |
| C | Both $(a)$ & $(b)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Fourier cosine transform of $\boldsymbol{e^{-x}}$ is |
| A | $\frac{s}{s^2+1}$ |
| B | $\frac{s}{s^2-1}$ |
| C | $\frac{1}{s^2+1}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | If $F\{f(x)\} = F(s)$ and $F\{g(x)\} = G(s)$ , then by parseval's identity $\frac{1}{2\pi}\int_{-\infty}^{\infty} F(s)\overline{G(s)}\ ds$ is equal to |
| A | $\int_{0}^{\infty} f(x)\overline{g(x)}\ dx$ |
| B | $\frac{1}{2\pi}\int_{-\infty}^{\infty} f(x)\ g(x)\ dx$ |
| C | $\int_{-\infty}^{\infty} f(x)\overline{g(x)}\ dx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| **Id** | |
|---|---|
| Question | If $F\{f(x)\} = F(s)$ , then by parseval's identity $\frac{1}{2\pi}\int_{-\infty}^{\infty}[F(s)]^2\ ds$ is equal to |
| A | $\frac{1}{\pi}\int_{0}^{\infty}[f(x)]^2\ dx$ |
| B | $\int_{-\infty}^{\infty}[f(x)]^2\ dx$ |
| C | $2\pi\int_{0}^{\infty}\left(f(x)\right)^2 dx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Parseval's identities for Fourier cosine transform is |
| A | $\frac{2}{\pi}\int_{0}^{\infty} F_c(s) G_c(s) ds = \int_{0}^{\infty} f(x)\, g(x) dx$ |
| B | $\int_{0}^{\infty} F_c(s) G_c(s) ds = \int_{0}^{\infty} f(x)\, g(x) dx$ |
| C | $\frac{2}{\pi}\int_{-\infty}^{\infty} F_c(s) G_c(s) ds = \int_{-\infty}^{\infty} f(x)\, g(x) dx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Parseval's identity for Fourier sine transform is |
| A | $\frac{2}{\pi}\int_0^{\infty}\{F_s(s)\}^2\ ds = \int_0^{\infty}\{f(x)\}^2\ dx$ |
| B | $\frac{2}{\pi}\int_{-\infty}^{\infty}\{F_s(s)\}^2\ ds = \int_0^{\infty}\{f(x)\}^2\ dx$ |
| C | $\int_0^{\infty}\{F_s(s)\}^2\ ds = \int_0^{\infty}\{f(x)\}^2\ dx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The inverse Fourier sine transform is given by |
| A | $f(x) = \frac{1}{\pi}\int_{0}^{\infty} F_s(s)\sin(sx)ds$ |
| B | $f(x) = \frac{2}{\pi}\int_{0}^{\infty} F_s(s)\sin(sx)ds$ |
| C | $f(x) = \frac{2}{\pi}\int_{0}^{\infty} F_s(s)\cos(sx)ds$ |
| D | $f(x) = \int_{0}^{\infty} F_s(s)\sin(sx)ds$ |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The inverse Fourier cosine transform is |
| A | $f(x) = \int_{0}^{\infty} F_c(s)\sin(sx)ds$ |
| B | $f(x) = \frac{2}{\pi}\int_{-\infty}^{\infty} F_c(s)\cos(sx)ds$ |
| C | $f(x) = \frac{2}{\pi}\int_{0}^{\infty} F_c(s)\cos(sx)ds$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | If $F_c\{f(ax)\} = kF_c\left(\frac{s}{a}\right)$ , then k is equal to |
| A | $\frac{2}{a}$ |
| B | $a$ |
| C | $\frac{1}{a}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| **Id** | |
|---|---|
| Question | In the Fourier integral representation of the function $f(x) = \int_0^{\infty} [A(\lambda)\cos \lambda x + B(\lambda)\sin \lambda x]\, d\lambda$ , $A(\lambda)$ is given by |
| A | $\int_{-\infty}^{\infty} f(t) \cos \lambda t \, dt$ |
| B | $\frac{1}{\pi}\int_{-\infty}^{\infty} f(t) \cos \lambda t \, dt$ |
| C | $\int_{-\infty}^{\infty} f(t) \sin \lambda t \, dt$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | In the Fourier integral representation of the function $f(x) = \int_0^\infty [A(\lambda)\cos\lambda x + B(\lambda)\sin\lambda x]\, d\lambda$ , $B(\lambda)$ is given by |
| A | $\frac{1}{\pi}\int_{-\infty}^{\infty} f(t)\sin\lambda t\, dt$ |
| B | $\frac{1}{\pi}\int_{-\infty}^{\infty} f(t)\cos\lambda t\, dt$ |
| C | $\int_{-\infty}^{\infty} f(t)\sin\lambda t\, dt$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | In the Fourier cosine integral representation of the function $f(x) = \int_0^\infty A(\lambda) \cos \lambda x \, d\lambda$, $A(\lambda)$ is given by |
| A | $\frac{2}{\pi} \int_0^\infty f(x) \cos \lambda x \, dx$ |
| B | $\frac{1}{\pi} \int_0^\infty f(x) \cos \lambda x \, dx$ |
| C | $\int_0^\infty f(x) \cos \lambda x \, dx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| **Id** | |
|---|---|
| Question | In the Fourier sine integral representation of the function $f(x) = \int_0^\infty B(\lambda) \sin \lambda x \, d\lambda$ , $B(\lambda)$ is given by |
| A | $\int_0^\infty f(x) \sin \lambda x \; dx$ |
| B | $\frac{1}{\pi} \int_0^\infty f(x) \sin \lambda x \; dx$ |
| C | $\frac{2}{\pi} \int_0^\infty f(x) \sin \lambda x \; dx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Fourier integral theorem is given by |
| A | $f(x) = \frac{1}{\pi}\int_0^{\infty}\int_{-\infty}^{\infty} f(t)\cos[\lambda(t-x)]\,dt\,d\lambda$ |
| B | $f(x) = \frac{1}{\pi}\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(t)\cos[\lambda(t-x)]\,dt\,d\lambda$ |
| C | $f(x) = \frac{1}{2\pi}\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} f(t)\cos[\lambda(t-x)]\,dt\,d\lambda$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | If the Fourier transform of $f(x)$ is $F(s)$, then $F(s)$ is equal to |
| A | $F(s) = \int_{-\infty}^{\infty} f(t)\, e^{-ist} dt$ |
| B | $F(s) = \int_{-\infty}^{\infty} f(t)\, e^{ist} dt$ |
| C | $F(s) = \frac{1}{\pi} \int_{-\infty}^{\infty} f(t)\, e^{ist} dt$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | If the Fourier transform of $f(x)$ is $F(s)$, then $f(x)$ is equal to |
| A | $f(x) = \frac{1}{2\pi}\int_{-\infty}^{\infty} F(s)\, e^{-isx} ds$ |
| B | $f(x) = \frac{1}{\pi}\int_{0}^{\infty} F(s)\, e^{-isx} ds$ |
| C | $f(x) = \int_{-\infty}^{\infty} F(s)\, e^{isx} ds$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Fourier cosine transform of $f(x) = \frac{1}{1+x^2}$ is equal to |
| A | $\frac{\pi}{4}e^{s}$ |
| B | $\frac{\pi}{2}e^{s}$ |
| C | $\frac{\pi}{2}e^{-s}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The value of $\int_0^\infty \frac{\sin t}{t}\,dt$ is equal to |
| A | $\frac{\pi}{4}$ |
| B | $\frac{\pi}{2}$ |
| C | 0 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| **Id** | |
|---|---|
| Question | If the Fourier cosine transform of $f(x)$ is $F_c(s)$, then |
| A | $F_c\{f(ax)\} = \frac{1}{a} F_s\left(\frac{s}{a}\right)$ |
| B | $F_c\{f(ax)\} = \frac{1}{a} F_c\left(\frac{s}{a}\right)$ |
| C | $F_c\{f(ax)\} = F_c\left(\frac{s}{a}\right)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| **Id** | |
| Question | The Fourier cosine transform of $\boldsymbol{e^{-x}}$ is |
| A | $\frac{s}{s^2+1}$ |
| B | $\frac{1}{s^2+1}$ |
| C | $\frac{s}{s^2-1}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | III |

| | |
|---|---|
| Id | |
| Question | The order of the partial differential equation $\frac{\partial z}{\partial x}+\frac{\partial^2 z}{\partial x^2}+\frac{\partial^2 z}{\partial x\,\partial y}=1$ is |
| A | 1 |
| B | 2 |
| C | 3 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The degree of the partial differential equation $\frac{\partial z}{\partial x} + \frac{\partial^2 z}{\partial y^2} = 1$ is. |
| A | 2 |
| B | 0 |
| C | 1 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The degree of the partial differential equation $a^2\left[\frac{\partial^2 z}{\partial x^2}+\frac{\partial z}{\partial y}\right]^2+\frac{\partial z}{\partial y}=\sin(x+y)$ is |
| A | 1 |
| B | 2 |
| C | 3 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The order of the partial differential equation $\frac{\partial^2 z}{\partial x^2}+\left(\frac{\partial z}{\partial y}\right)^2=1$ is |
| A | 2 |
| B | 0 |
| C | 1 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating $a$ & $b$ from $z = ax + (1 - a)y + b$ is |
| A | $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 1$ |
| B | $\frac{\partial z}{\partial x} - \frac{\partial z}{\partial y} = 1$ |
| C | $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = 0$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating $a$ & $b$ from $z = ax + by + ab$ is |
| A | $z = xp + yq - pq$ |
| B | $z = xp + yq + pq$ |
| C | $z = xp - yq - pq$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating $a$ and $b$ from $z = (x^2 + a^2)(y^2 + b^2)$ is |
| A | $2xyz = pq$ |
| B | $xyz = pq$ |
| C | $4xyz = pq$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating $a$ and $b$ from $z = ax^3 + by^3$ is |
| A | $z = xp + yq$ |
| B | $z = xp + yq + pq$ |
| C | $3z = xp + yq$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating the arbitrary function $f$ from $z = f(y^2 - x^2)$ is |
| A | $yp + xq = 0$ |
| B | $yp - xq = 0$ |
| C | $xp + yq = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating the arbitrary function $f$ from $z = x + y + f(xy)$ is |
| A | $px - qy = x - y$ |
| B | $px + qy = x + y$ |
| C | $py - qx = x + y$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The general solution of $3p + 4q = 7$ is given by |
| A | $\phi(4x - 3y, 7x - 3z) = 0$ |
| B | $\phi(4x + 3y, 7x + 3z) = 0$ |
| C | $\phi(4x - 3y, 7x + 3z) = 0$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The general solution of $xp + yq = z$ is given by |
| A | $\phi\left(\frac{x}{y}, \frac{y}{z}\right) = 0$ |
| B | $\phi(xy, z) = 0$ |
| C | $\phi(xy, yz) = 0$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating arbitrary function from $z = f(x + it) + g(x - it)$ is |
| A | $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial t^2} = 0$ |
| B | $\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$ |
| C | $\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial t^2} = 0$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation for one dimensional heat equation is |
| A | $\frac{\partial^2 u}{\partial t^2} = \frac{\partial u}{\partial x}$ |
| B | $\frac{\partial u}{\partial t} = c^2 \frac{\partial^2 u}{\partial x^2}$ |
| C | $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating the function from $z = f(x^2 - y^2)$ |
| A | $yp + xq = 0$ |
| B | $xp - yq = 0$ |
| C | $xp + yq = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating the function from $z = e^{ny} \emptyset(x - y)$ |
| A | $p - q = nz$ |
| B | $p + q = n$ |
| C | $p + q = nz$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The general solution of $2p + 3q = a$ is given by |
| A | $\phi(3x - 2y, ay - 3z) = 0$ |
| B | $\phi(3x + 2y, ay - 3z) = 0$ |
| C | $\phi(3x - 2y, ay + 3z) = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The general solution of $zp = -x$ is given by |
| A | $\phi(x^2 + z^2, y) = 0$ |
| B | $\phi(x^2 - z^2, y) = 0$ |
| C | $\phi(x^2 + z^2, 2y) = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | Temperature distribution of the plate in unsteady state is given by the equation |
| A | $\frac{\partial u}{\partial t} = c^2 \left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right)$ |
| B | $\frac{\partial^2 u}{\partial t^2} = c^2 \left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}\right)$ |
| C | $\frac{\partial^2 u}{\partial t^2} = c^2 \left(\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2}\right)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation for one dimensional wave equation is |
| A | $\frac{\partial^2 y}{\partial t^2} = \frac{\partial y}{\partial x}$ |
| B | $\frac{\partial y}{\partial t} = c^2 \frac{\partial^2 y}{\partial x^2}$ |
| C | $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The Laplace equation in two dimension is |
| A | $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ |
| B | $\frac{\partial^2 u}{\partial x^2} - \frac{\partial^2 u}{\partial y^2} = 0$ |
| C | $\frac{\partial^2 u}{\partial x^2} = \frac{\partial^2 u}{\partial y^2}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation obtained by eliminating the constants $a$ and $b$ from $z = (x^2 - a)(y^2 - b)$ is |
| A | $4xyz = \left(\frac{\partial z}{\partial x}\right)\left(\frac{\partial z}{\partial y}\right)$ |
| B | $4 = \left(\frac{\partial z}{\partial x}\right)\left(\frac{\partial z}{\partial y}\right)$ |
| C | $4xy = \left(\frac{\partial z}{\partial x}\right)\left(\frac{\partial z}{\partial y}\right)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The partial differential equation formed by eliminating the function f from $z = f\left(\frac{y}{x}\right)$ is |
| A | $y\left(\frac{\partial z}{\partial x}\right) + x\left(\frac{\partial z}{\partial y}\right) = 0$ |
| B | $\left(\frac{\partial z}{\partial x}\right) + \left(\frac{\partial z}{\partial y}\right) = 0$ |
| C | $x\left(\frac{\partial z}{\partial x}\right) + y\left(\frac{\partial z}{\partial y}\right) = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The general solution of the one dimensional heat flow equation $\frac{\partial u}{\partial t} = C^2 \frac{\partial^2 u}{\partial x^2}$ is |
| A | $u = (c_1 e^{mx} + c_2 e^{-mx}) c_3 e^{m^2 c^2 t}$ |
| B | $u = c_1 (c_2 x + c_3)$ |
| C | $u = (c_1 \cos mx + c_2 \sin mx) c_3 e^{-m^2 c^2 t}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | If $u = c_1$ , $v = c_2$ are the two solutions of $Pp + Qq = R$, then its general solution will be |
| A | $\emptyset(u, v) = 1$ |
| B | $\emptyset(u, v) = -1$ |
| C | $\emptyset(u, v) = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | IV |

| | |
|---|---|
| Id | |
| Question | The differential equation $\boldsymbol{x}^2 \frac{\boldsymbol{d^2y}}{\boldsymbol{dx^2}} + \boldsymbol{x}\left(\frac{\boldsymbol{dy}}{\boldsymbol{dx}}\right) + (\boldsymbol{x}^2 - 25)\boldsymbol{y} = 0$ is called |
| A | Bessel's differential equation of order 5 |
| B | Bessel's differential equation of order 4 |
| C | Bessel's differential equation of order 2 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J}_{\frac{-1}{2}}(\boldsymbol{x})$ is equal to |
| A | $\sqrt{\left(\frac{2}{\pi x}\right)} cosx$ |
| B | $\sqrt{\left(\frac{2}{\pi x}\right)} sinx$ |
| C | $\sqrt{\left(\frac{\pi x}{2}\right)} cosx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J}_{\frac{1}{2}}(\boldsymbol{x})$ is equal to |
| A | $\sqrt{\left(\frac{2}{\pi x}\right)} cosx$ |
| B | $\sqrt{\left(\frac{2}{\pi x}\right)} sinx$ |
| C | $\sqrt{\left(\frac{\pi x}{2}\right)} cosx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\left[J_{\frac{1}{2}}(x)\right]^2 + \left[J_{\frac{-1}{2}}(x)\right]^2$ is equal to |
| A | $\frac{2}{\pi x}$ |
| B | $\frac{\pi x}{2}$ |
| C | $\frac{1}{\pi x}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\frac{d}{dx}\{\boldsymbol{x^n J_n(x)}\}$ is equal to |
| A | $x^n\ J_n(x)$ |
| B | $x^n\ J_{n-1}(x)$ |
| C | $x^n\ J_{n+1}(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\frac{d}{dx}\{\boldsymbol{x^{-n} J_n(x)}\}$ is equal to |
| A | $-x^{-n} J_n(x)$ |
| B | $-x^{n} J_{n+1}(x)$ |
| C | $-x^{-n} J_{n+1}(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | The value of $\boldsymbol{J_{-n}(x)}$ is |
| A | $(-1)^n J_n(x)$ |
| B | $-1)^{n-1} J_n(x)$ |
| C | $(-1)^n J_{n+1}(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | Which recurrence relation is true |
| A | $J_{n+1}(x) = \frac{2n}{x} \; J_n(x) - J_{n-1}(x)$ |
| B | $J_{n+1}(x) = \frac{n}{x} J_n(x) - J_{n-1}(x)$ |
| C | $J_{n+1}(x) = \frac{2n}{x} \; J_n(x) + J_{n-1}(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | The Bessel equation of order zero is |
| A | $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + (x^2 - n^2)y = 0$ |
| B | $x\frac{d^2y}{dx^2} + \frac{dy}{dx} - xy = 0$ |
| C | $x\frac{d^2y}{dx^2} + \frac{dy}{dx} + xy = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | The value of $J_0(0)$ is |
| A | 0 |
| B | -1 |
| C | 1 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | Which recurrence relation is false |
| A | $J_n{}'(x) + \frac{n}{x} J_n(x) = J_{n-1}(x)$ |
| B | $J_n{}'(x) - \frac{n}{x} J_n(x) = -J_{n+1}(x)$ |
| C | $2J_n{}'(x) = J_{n-1}(x) - J_{n+1}(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J_{-n}(x)}$ is equal to |
| A | $\sum_{r=0}^{\infty} \frac{(-1)^r (x)^{n+2r}}{(2)^{n+2r} \Gamma n + r + 1}$ |
| B | $\sum_{r=0}^{\infty} \frac{(-1)^r (x)^{-n+2r}}{(2)^{-n+2r} \Gamma - n + r + 1}$ |
| C | $\sum_{r=0}^{\infty} \frac{(-1)^r (x)^{2r}}{(2)^{2r} \Gamma n + r + 1}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | If $\propto$ $and$ $\beta$ are the roots of the equation $J_n(x) = 0$ , then the value of integral $\int_0^1 \boldsymbol{x} \boldsymbol{J_n} (\propto \boldsymbol{x})\boldsymbol{J_n}(\boldsymbol{\beta x})\ \boldsymbol{dx}$ if $\propto \neq \boldsymbol{\beta}$ is |
| A | 0 |
| B | 1 |
| C | $\frac{1}{2}\ [J_{n+1}(\propto)]^2$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | If $\propto$ *and* $\beta$ are the roots of the equation $J_n(x) = 0$ , then the value of integral $\int_0^1 \boldsymbol{x\, J_n(\propto x) J_n(\beta x)\ dx}$ if $\propto = \boldsymbol{\beta}$ is |
| A | $\frac{1}{2}\ [J_{n+1}(\propto)]^2$ |
| B | $[J_{n+1}(\propto)]^2$ |
| C | $\frac{1}{2}\ [J_{n-1}(\propto)]^2$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | The value of $\boldsymbol{J_{\frac{1}{2}}(x)}$ is |
| A | $J_{\frac{-1}{2}}(x)\ tanx$ |
| B | $J_{\frac{-1}{2}}(x)\ sinx$ |
| C | $J_{\frac{-1}{2}}(x)\ cotx$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J_{\frac{-5}{2}}(x)}$ is equal to |
| A | $\sqrt{\left(\frac{2}{\pi x}\right)}\ \left\{\left(\frac{3-x^2}{x^2}\right)cosx + \frac{3}{x}sinx\right\}$ |
| B | $\sqrt{\left(\frac{2}{\pi x}\right)}\left\{\left(\frac{3+x^2}{x^2}\right)cosx + \frac{3}{x}sinx\right\}$ |
| C | $\sqrt{\left(\frac{2}{\pi x}\right)}\ \left\{\left(\frac{3-x^2}{x^2}\right)sinx - \frac{3}{x}cosx\right\}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\frac{d}{dx}J_0(x)$ is equal to |
| A | $J_1(x)$ |
| B | $-J_1(x)$ |
| C | $J_0(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J_{\frac{5}{2}}}\ (\boldsymbol{x})$ is equal to |
| A | $\sqrt{\left(\frac{2}{\pi x}\right)}\ \left\{\left(\frac{3-x^2}{x^2}\right) sinx - \frac{3}{x} cosx\right\}$ |
| B | $\sqrt{\left(\frac{2}{\pi x}\right)}\left\{\left(\frac{3-x^2}{x^2}\right) sinx + \frac{3}{x} cosx\right\}$ |
| C | $\sqrt{\left(\frac{2}{\pi x}\right)}\ \left\{\left(\frac{3-x^2}{x^2}\right) sinx - \frac{1}{x} cosx\right\}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J_{\frac{3}{2}}(x)}$ is equal to |
| A | $\sqrt{\left(\frac{2}{\pi x}\right)}\ \left\{\left(\frac{sinx}{x} - cosx\right)\right\}$ |
| B | $\sqrt{\left(\frac{2}{\pi x}\right)}\ \left\{\left(\frac{sinx}{x} + cosx\right)\right\}$ |
| C | $\sqrt{\left(\frac{2}{\pi x}\right)}\ \left\{\left(\frac{cosx}{x} - sinx\right)\right\}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $J_{\frac{-3}{2}}(x)$ is equal to |
| A | $\sqrt{\left(\frac{2}{\pi x}\right)}\left\{\left(-\frac{cosx}{x} - sinx\right)\right\}$ |
| B | $\sqrt{\left(\frac{2}{\pi x}\right)}\left\{\left(\frac{cosx}{x} - sinx\right)\right\}$ |
| C | $\sqrt{\left(\frac{2}{\pi x}\right)}\left\{\left(\frac{sinx}{x} + cosx\right)\right\}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J_4(x)}$ is equal to |
| A | $\left(\frac{48}{x^3}-\frac{8}{x}\right)J_1(x)-\left(\frac{24}{x^2}-1\right)J_0(x)$ |
| B | $\left(\frac{48}{x^3}-\frac{8}{x}\right)J_1(x)+\left(\frac{24}{x^2}-1\right)J_0(x)$ |
| C | $\left(\frac{48}{x^3}-\frac{8}{x}\right)J_0(x)-\left(\frac{24}{x^2}-1\right)J_1(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $4\boldsymbol{J_n}''(\boldsymbol{x})$ is equal to |
| A | $J_{n-2}(x) - 2J_n(x) + J_{n+2}(x)$ |
| B | $J_{n-2}(x) + 2J_n(x) + J_{n+2}(x)$ |
| C | $J_{n-2}(x) + 2J_n(x) - J_{n+2}(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\frac{d}{dx}[x\ J_1(x)]$ is equal to |
| A | $x\ J_0(x)$ |
| B | $J_0(x)$ |
| C | $J_1(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\frac{\boldsymbol{d}}{\boldsymbol{dx}}[\boldsymbol{x^n}\,\boldsymbol{J_n}(\boldsymbol{ax})]$ is equal to |
| A | $a\,x^n\,J_{n-1}(ax)$ |
| B | $a\,x^{-n}\;J_{n-1}(ax)$ |
| C | $a\,x^n\,J_{n+1}(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | $\boldsymbol{J_1}''(\boldsymbol{x})$ is equal to |
| A | $J_1(x) - \frac{1}{x} J_2(x)$ |
| B | $J_1(x) + \frac{1}{x} J_2(x)$ |
| C | $J_1(x) - J_2(x)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | V |

| | |
|---|---|
| Id | |
| Question | Which of the following functions is an analytic function |
| A | $f(z) = \bar{z}$ |
| B | $f(z) = \sin z$ |
| C | $f(z) = \mathrm{Im}(z)$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The function $f(z) = \|z\|^2$ is analytic at |
| A | everywhere |
| B | no where |
| C | origin |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | If f(z)= u + iv is an analytic function , then $f'(z)$ is equal to |
| A | $\frac{\partial u}{\partial x} - i\frac{\partial v}{\partial x}$ |
| B | $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x}$ |
| C | $\frac{\partial u}{\partial x} - i\frac{\partial v}{\partial y}$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | If the function $u = ax^3 + bx^2y + cxy^2 + dy^3$ is to be harmonic, if |
| A | $c = 3d$ and $b = 3a$ |
| B | $c = -3a$ and $b = -3d$ |
| C | $c = 3a$ and $b = 3d$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | If the function $2x + x^2 + \propto y^2$ is to be harmonic , then the value of $\propto$ will be |
| A | -1 |
| B | 1 |
| C | 2 |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The transformation $w = \frac{az+b}{cz+d}$, where $ad - bc \neq 0$ represents a transformation called |
| A | Magnification and rotation |
| B | Bilinear |
| C | Inversion |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The transformation $w = cz$ represents a transformation called |
| A | Magnification and rotation |
| B | Translation |
| C | Inversion |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The analytic function $f(z) = \frac{z-1}{z^2+1}$ has singularities at |
| A | $1 \& -1$ |
| B | $i \& -i$. |
| C | $1 \& -i$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The value of m for the function $u = 2x - x^2 + my^2$ to be harmonic is |
| A | 0 |
| B | 1 |
| C | 2 |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | A function u( x, y) is said to be harmonic if |
| A | $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ |
| B | $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$ |
| C | $\frac{\partial^2 u}{\partial x^2} - \frac{\partial^2 u}{\partial x^2} = 0$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | Which of the following is a bilinear transformation |
| A | $w = \frac{2z+1}{4z+2}$ |
| B | $w = \frac{2z+1}{4z-2}$ |
| C | $w = z$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The transformation $w = z + \alpha$ is known as |
| A | Magnification and rotation |
| B | Translation |
| C | Inversion |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | If real part of function $f(z)$ constant, then $f(z)$ is |
| A | Analytic function |
| B | Nowhere analytic function |
| C | Entire function |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The Cauchy - Riemann equations for $f(z) = u(x, y) + iv(x, y)$ to be analytic are |
| A | $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0; \frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} = 0$ |
| B | $\frac{\partial u}{\partial x} = -\frac{\partial v}{\partial y}; \frac{\partial u}{\partial y} = -\frac{\partial v}{\partial x}$ |
| C | $\frac{\partial u}{\partial x} = \frac{\partial v}{\partial y}; \frac{\partial u}{\partial y} = -\frac{\partial v}{\partial x}$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | If $f(z) = u + iv$ is analyticin polar form, then $\frac{\partial u}{\partial r}$ is |
| A | $\frac{\partial v}{\partial \theta}$ |
| B | $r\frac{\partial v}{\partial \theta}$ |
| C | $\frac{1}{r}\frac{\partial v}{\partial \theta}$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | Which of the following is true : |
| A | $\mathrm{Re}(z_1 - z_2) = \mathrm{Re}(z_1) - \mathrm{Re}(z_2)$ |
| B | $\mathrm{Re}(z_1 z_2) = \mathrm{Re}(z_1)\mathrm{Re}(z_2)$ |
| C | $\lvert z_1 - z_2 \rvert = \lvert z_1 \rvert - \lvert z_2 \rvert$ |
| D | None |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | $f(z) = \bar{z}$ is differentiable |
| A | Nowhere |
| B | only at $z = 0$ |
| C | Everywhere |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The polar form of Cauchy - Riemann equations are |
| A | $\frac{\partial u}{\partial \theta} = \frac{1}{r}\frac{\partial v}{\partial r}; \frac{\partial u}{\partial r} = r\frac{\partial v}{\partial \theta}$ |
| B | $\frac{\partial u}{\partial \theta} = r\frac{\partial v}{\partial \theta}; \frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}$ |
| C | $\frac{\partial u}{\partial r} = \frac{1}{r}\frac{\partial v}{\partial \theta}; \frac{\partial u}{\partial \theta} = -r\frac{\partial v}{\partial r}$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | $f(z) = e^{x}(\cos y - i\sin y)$ is |
| A | analytic |
| B | Not analytic |
| C | Analytic when z = 0 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The harmonic conjugate of $u(x, y) = e^y \cos x$ is |
| A | $-e^y \cos y + c$ |
| B | $-e^y \sin x + c$ |
| C | $e^y \sin x + c$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | Function u is said to be harmonic if and only if |
| A | $u_{xx} + u_{yy} = 0$ |
| B | $u_{xx} - u_{yy} = 0$ |
| C | $u_x + u_y = 0$ |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | If u and v are harmonic functions then f(z)= u+iv is |
| A | Analytic function |
| B | Need not be analytic function |
| C | Analytic function only at z=0 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | If $e^{ax}\cos y$ is harmonic ,then a = |
| A | i |
| B | 0 |
| C | -1 |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | The function $f(z) = \|z\|$ is a nonconstant |
| A | Nowhere analytic function |
| B | analytic function only at $z = 0$ |
| C | Everywhere analytic function |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

| | |
|---|---|
| Id | |
| Question | $f(z) = \|\bar{z}\|^2$ is differentiable |
| A | nowhere |
| B | only at $z = 0$ |
| C | everywhere |
| D | None. |
| Answer | |
| Marks | 1.5 |
| Unit | VI |

Engineering Mathematics-III
MCQ's of all six Chapters

# Unit 03 Fourier Transform

| | |
|---|---|
| **Id** | **1** |
| Question | Fourier sine transform of $f(x) = e^{-\beta x}$ |
| A | $\sqrt{\frac{2}{\pi}}\,\frac{\lambda}{\beta^2 - \lambda^2}$ |
| B | $\sqrt{\frac{2}{\pi}}\,\frac{\beta}{\beta^2 + \lambda^2}$ |
| C | $\sqrt{\frac{2}{\pi}}\,\frac{\beta}{\beta^2 - \lambda^2}$ |
| D | $\sqrt{\frac{2}{\pi}}\,\frac{\lambda}{\beta^2 + \lambda^2}$ |
| Answer | B |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **2** |
| Question | The Fourier Transform of $f(x) = \begin{cases} 1, & \lvert x \rvert < a \\ 0, & \lvert x \rvert > a \end{cases}$ |
| A | $\sqrt{\frac{2}{\pi}} \frac{\cos \lambda a}{\lambda}$ |
| B | $\sqrt{\frac{2}{\pi}} \frac{\sin \lambda a}{\lambda}$ |
| C | $\sqrt{\frac{1}{\pi}} \frac{\sin \lambda a}{\lambda}$ |
| D | $\sqrt{\frac{2}{\pi}} \frac{\cos \lambda a}{\lambda}$ |
| Answer | B |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **3** |
| Question | If $f(x) = cos\ x\ ;\ -\infty < x < \infty\ is$ ? |
| A | None |
| B | Odd function |
| C | Neither Even nor Odd |
| D | Even function |
| Answer | D |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **4** |
| Question | If $f(x)$ is define in $0 < x < \infty$ , then sine transform of $f(x)$ is ? |
| A | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \int_0^\infty f(u) \sin \lambda u \ du$ |
| B | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \int_0^\infty f(u) \cos \lambda u \ du$ |
| C | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \int_{-a}^{a} f(u) \sin \lambda u \ du$ |
| D | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \int_{-a}^{a} f(u) \cos \lambda u \ du$ |
| Answer | A |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **5** |
| Question | Complex form of Fourier Transform of $f(x)$ is ? |
| A | $$F(\lambda) = \sqrt{\frac{2}{\pi}}\int_{0}^{\infty} f(u)\cos\lambda u \; du$$ |
| B | $$F(\lambda) = \frac{1}{\sqrt{2\pi}}\int_{-\infty}^{\infty} f(u)\, e^{i\lambda u} du$$ |
| C | $$F(\lambda) = \sqrt{\frac{2}{\pi}}\int_{0}^{\infty} f(u)\sin\lambda u \; du$$ |
| D | $$F(\lambda) = \frac{1}{\sqrt{2\pi}}\int_{-a}^{a} f(u)\, e^{i\lambda u} du$$ |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **6** |
| Question | The Fourier cosine integral representation of $f(x)$ is |
| A | $$f(x) = \frac{2}{\pi}\int_0^a \cos\lambda x \left[\int_0^a f(u)\cos\lambda u\,du\right] d\lambda$$ |
| B | $$f(x) = \frac{2}{\pi}\int_0^\infty \sin\lambda x \left[\int_0^\infty f(u)\sin\lambda u\,du\right] d\lambda$$ |
| C | $$f(x) = \frac{2}{\pi}\int_0^\infty \cos\lambda x \left[\int_0^\infty f(u)\cos\lambda u\,du\right] d\lambda$$ |
| D | $$f(x) = \frac{2}{\pi}\int_0^a \sin\lambda x \left[\int_0^a f(u)\sin\lambda u\,du\right] d\lambda$$ |
| Answer | C |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **7** |
| Question | If $f(x) = x^3 + x\ ;\ -\infty < x < \infty\ is$ ? |
| A | None |
| B | Odd function |
| C | Neither Even nor Odd |
| D | Even function |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **8** |
| Question | Fourier cosine transform of $f(x) = k\,;\ 0 < x < a\ is$ ? |
| A | $F_c(\lambda) = \sqrt{\frac{2}{\pi}}\frac{k\sin\lambda a}{\lambda}$ |
| B | $F_c(\lambda) = \sqrt{\frac{2}{\pi}}\frac{k\cos\lambda a}{\lambda}$ |
| C | $F_c(\lambda) = -\sqrt{\frac{2}{\pi}}\frac{k\sin\lambda a}{\lambda}$ |
| D | $F_c(\lambda) = -\sqrt{\frac{2}{\pi}}\frac{k\cos\lambda a}{\lambda}$ |
| Answer | A |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **9** |
| Question | The Fourier sine integral representation of $f(x) = 1\ ;\ 0 < x < 1\ is$ |
| A | $f(x) = \frac{2}{\pi}\int_0^\infty \left[\frac{1+\cos\lambda}{\lambda}\right]\sin x\lambda\ d\lambda$ |
| B | $f(x) = \frac{2}{\pi}\int_0^\infty \left[\frac{1-\sin\lambda}{\lambda}\right]\sin x\lambda\ d\lambda$ |
| C | $f(x) = \frac{2}{\pi}\int_0^\infty \left[\frac{1-\cos\lambda}{\lambda}\right]\sin x\lambda\ d\lambda$ |
| D | $f(x) = \frac{2}{\pi}\int_0^\infty \left[\frac{1+\sin\lambda}{\lambda}\right]\sin x\lambda\ d\lambda$ |
| Answer | C |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **10** |
| Question | If $f(x)$ is define in $0 < x < \infty$ , then cosine transform of $f(x)$ is ? |
| A | $F_c(\lambda) = \sqrt{\frac{2}{\pi}} \int_0^\infty f(u) \sin \lambda u \ du$ |
| B | $F_c(\lambda) = \sqrt{\frac{2}{\pi}} \int_0^\infty f(u) \cos \lambda u \ du$ |
| C | $F_c(\lambda) = \sqrt{\frac{2}{\pi}} \int_{-a}^{a} f(u) \sin \lambda u \ du$ |
| D | $F_c(\lambda) = \sqrt{\frac{2}{\pi}} \int_{-a}^{a} f(u) \cos \lambda u \ du$ |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| **Id** | **11** |
|---|---|
| Question | Fourier sine transform of $f(x) = a$ ; $0 < x < 1$ is ? |
| A | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \frac{a(1 - \cos \lambda)}{\lambda}$ |
| B | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \frac{(1 - \cos \lambda)}{\lambda}$ |
| C | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \frac{a(1 - \sin \lambda a)}{\lambda}$ |
| D | $F_s(\lambda) = \sqrt{\frac{2}{\pi}} \frac{(1 - \sin \lambda a)}{\lambda}$ |
| Answer | A |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **12** |
| Question | If $\boldsymbol{f(x)}$ is odd function then Fourier integral of $\boldsymbol{f(x)}$ reduces to |
| A | Fourier cosine integral |
| B | Fourier sine integral |
| C | Fourier complex integral |
| D | Fourier Even odd integral |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **13** |
| Question | The Fourier Transform of $f(x) = \begin{cases} a, & \lvert x\rvert \le 1 \\ 0, & \lvert x\rvert > 1 \end{cases}$ |
| A | $\sqrt{\frac{2}{\pi}}\frac{a\sin\lambda}{\lambda}$ |
| B | $\sqrt{\frac{2}{\pi}}\frac{a\cos\lambda}{\lambda}$ |
| C | $\sqrt{\frac{1}{\pi}}\frac{\sin\lambda a}{\lambda}$ |
| D | $\sqrt{\frac{2}{\pi}}\frac{\cos\lambda a}{\lambda}$ |
| Answer | A |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **14** |
| Question | If $f(x) = \sin 2x$ ; $-\infty < x < \infty$ is ? |
| A | None |
| B | Odd function |
| C | Neither Even nor Odd |
| D | Even function |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **15** |
| Question | If $\boldsymbol{f(x)}$ is even function then fourier integral of $\boldsymbol{f(x)}$ reduces to |
| A | cosine integral |
| B | sine integral |
| C | complex integral |
| D | Even odd integral |
| Answer | A |
| Marks | 1 |
| Unit | 3 |

| **Id** | **16** |
|---|---|
| Question | The inverse Fourier transform of $f(x)$ in the interval$(-\infty,\infty)$ is defined as.. |
| A | $2\int_0^{\infty} f(u)e^{-i\omega u}\,du$ |
| B | $\frac{1}{2\pi}\int_{-\infty}^{\infty} f(\omega)e^{i\omega x}d\omega$ |
| C | $\int_{-\infty}^{\infty} f(u)e^{-i\omega u}du$ |
| D | $2\int_0^{\infty} f(\omega)e^{i\omega x}d\omega$ |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **17** |
| Question | The Fourier transform of the function $f(x) = \begin{cases} -3, & \lvert x \rvert \leq 1 \\ 0, & \lvert x \rvert > 1 \end{cases}$ is $f(\omega) =$….. |
| A | $\frac{sin\omega}{\omega}$ |
| B | $\frac{sin\omega 3}{\omega}$ |
| C | $\boldsymbol{\frac{-3sin\omega}{\omega}}$ |
| D | none of these |
| Answer | C |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **18** |
| Question | The Fourier transform of the function$f(x) = \begin{cases} 1, & -2 \leq x \leq 0 \\ -1, & 0 \leq x \leq 2 \end{cases}$ is $f(\omega) =$….. |
| A | $\frac{cos2\omega - 1}{\omega}$ |
| B | $\frac{1+cos2\omega}{\omega}$ |
| C | $\frac{1+\sin 2\omega}{\omega}$ |
| D | none of these |
| Answer | A |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **19** |
| Question | The Fourier transform of the function $f(x) = \begin{cases} x, & x > 0 \\ 0, & x < 0 \end{cases}$ is $f(\omega) =$..... |
| A | $\frac{1}{\omega}$ |
| B | $\frac{-1}{\omega^2}$ |
| C | $\frac{-1}{\omega}$ |
| D | $\frac{1}{\omega^2}$, |
| Answer | B |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **20** |
| Question | If the Fourier transform of the odd function $f(x) = \begin{cases} 1, & -2 \leq x \leq 0 \\ -1, & 0 \leq x \leq 2 \end{cases}$ is $\frac{cos2\omega-1}{\omega}$ Then using Fourier representation value of $\int_0^\infty \frac{(cos2x-1)sin2x}{x}dx$ is... |
| A | $2\pi$ |
| B | $\frac{-\pi}{2}$ |
| C | $\frac{\pi}{2}$ |
| D | none of these |
| Answer | B |
| Marks | 2 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **21** |
| Question | If the integral equation is $\int_0^\infty f(x) sin\omega x dx = e^{-\omega},\ \omega > 0$ by using Inverse Fourier transform with $F_c(\omega) = e^{-\omega}, \omega > 0$ then the value of $f(x) =$... |
| A | $\frac{2(x+1)}{\pi(x-1)}$ |
| B | $\frac{2x}{(1+x^2)}$ |
| C | $\frac{2x}{\pi(1+x^2)}$ |
| D | None of these |
| Answer | C |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **22** |
| Question | In Fourier cosine integral representation $\int_0^\infty \frac{2cos\omega x}{1+\omega^2}\,d\omega = \begin{cases} 0, & x < 0 \\ \pi e^{-x}, & x > 0 \end{cases}$ such that $F_s(\omega)$ is … |
| A | $\frac{1}{1+\omega^2}$ |
| B | $\frac{\pi}{1+\omega^2}$ |
| C | $\frac{2cos\omega x}{1-\omega^2}$ |
| D | $\frac{2}{1+\omega^2}$ |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **23** |
| Question | The Fourier transform of $f(x) = \begin{cases} sin, & 0 < x < \pi \\ 0, & x < 0 \; or \; x > \pi \end{cases}$ is $f(\boldsymbol{\omega})$=… |
| A | $\int_{0}^{\pi} e^{-i\omega u} sinu \, du$ |
| B | $\int_{-\infty}^{\infty} sinx \; sin\omega x \; dx$ |
| C | $\int_{0}^{\infty} sinu \; sin\omega u \; du$ |
| D | $\int_{0}^{\pi} e^{-i\omega u} sinx \; d\omega$ |
| Answer | A |
| Marks | 1 |
| Unit | 3 |

| Id | 24 |
| --- | --- |
| Question | The Fourier sine transform of the function $f(x)$=$e^{-2x} - e^{-3x}$ is $F_s(\omega)$ |
| A | $\frac{2}{4+\omega^2} + \frac{3}{9+\omega^2}$ |
| B | $\frac{2}{4+\omega^2} - \frac{3}{9+\omega^2}$ |
| C | $\frac{\omega}{4+\omega^2} + \frac{\omega}{9+\omega^2}$ |
| D | $\frac{\omega}{4+\omega^2} - \frac{\omega}{9+\omega^2}$ |
| Answer | D |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **25** |
| Question | The Fourier cosine transform of $f(x) = e^{-x}$ is …. |
| A | $\frac{\omega}{1+\omega^2}$ |
| B | $\frac{\omega}{\omega^2-1}$ |
| C | $\frac{1}{1+\omega^2}$ |
| D | none of these |
| Answer | C |
| Marks | 1 |
| Unit | 3 |

| Id | **26** |
|---|---|
| Question | If $F\{f(x)\} = F(\omega)$ and If $F\{g(x)\} = G(\omega)$ , by parseval's identity $\frac{1}{2\pi}\int_{-\infty}^{\infty} f(\omega)\overline{g(\omega)}d\omega =\ldots$ |
| A | $\int_{0}^{\infty} f(x)\overline{g(x)}dx$ |
| B | $\frac{1}{2\pi}\int_{-\infty}^{\infty} f(x)\overline{g(x)}dx$ |
| C | $\int_{-\infty}^{\infty} f(\omega)\overline{g(\omega)}d\omega$ |
| D | None of these |
| Answer | C |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **27** |
| Question | If $F\{f(x)\} = F(\omega)$ by parseval's identity $\frac{1}{2\pi}\int_{-\infty}^{\infty}[\mathrm{f}(\omega)]^2 \mathrm{d}\omega =$… |
| A | $\frac{1}{\pi}\int_{-\infty}^{\infty}[\mathrm{f}(\mathrm{x})]^2 \mathrm{dx}$ |
| B | $\int_{-\infty}^{\infty}[\mathrm{f}(\mathrm{x})]^2 \mathrm{dx}$ |
| C | $2\pi\int_{0}^{\infty}[\mathrm{f}(\mathrm{x})]^2 \mathrm{dx}$ |
| D | None of the above |
| Answer | **B** |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **28** |
| Question | The Parseval's identity for Fourier cosine transform is …. |
| A | $\frac{2}{\pi}\int_0^\infty F_c(\omega) * G_c(\omega)d\omega = \int_0^\infty f(x) * g(x)dx$ |
| B | $\int_0^\infty F_c(\omega) * G_c(\omega)d\omega = \int_0^\infty f(x) * g(x)dx$ |
| C | $\frac{2}{\pi}\int_{-\infty}^\infty F_c(\omega) * G_c(\omega)d\omega = \int_0^\infty f(x) * g(x)dx$ |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **29** |
| Question | The Parseval's identity for Fourier sine transform is …. |
| A | $\frac{2}{\pi}\int_0^\infty [F_s(\omega)]^2 d\omega = \int_0^\infty [f(x)]^2 dx$ |
| B | $\frac{2}{\pi}\int_{-\infty}^\infty [\mathrm{F_s}(\omega)]^2 \mathrm{d}\omega = \int_0^\infty [\mathrm{f}(\mathrm{x})]^2 \mathrm{dx}$ |
| C | $\int_0^\infty [\mathrm{F_s}(\omega)]^2 \mathrm{d}\omega = \int_0^\infty [\mathrm{f}(\mathrm{x})]^2 \mathrm{dx}$ |
| D | None of the above |
| Answer | A |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **30** |
| Question | If $F(\omega)$ is the Fourier transform of $f(x)$, then the Fourier transform of $f(ax)$ is… |
| A | $F(\frac{\omega}{a})$ |
| B | $\frac{1}{a}F(\omega)$ |
| C | $\frac{1}{a}F(\frac{\omega}{a})$ |
| D | $None\ of\ above$ |
| Answer | $\boldsymbol{C}$ |
| Marks | 1 |
| Unit | 3 |

| Id | 31 |
|---|---|
| Question | The Fourier sine transform of $f(x) = e^{-\|x\|}$ is |
| A | $\frac{\omega}{\omega^2+1}$ |
| B | $\frac{1}{\omega^2+1}$ |
| C | $\frac{\omega}{\omega^2-1}$ |
| D | None of the above |
| Answer | A |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **32** |
| Question | If $F_s(\omega) = \begin{cases} 1, & 0 \le \omega \le 1 \\ 2, & 1 \le \omega \le 2 \\ 0, & \omega > 2 \end{cases}$ then inverse Fourier sine transform of $F_s(\omega) is\ f(x) = \cdots$ |
| A | $\frac{2}{\pi}\left(\frac{cosx+2cosx}{x^2}\right)$ |
| B | $\boldsymbol{\frac{2}{\pi}\left(\frac{1-2cos2x+cosx}{x}\right)}$ |
| C | $\frac{2}{\pi}\left(\frac{sinx-2sin2x}{x}\right)$ |
| D | $\frac{2}{\pi}\left(\frac{\cos x + 2\cos x}{x}\right)$ |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

| Id | **33** |
|---|---|
| Question | If $F_s(\omega) = \begin{cases} 1-\omega, & 0 \le \omega \le 1 \\ 0, & \omega \ge 1 \end{cases}$ then inverse Fourier sine transform of $F_s(\omega) is\ f(x) = \cdots$ |
| A | $\frac{2}{\pi}\left(\frac{x + cosx}{x^2}\right)$ |
| B | $\frac{2}{\pi}\left(\frac{x - sinx}{x^2}\right)$ |
| C | $\frac{2}{\pi}\left(\frac{x + sinx}{x^2}\right)$ |
| D | $\frac{2}{\pi}\left(\frac{1 - \cos x}{x^2}\right)$ |
| Answer | **B** |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **34** |
| Question | If Fourier cosine transform of $f(x)$ is $F_c(\omega) = e^{-\omega}, \omega > 0$ then inverse Fourier cosine transform of $F_c(\omega)\ is\ f(x) =$ |
| A | $e^{-\omega} cosx$ |
| B | $\frac{2x}{(1+x^2)}$ |
| C | $\frac{\mathbf{2}}{\boldsymbol{\pi}(\mathbf{1}+\boldsymbol{x}^{\mathbf{2}})}$ |
| D | None of these |
| Answer | C |
| Marks | 1 |
| Unit | 3 |

| | |
|---|---|
| **Id** | **35** |
| Question | The Fourier transform of the function $f(x) = \begin{cases} x, & x > 0 \\ 0, & x < 0 \end{cases}$ is $f(\omega) =$..... |
| A | $\frac{1}{\omega}$ |
| B | $\frac{-1}{\omega^2}$ |
| C | $\frac{-1}{\omega}$ |
| D | $\frac{1}{\omega^2}$ |
| Answer | B |
| Marks | 1 |
| Unit | 3 |

# Unit 01 Laplace Transform

| | |
|---|---|
| **Id** | **36** |
| Question | The Laplace transform of the function $\frac{\sin 2t}{t}$ is ------------- |
| A | $\tan^{-1} s$ |
| B | $\cot^{-1} \frac{s}{2}$ |
| C | $\tan^{-1} \frac{s}{2}$ |
| D | $\cot^{-1} s$ |
| Answer | B |
| Marks | 2 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **37** |
| Question | The Laplace transform of the function $e^{3t}+\sin 4t$ is ------------- |
| A | $\frac{12s}{(s^2+16)}$ |
| B | $\frac{s^2}{(s-3)(s^2+16)}$ |
| C | $\frac{s^2+4s-8}{(s-3)(s^2+4)}$ |
| D | $\frac{s^2+4s}{(s+3)(s^2+4)}$ |
| Answer | C |
| Marks | 2 |
| Unit | 1 |

| Id | **38** |
|---|---|
| Question | *If* is a function of t(t > 0) then Laplace transform of function f(t) is |
| A | $\int_0^\infty e^{-st} f(t)\,\mathrm{dt}$ |
| B | $\int_0^\infty e^{-st} t^{n-1} dt$ |
| C | $\int_0^1 e^{-st} f(t) dt$ |
| D | $\int_0^1 e^{-t} f(t) dt$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **39** |
| Question | $If\ \mathrm{f(t)=1\ then\ L[f(t)]=------}$ |
| A | 1 |
| B | $\frac{1}{s}$ |
| C | 0 |
| D | $\infty$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **40** |
| Question | *If* f(t) = cos2t then Laplace transform of f(t) is - - - - |
| A | $\frac{s}{s^2+4}$ |
| B | $\frac{s}{s^2+4}$ |
| C | $\frac{s}{s^2-4}$ |
| D | $\frac{2}{s^2-4}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **41** |
| Question | *If* $f(t) = e^{-3t}$ then $L[f(t)] = ----$ |
| A | $\frac{1}{s} \quad s > 0$ |
| B | $\frac{1}{s+3}$ |
| C | $\frac{s}{s+3}$ |
| D | $\frac{3}{s+3}$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **42** |
| Question | $If\ \mathrm{f(t) = t^3}\ \ \text{then } \mathrm{L}\left[\mathrm{f(t)}\right] = ----$ |
| A | $\frac{2}{s^4}$ |
| B | $\frac{1}{s^2}$ |
| C | $\frac{1}{s^4}$ |
| D | $\frac{6}{s^4}$ |
| Answer | D |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **43** |
| Question | *The* Laplace transform of $t^{-\frac{1}{2}}$ is |
| A | $\frac{1}{\sqrt{s}}$ |
| B | $\frac{\pi}{s}$ |
| C | $\frac{1}{s}$ |
| D | $\sqrt{\frac{\pi}{s}}$ |
| Answer | D |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **44** |
| Question | $If\ \mathrm{L}[\mathrm{f(t)}]= f(s)$ then $\mathrm{L}[\mathrm{tf(t)}]= ----$ |
| A | $\int_0^\infty f(s)ds$ |
| B | $\frac{d}{ds}[f(s)]$ |
| C | $-\frac{d}{ds}[f(s)]$ |
| D | $\int_0^1 f(s)ds$ |
| Answer | C |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **45** |
| Question | $If\ \mathrm{L}\left[\mathrm{f(t)}\right]= f(s)$ then $\mathrm{L}\left[\mathrm{f}^{'}(t)\right]= ----$ |
| A | $sf(s)$ |
| B | $sf(s)- f(0)$ |
| C | $f(s)- f(0)$ |
| D | $f(s)- f(0)$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| Id | 46 |
|---|---|
| Question | *The* Laplace transform of $e^{-5t}$ is |
| A | $\frac{1}{s+5}$ |
| B | $\frac{1}{s-5}$ |
| C | $\frac{-1}{s+5}$ |
| D | $\frac{1}{2s+5}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **47** |
| Question | $If\ \mathrm{L}\left[\mathrm{f(t)}\right]= f(s)$ then $\mathrm{L}\left[\mathrm{f(t)u(t-a)}\right]=----$ |
| A | $L\left[f(t+a)\right]$ |
| B | $e^{-as}L\left[f(t+a)\right]$ |
| C | $L\left[f(t-a)\right]$ |
| D | $e^{as}L\left[f(t+a)\right]$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **48** |
| Question | *If* $L[f(t)] = f(s)$ then $L[f(t)\delta(t - a)]$ is --- |
| A | $e^{-as} f(a)$ |
| B | $e^{-as} f(s)$ |
| C | $e^{-as} f(t)$ |
| D | $e^{-as} f(t+a)$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| Id | **49** |
|---|---|
| Question | $If\ \mathrm{f(t) = sinht\ then\ L}\left[\mathrm{f(t)}\right] = ---$ |
| A | $\frac{1}{s^2-1}\ \ \mathrm{s>1}$ |
| B | $\frac{1}{s^2+1}$ |
| C | $\frac{s}{s^2-1}\ \ \mathrm{s>1}$ |
| D | $\frac{s}{s^2+1}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **50** |
| Question | The Laplace transform of the function $\frac{\sin 2t}{t}$ is ------------- |
| A | $\tan^{-1} s$ |
| B | $\cot^{-1} \frac{s}{2}$ |
| C | $\tan^{-1} \frac{s}{2}$ |
| D | $\cot^{-1} s$ |
| Answer | B |
| Marks | 2 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **51** |
| Question | The Laplace transform of the function<br>$e^{3t} + \sin 4t$ is ------------- |
| A | $\frac{12s}{(s^2+16)}$ |
| B | $\frac{s^2}{(s-3)(s^2+16)}$ |
| C | $\frac{s^2+4s-8}{(s-3)(s^2+4)}$ |
| D | $\frac{s^2+4s}{(s+3)(s^2+4)}$ |
| Answer | C |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **52** |
| Question | The Laplace transform of $\sin^3 t$ is ---------- |
| A | $\frac{3}{4}\left[\frac{1}{(s^2+1)(s^2+9)}\right]$ |
| B | $\frac{3}{s^2+1}$ |
| C | $\frac{6}{(s^2+1)(s^2+9)}$ |
| D | $\frac{3}{s^2+9}$ |
| Answer | C |
| Marks | 2 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **53** |
| Question | The Laplace transform of the function f(t)= $5e^{-\frac{t}{2}}+7\sin\frac{t}{2}$ |
| A | $\frac{1}{2s+1}+\frac{1}{4s^2+1}$ |
| B | $\frac{5}{s+1}+\frac{7}{s^2+1}$ |
| C | $\frac{5}{2s+1}+\frac{7}{4s^2+1}$ |
| D | $\frac{10}{2s+1}+\frac{14}{4s^2+1}$ |
| Answer | D |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **54** |
| Question | The Laplace transform of $\frac{e^{-at}\sin bt}{t}$ is -------------- |
| A | $\cot^{-1}\frac{s+a}{b}$ |
| B | $\cot^{-1}\frac{s-b}{a}$ |
| C | $\frac{1}{a}\tan^{-1}\frac{s}{b}$ |
| D | $\frac{1}{b}\tan^{-1}\frac{s}{a}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **55** |
| Question | The Laplace transform of $t\cosh at$ is------------ |
| A | $\frac{s^2-a^2}{(s^2+a^2)^2}$ |
| B | $\frac{s^2+a^2}{(s^2-a^2)^2}$ |
| C | $\frac{s+a}{(s^2+a^2)^2}$ |
| D | $\frac{s-a}{s^2+a^2}$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **56** |
| Question | If Laplace transform of $\left[\frac{e^{-at}-e^{-bt}}{t}\right] is \log\left(\frac{s+b}{s+a}\right) then \int_0^\infty \frac{e^{-at}-e^{-bt}}{t} dt is equal to$ |
| A | $\log a+\log b$ |
| B | $\log a-\log b$ |
| C | $\log\frac{a}{b}$ |
| D | $\frac{1}{s}\log\frac{s+b}{s+a}$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **57** |
| Question | By Laplace transform the value of $\int_0^\infty e^{-t} \sin t dt$ |
| A | 1 |
| B | $\frac{1}{2}$ |
| C | 0 |
| D | 2 |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| Id | **58** |
|---|---|
| Question | The Laplace transform of $f(t)=(t-\pi)u(t-\pi) is$ |
| A | $e^{-\pi s}\sin\pi$ |
| B | $\frac{e^{-2(s+3)}}{s+3}$ |
| C | $\frac{e^{-2s}}{s-1}$ |
| D | $\frac{e^{-\pi s}}{s^2}$ |
| Answer | D |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **59** |
| Question | The Laplace transform of $f(t) = \sin t.\delta(t-\pi) is$ |
| A | 0 |
| B | $\pi$ |
| C | $\frac{e^{-2s}}{s-1}$ |
| D | $\frac{e^{-\pi s}}{s^2}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| Id | **60** |
|---|---|
| Question | If $L[J_0(t)] = \frac{1}{\sqrt{s^2+1}}$ *then the value of* $\int_0^\infty J_0(t)$ dt is |
| A | 0 |
| B | $\pi$ |
| C | 1 |
| D | $\frac{e^{-\pi s}}{s^2}$ |
| Answer | C |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **61** |
| Question | The Laplace transform of $\int_0^t \sin 3t \, dt$ is |
| A | $\frac{3}{s(s^2+9)}$ |
| B | $\frac{3}{s^2+9}$ |
| C | $\frac{1}{s}+\frac{1}{s^2+9}$ |
| D | $\frac{1}{s}-\frac{1}{s^2-9}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **62** |
| Question | *The* Laplace transform of cos2tcos4t is ---------- |
| A | $\frac{20}{(s^2+36)(s^2+4)}$ |
| B | $\frac{s(s^2+20)}{(s^2+4)(s^2+36)}$ |
| C | $\frac{s}{(s^2+4)(s^2+36)}$ |
| D | $\frac{s^2+20}{(s^2+4)(s^2+36)}$ |
| Answer | B |
| Marks | 2 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **63** |
| Question | *The* Laplace transform of function $f(t) = te^{-4t} \sin 3t$ is |
| A | $\frac{6s}{(s^2+9)^2}$ |
| B | $\frac{6(s+4)}{[(s+4)^2+9]^2}$ |
| C | $\frac{s^2+2s+9}{(s^2+9)^2}$ |
| D | $\frac{s-9}{(s^2+9)^2}$ |
| Answer | B |
| Marks | 2 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **64** |
| Question | *The* Laplace transform of $\mathrm{f(t)} = \mathrm{e}^{\mathrm{t-2}}.u(t-2)$ is ----- |
| A | $\frac{2e^{-s}}{s^3}$ |
| B | $\frac{e^{-2(s+3)}}{s+3}$ |
| C | $\frac{e^{-2s}}{s-1}$ |
| D | $\frac{2e^{-(s+1)}}{s^2}$ |
| Answer | C |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **65** |
| Question | *The* Laplace transform of $t^3 e^{2t}$ is ----- |
| A | $\frac{6}{s^4}$ |
| B | $\frac{6}{(s-2)^4}$ |
| C | $\frac{6}{(s+2)^4}$ |
| D | $\frac{1}{(s+2)^4}$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **66** |
| Question | *The* Laplace transform of $(e^{2t} - \cos 3t)$ is ------ |
| A | $\frac{s}{(s+2)(s^2+9}$ |
| B | $\frac{2s+9}{(s-2)(s^2+9)}$ |
| C | $\frac{2s^2-2s+9}{(s+2)(s^2+9)}$ |
| D | $\frac{1}{(s-2)(s^2+9)}$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **67** |
| Question | The Laplace transform of $\frac{f(t)}{t^2}$ |
| A | $\frac{1}{s^2} f(s)$ |
| B | $(-1)^2 \frac{d^2}{ds^2} f(s)$ |
| C | $\int_0^\infty \int_0^\infty f(s)\, \mathrm{ds}\, \mathrm{ds}$ |
| D | $\frac{d}{ds}[f(s)]^2$ |
| Answer | C |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **68** |
| Question | *The* Laplace transform of $\int_0^\infty e^{-2t} t \cos t \, dt$ is ----- |
| A | $\frac{3}{25}$ |
| B | $\frac{1}{s}\left[\frac{s^2-1}{(s^2+1)^2}\right]$ |
| C | $\frac{s+2}{(s^2+1)^2}$ |
| D | $\frac{6}{25}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **69** |
| Question | Laplace Transform of $H(t-a) =$ |
| A | $\frac{e^{-as}}{a}$ |
| B | $\frac{e^{s}}{a}$ |
| C | $\frac{e^{as}}{s}$ |
| D | $\frac{e^{-2as}}{a}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **70** |
| Question | By Convolution Theorem $L^{-1}\{f(s) * g(s)\} =$ |
| A | $\int_0^t f(u).g(t-u)du$ |
| B | $\int_0^\infty f(u).g(t-u)du$ |
| C | $\int_a^b f(u).g(t-u)du$ |
| D | None of the above |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

# Unit 03 Inverse Laplace Transform

| | |
|---|---|
| **Id** | **71** |
| Question | If $L^{-1}\left\{\overline{f}(s)\right\} = f(t)$ , then $L^{-1}\left\{\overline{f}(s+a)\right\}$ is equal to |
| A | $e^{at} f(t)$ |
| B | $e^{-at} f(t)$ |
| C | $-t\ f(t)$ |
| D | None of these |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **72** |
| Question | If $L^{-1}\left\{\overline{f}(s)\right\} = f(t)$, then $L^{-1}\left\{e^{-as}\overline{f}(s)\right\}$ is equal to |
| A | $F(t) = f(t+a)\ ,\ t < a$<br>$= 0\ ,\ t > a$ |
| B | $e^{-at} f(t)$ |
| C | $F(t) = f(t-a)\ ,\ t > a$<br>$= 0\ ,\ t < a$ |
| D | $-t\ f(t)$ |
| Answer | C |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **73** |
| Question | If $L^{-1}\left\{\overline{f}(s)\right\} = f(t)$, then $L^{-1}\left\{\frac{d}{ds}\overline{f}(s)\right\}$ is equal to |
| A | $e^{-at} f(t)$ |
| B | $-t\, f(t)$ |
| C | $t\, f(t)$ |
| D | $e^{at} f(t)$ |
| Answer | B |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **74** |
| Question | $L^{-1}\left\{\overline{f}(s)\right\} = f(t)$, then $L^{-1}\int_{s}^{\infty}\overline{f}(s)\,ds$ is equal to |
| A | $\frac{d}{dt}f(t)$ |
| B | $-t\,f(t)$ |
| C | $\int_{0}^{t} f(t)\,dt$ |
| D | $\frac{1}{t}f(t)$ |
| Answer | D |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **75** |
| Question | $L^{-1}\left\{\frac{1}{(s+a)^2}\right\}$ is |
| A | $te^{-at}$ |
| B | $te^{at}$ |
| C | $t^2e^{-at}$ |
| D | $-te^{-at}$ |
| Answer | A |
| Marks | 1 |
| Unit | 1 |

| | |
|---|---|
| **Id** | **76** |
| Question | $L^{-1}\left\{\frac{1}{s\left(s^2+1\right)}\right\}$ is equal to |
| A | $1+\cos t$ |
| B | $2-\cos t$ |
| C | $1-\cos t$ |
| D | $1-\sin t$ |
| Answer | C |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **77** |
| Question | $L^{-1}\left\{\frac{e^{-4s}}{s^3}\right\}$ is equal to |
| A | $(t+4)^2 u(t+4)$ |
| B | $(t-4)^2 u(t-4)$ |
| C | $\frac{(t+4)^2}{2} u(t+4)$ |
| D | $\frac{(t-4)^2}{2} u(t-4)$ |
| Answer | D |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **78** |
| Question | $L^{-1}\{1\}$ is equal to |
| A | $\delta(t)$ |
| B | $u(t)$ |
| C | $\delta(t-1)$ |
| D | $u(t-1)$ |
| Answer | A |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **79** |
| Question | If $L^{-1}\left\{\overline{f}(s)\right\} = f(t)$ and $L^{-1}\left\{\overline{g}(s)\right\} = g(t)$ then $L^{-1}\left\{\overline{f}(s) * \overline{g}(s)\right\} =$ -------- |
| A | $\int_0^t f(u)\ g(t-u)du$ |
| B | $\int_0^\infty f(u)\ g(t-u)du$ |
| C | $\int_0^\infty f(u)\ g(u-t)dt$ |
| D | $\int_0^\infty f(u)\ g(u)du$ |
| Answer | A |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **80** |
| Question | $L^{-1}\left\{\frac{1}{(s-2)^2}\right\}$ is equal to |
| A | $te^{2t}$ |
| B | $te^{-2t}$ |
| C | $te^{-t}$ |
| D | $te^{t}$ |
| Answer | A |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **81** |
| Question | $L^{-1}\left\{\frac{1}{s^2+4s+13}\right\}$ is equal to |
| A | $\frac{1}{3}e^{2t}\sin 3t$ |
| B | $e^{-2t}\sin 3t$ |
| C | $\frac{1}{3}e^{-2t}\sin 3t$ |
| D | None of these |
| Answer | C |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **82** |
| Question | $L^{-1}\left\{\frac{1}{s^n}\right\}$ is possible only if n is |
| A | 0 |
| B | - ve integer |
| C | + ve integer |
| D | odd number |
| Answer | C |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **83** |
| Question | $L^{-1}\left\{\frac{1}{\sqrt{S+3}}\right\}$ is equal to |
| A | $\frac{e^{-3t}}{\sqrt{\pi t}}$ |
| B | $\frac{e^{3t}}{\sqrt{\pi t}}$ |
| C | $\frac{e^{-3t}}{\pi t}$ |
| D | None of these |
| Answer | A |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **84** |
| Question | $L^{-1}\left\{\frac{1}{s^7}\right\}$ is equal to |
| A | $\frac{t^6}{6!}$ |
| B | $\frac{t^{-6}}{6!}$ |
| C | $\frac{t^{-6}}{7!}$ |
| D | None of these |
| Answer | A |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **85** |
| Question | $L^{-1}\left\{\frac{1}{s^{\frac{3}{2}}}\right\} =$ --------- |
| A | $\frac{2t^{\frac{3}{2}}}{\sqrt{\pi}}$ |
| B | $\frac{2t^{\frac{1}{2}}}{\pi}$ |
| C | $2\sqrt{\frac{t}{\pi}}$ |
| D | None of these |
| Answer | C |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **86** |
| Question | $L^{-1}\left\{\frac{1}{(s-1)^5}\right\}$ is equal to |
| A | $\frac{e^{-t}t^4}{3!}$ |
| B | $\frac{e^{t}t^4}{4!}$ |
| C | $\frac{e^{-t}t^5}{4!}$ |
| D | None of these |
| Answer | B |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **87** |
| Question | $L^{-1}\left\{\dfrac{e^{-s}}{(s+1)^2}\right\}$ is equal to |
| A | $f(t)=(t-2)e^{-(t-1)},\ t\ge 1$<br>$=0\ ,t<1$ |
| B | $f(t)=(t-1)e^{-(t-1)},\ t\ge 1$<br>$=0\ ,t<1$ |
| C | $f(t)=(t+1)e^{-(t-1)},\ t\ge 1$<br>$=0\ ,t<1$ |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **88** |
| Question | $L^{-1}\left\{\frac{1}{s^2-16}\right\}$ is equal to |
| A | $\frac{1}{4}\sinh 4t$ |
| B | $\frac{1}{4}\cosh at$ |
| C | $\frac{1}{3}\sin 2t$ |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **89** |
| Question | $L^{-1}\left\{\frac{s}{s^2-49}\right\}$ is equal to |
| A | $\sin 7t$ |
| B | $\cos 7t$ |
| C | $\sinh 7t$ |
| D | None |
| Answer | D |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **90** |
| Question | $L^{-1}\left\{\dfrac{s}{\left(s^2+a^2\right)^2}\right\}$ is equal to |
| A | $\dfrac{1}{2}t\sin at$ |
| B | $\dfrac{1}{2a}t\cos at$ |
| C | $\dfrac{1}{2a}t\sin at$ |
| D | None |
| Answer | C |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **91** |
| Question | $L^{-1}\left\{\frac{s^2-3s+4}{s^3}\right\}$ is equal to |
| A | $1+3t+2t^2$ |
| B | $1-3t+2t^2$ |
| C | $2-3t+2t^2$ |
| D | None |
| Answer | B |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **92** |
| Question | $L^{-1}\left\{\frac{3s+4}{s^2+9}\right\}$ is equal to |
| A | $3\sin 3t+\frac{4}{3}\cos 3t$ |
| B | $3\cos 3t+\frac{4}{3}\sin 3t$ |
| C | $\cos 3t-\frac{4}{3}\sin 3t$ |
| D | none |
| Answer | B |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **93** |
| Question | $L^{-1}\left\{\frac{s+1}{s^{\frac{4}{3}}}\right\}$ is equal to |
| A | $\frac{t^{\frac{1}{3}}+t^{\frac{4}{3}}}{\Gamma\frac{1}{3}}$ |
| B | $\frac{t^{\frac{2}{3}}+t^{\frac{-1}{3}}}{\Gamma\frac{1}{3}}$ |
| C | $\frac{t^{\frac{-2}{3}}+3t^{\frac{1}{3}}}{\Gamma\frac{1}{3}}$ |
| D | None |
| Answer | C |
| Marks | 2 |
| Unit | 2 |

| Id | **94** |
|---|---|
| Question | $L^{-1}\left\{\frac{2s-5}{s^2-4}\right\}$ is equal to |
| A | $2\cosh 4t - \frac{5}{2}\sinh 2t$ |
| B | $2\cosh 2t - \frac{5}{2}\sinh 2t$ |
| C | $2\cos 2t - \frac{5}{4}\sinh 4t$ |
| D | None of these |
| Answer | B |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **95** |
| Question | $L^{-1}\left\{\frac{s}{(s-2)^4}\right\}$ is equal to |
| A | $e^{2t}\frac{t^2}{2}+\frac{1}{3}e^{2t}t^3$ |
| B | $e^{2t}\frac{t^2}{3}+\frac{1}{6}e^{2t}t^4$ |
| C | $e^{2t}\frac{t^2}{2}+\frac{1}{3}e^{-2t}t^3$ |
| D | None |
| Answer | A |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **96** |
| Question | $L^{-1}\left\{\tan^{-1} s\right\}$ is equal to |
| A | $\frac{\sin t}{t}$ |
| B | $\frac{\cos t}{t}$ |
| C | $\frac{-\sin t}{t}$ |
| D | None |
| Answer | C |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **97** |
| Question | $L^{-1}\left\{\frac{1}{(s+3)^5}\right\}$ is equal to |
| A | $e^{3t}\,\frac{t^4}{24}$ |
| B | $e^{-3t}\,\frac{t^5}{5\,!}$ |
| C | $e^{-3t}\,\frac{t^4}{24}$ |
| D | None |
| Answer | C |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **98** |
| Question | $L^{-1}\left\{\log\dfrac{s-3}{s-2}\right\}$ is equal to |
| A | $\dfrac{e^{3t}+e^{2t}}{t}$ |
| B | $\dfrac{e^{-2t}-e^{-3t}}{t}$ |
| C | $\dfrac{e^{2t}-e^{3t}}{t}$ |
| D | $\dfrac{e^{-2t}+e^{-3t}}{t}$ |
| Answer | C |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **99** |
| Question | $L^{-1}\left\{\dfrac{s^2}{s^3\left(S^2+16\right)}\right\}$ is equal to |
| A | $\frac{1}{16}\left(1+\cos 4t\right)$ |
| B | $\frac{1}{4}\left(1-\cos 4t\right)$ |
| C | $\frac{1}{16}\left(1+\sin 4t\right)$ |
| D | $\frac{1}{16}\left(1-\cos 4t\right)$ |
| Answer | D |
| Marks | 2 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **100** |
| Question | $L^{-1}\left\{\log\frac{s+b}{s+a}\right\}$ is equal to |
| A | $\frac{e^{at}-e^{bt}}{t}$ |
| B | $\frac{e^{-at}-e^{-bt}}{t}$ |
| C | $\frac{e^{-bt}-e^{-at}}{t}$ |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **101** |
| Question | $L^{-1}\left\{\frac{s}{s^2+2}\right\}$ is equal to |
| A | $\cosh\sqrt{2}t$ |
| B | $s\,in\sqrt{2}t$ |
| C | $\cos\sqrt{2}t$ |
| D | None |
| Answer | C |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **102** |
| Question | If $L^{-1}\left\{\overline{f}(s)\right\} = f(t)$ then $L^{-1}\left\{\frac{\overline{f}(s)}{s}\right\}$ is |
| A | $\int_0^\infty f(t)dt$ |
| B | $\int_0^t f(t)dt$ |
| C | $\int_0^t\int_0^t f(t)(dt)^2$ |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **103** |
| Question | $L^{-1}\left\{\frac{e^{-as}}{s^2}\right\}$ is equal to |
| A | $f(t)=(t-a)$ , $t \geq a$ <br> $=0$ , $t<a$ |
| B | $f(t)=(t-a)$ , $t<a$ <br> $=0$ , $t \geq a$ |
| C | $f(t)=(t+a)$ , $t \geq a$ <br> $=0$ , $t<a$ |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **104** |
| Question | $L^{-1}\left\{\frac{1}{(s+a)^n}\right\}$ is equal to |
| A | $e^{at}\frac{t^{n-1}}{(n-1)!}$ |
| B | $e^{-at}\frac{t^{n+1}}{(n+1)!}$ |
| C | $e^{-at}\frac{t^{n-1}}{(n-1)!}$ |
| D | None |
| Answer | C |
| Marks | 1 |
| Unit | 2 |

| | |
|---|---|
| **Id** | **105** |
| Question | $L^{-1}\left\{\overline{f}(ks)\right\}$ is equal to |
| A | $f\left(\frac{t}{k}\right)$ |
| B | $\frac{1}{k}f\left(\frac{t}{k}\right)$ |
| C | $\frac{1}{2k}f\left(\frac{t}{k}\right)$ |
| D | $f\left(\frac{k}{t}\right)$ |
| Answer | B |
| Marks | 1 |
| Unit | 2 |

# Unit 04 Partial Differential Equations

| | |
|---|---|
| **Id** | **106** |
| Question | The solution of $\frac{\partial^2 z}{\partial y^2} = \sin(xy)$ is |
| A | $-\frac{sin(\,xy)}{x^2} + yf(x) + g(x)$ |
| B | $-\frac{sin(xy)}{x^2} + xf(x) + g(y)$ |
| C | $-\frac{sin(xy)}{x^2} + xf(y) + g(y)$ |
| D | None of the above |
| Answer | A |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **107** |
| Question | The first integral of the linear partial differential equation $y^2p - xyq = x(z-2y), with \frac{dx}{y^2} = \frac{dx}{-xy} = \frac{dx}{x(z-2y)}$ is |
| A | $x^2 - y^2 = c_1$ |
| B | $x^2 + y^2 = c_1$ |
| C | $x^3 + y^3 = c_1$ |
| D | None of the above |
| Answer | B |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **108** |
| Question | First order partial differential equation is obtained by eliminating an arbitrary constant |
| A | In the solution if the number of arbitrary constants is less than the number of independent variables. |
| B | In the solution, if the number of an arbitrary constants is equal to the number of independent variables. |
| C | In the solution if the number of arbitrary constants is greater than the number of independent variables. |
| D | None of the above |
| Answer | B |
| Marks | 1 |
| Unit | 4 |

| Id | **109** |
|---|---|
| Question | A partial differential equation requires |
| A | exactly one independent variable |
| B | more than one dependent variable |
| C | two or more independent variables |
| D | None of the above |
| Answer | C |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **110** |
| Question | The solution of partial differential equation $px + py = z$is |
| A | $\phi(x^2, y^2) = 0$ |
| B | $\phi(xy, yz) = 0$ |
| C | $\phi\left(\frac{x}{y}, \frac{y}{z}\right) = 0$ |
| D | None of the above |
| Answer | C |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **111** |
| Question | The solution of $p + q = z$ is |
| A | f(x-y, y-logz)=0 |
| B | f(xy, ylogz)=0 |
| C | f(x+y, y+logz)=0 |
| D | None of the above |
| Answer | A |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **112** |
| Question | The solution of $\frac{\partial^3 z}{\partial x^3} = 0$ is |
| A | $k$z=(1+x+x$^2$)$f(y)$ |
| B | z=(1+y+y$^2$)$f(x)$ |
| C | z=f$_1(y)$+xf$_2(y)$+x$^2 f_3(y)$ |
| D | None of the above |
| Answer | C |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **113** |
| Question | From the given solution, if the number of arbitrary functions are n to be eliminated, then |
| A | The $(n+1)^{th}$ order partial differential equations is obtained. |
| B | The $(n-2)^{th}$ order partial differential equations is obtained. |
| C | The $n^{th}$ order partial differential equations is obtained. |
| D | None of the above |
| Answer | C |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **114** |
| Question | If $\frac{\partial^2 u}{\partial x^2} = x + y$ then u = ………. |
| A | $\frac{y^3}{6} + \frac{yx^2}{2} + xf(y) + g(y)$ |
| B | $\frac{x^3}{6} + \frac{yx^2}{2} + xf(y) + g(y)$ |
| C | $\frac{y^3}{6} - \frac{yx^2}{2} - xf(y) + g(y)$ |
| D | None of the above |
| Answer | B |
| Marks | 2 |
| Unit | 4 |

| Id | **115** |
|---|---|
| Question | The solution of two-dimensional heat flow equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ $u(x, y) = 0$ as x $\rightarrow \infty$ is |
| A | u(x,t) $= (c_1 \, cosh \, m\, x + c_2 \, sinh \, m\, x)e^{-c^2 m^2 y}$ |
| B | u(x,y) $= (c_1 e^{px} + c_2 e^{-px})(c_3 \cos m\, cy + c_4 \sin m\, cy)$ |
| C | u(x,t) $= (c_1 \cos m\, x + c_2 \sin m\, x)(c_3 e^{py} + c_4 e^{-py})$ |
| D | None of the above |
| Answer | B |
| Marks | 1 |
| Unit | 4 |

| Id | **116** |
| --- | --- |
| Question | The order and degree of the equation $\frac{\partial^2 z}{\partial x^2}+2xy\left(\frac{\partial z}{\partial x}\right)^2+\left(\frac{\partial z}{\partial y}\right)=5$ is |
| A | Order = 2 and degree = 1 |
| B | Order = 1 and degree = 2 |
| C | Order = 1 and degree = 1 |
| D | Order = 2 and degree = 2 |
| Answer | A |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **117** |
| Question | The partial differential equation formed by eliminating arbitrary constants from the equation $z = ax^3 + by^3$ is |
| A | z = px+qy |
| B | 3z = px-qy |
| C | 3z = px+qy |
| D | z = px-qy |
| Answer | C |
| Marks | 2 |
| Unit | 4 |

| Id | **118** |
|---|---|
| Question | The first integral of the linear partial differential equation $y^2 p - xyq = x(z-2y), with \ \frac{dx}{y^2} = \frac{dx}{-xy} = \frac{dx}{x(z-2y)}$ is |
| A | $\mathrm{x}^2 - y^2 = c_1$ |
| B | $\mathrm{x}^2 + y^2 = c_1$ |
| C | $\mathrm{x}^3 + y^3 = c_1$ |
| D | $\mathrm{x}^2 = c_1$ |
| Answer | B |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **119** |
| Question | The partial differential equation formed by eliminating arbitrary constants from the equation $z^2 = (x-a)^2 + (y-b)^2$ is |
| A | $p^2 - q^2 = 1$ |
| B | $p^2z - q^2z = 1$ |
| C | $p^2z + q^2z = 1$ |
| D | $p^2 + q^2 = 1$ |
| Answer | D |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **120** |
| Question | The partial differential equation formed by eliminating arbitrary functions from the equation $z = \phi(x^2y^2)$ is |
| A | px-qy = 1 |
| B | px+qy = 0 |
| C | px+qy = 1 |
| D | px-qy = 0 |
| Answer | D |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **121** |
| Question | The partial differential equation formed by eliminating arbitrary functions from the equation $z = f(x^2-y^2)$ is |
| A | py-qx = 1 |
| B | py+qx = 0 |
| C | py+qx = 1 |
| D | px-qy = 0 |
| Answer | B |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **122** |
| Question | The solution of the partial differential equation $2p+3q = 1$ is |
| A | $\phi(3x-2y,y-3z)=0$ |
| B | $\phi(x+y,y-3z)=0$ |
| C | $\phi(x-y,y-z)=0$ |
| D | $\phi(3x+2y,y+3z)=0$ |
| Answer | A |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **123** |
| Question | Using substitution, which of the following equations are solutions to the partial differential equation $\frac{\partial^2 u}{\partial x^2} = 9\frac{\partial^2 u}{\partial y^2}$ |
| A | cos(3x-y) |
| B | $x^2 + y^2$ |
| C | sin(3x-3y) |
| D | $e^{-3\pi x}\sin(\pi y)$ |
| Answer | D |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **124** |
| Question | The standard form of Lagrange's first order linear partial differential equation is |
| A | Pp-Qq=R, Where P,Q,R are functions of x,y,z |
| B | Pp+Qq=0, Where P,Q are functions of x,y,z |
| C | p-q=0, Where p,q are functions of x,y,z |
| D | Pp+Qq=R, Where P,Q,R are functions of x,y,z |
| Answer | D |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **125** |
| Question | The partial differential equation by eliminating *a* & *b* from the relation $Z = (x^2 + a)\ (y^2 + b)$ is |
| A | $z_x z_y = xyz$ |
| B | $z_{xy} = xyz$ |
| C | $z_{xy} = 4xyz$ |
| D | $z_x z_y = 4xyz$ |
| Answer | D |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **126** |
| Question | From the given solution, if the number of arbitrary functions are n to be eliminated, then |
| A | The $(n+1)^{th}$ order partial differential equations is obtained. |
| B | The $(n-1)^{th}$ order partial differential equations is obtained. |
| C | The $(n-2)^{th}$ order partial differential equations is obtained. |
| D | The $n^{th}$ order partial differential equations is obtained. |
| Answer | D |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **127** |
| Question | The solution of partial differential equation $\log\left[\dfrac{\partial^2 z}{\partial x \partial y}\right] = x + y$ with $\dfrac{\partial z}{\partial y} = e^y.e^x + f(y)$ is |
| A | $z = e^{x-y} + g(y) - \phi(x),$ where g(y)= $\int f(y)dy$ |
| B | $z = e^{x+y} + g(y).\phi(x),$ where g(y)= $\int f(y)dy$ |
| C | $z = e^{x+y} + g(y) + \phi(x),$ where g(y)= $\int f(y)dy$ |
| D | $z = e^{x+y} - g(y) - \phi(x),$ where g(y)= $\int f(y)dy$ |
| Answer | C |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **128** |
| Question | The auxiliary equation of the equation $(y - z)p + (z - x)q = (x - y)$ is |
| A | $\frac{dx}{z-x} = \frac{dy}{y-x} = \frac{dz}{x-y}$ |
| B | $\frac{dx}{y-z} = \frac{dy}{z-x} = \frac{dz}{x-y}$ |
| C | $\frac{dx}{z-x} = \frac{dy}{x-y} = \frac{dz}{y-x}$ |
| D | None of these |
| Answer | B |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **129** |
| Question | The solution of one-dimensional heat flow equation $\frac{\partial u}{\partial t} = C^2 \frac{\partial^2 u}{\partial x^2}$ is |
| A | u(x,t)=$(c_1 \cos mx + c_2 \sin mx)e^{-c^2 m^2 t}$ |
| B | u(x,t)=$(c_1 \cos mx + c_2 \sin mx)(c_3 \cos mct + c_4 \sin mct)$ |
| C | u(x,t)=$(c_1 \cosh mx + c_2 \sinh mx)e^{-c^2 m^2 t}$ |
| D | u(x,t)=$(c_1 e^{px} + c_2 e^{-px})(c_3 \cos pt + c_4 \sin pt)$ |
| Answer | A |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **130** |
| Question | If z=f(x, y, a, b) then the P.D.E formed by eliminating the arbitrary constants a and b is of |
| A | second order |
| B | third order |
| C | first order |
| D | forth order |
| Answer | C |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **131** |
| Question | A general solution of $u_{xy} = 0$ is of the form |
| A | u = f(y)+$\phi$(x) |
| B | u = $\int f(y)$ dy+$\phi$(x) |
| C | u = $\int f(y)dy$ |
| D | None of these |
| Answer | **B** |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **132** |
| Question | $u = e^{-t} \sin x$ is a solution of |
| A | $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = 0$ |
| B | $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} = u$ |
| C | $\frac{\partial^2 u}{\partial t^2} + \frac{\partial^2 u}{\partial x^2} = 0$ |
| D | None of these |
| Answer | C |
| Marks | 1 |
| Unit | 4 |

| Id | **133** |
| --- | --- |
| Question | The partial differential equation $f_{xx} + 2f_{xy} + 4f_{yy} = 0$ is classified as |
| A | non –homogeneous P.D.E |
| B | homogeneous P.D.E |
| C | linear P.D.E |
| D | none |
| Answer | B |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **134** |
| Question | By eliminating a and b from $(x-a)^2+(y-b)^2+z^2=c^2$ , the P.D.E formed is |
| A | $c^2=(1+p^2+q^2)z^2$ |
| B | $c=(1+p+q)z$ |
| C | $z^2=(1+p^2+q^2)c^2$ |
| D | $z=(1+p+q)c$ |
| Answer | D |
| Marks | 2 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **135** |
| Question | The partial differential equation obtained from $z =$ ax+by+ab by eliminating a and b is |
| A | $z = x + y + pq$ |
| B | $z = px + qy + pq$ |
| C | $z = ax + py + pq$ |
| D | $z = px + qy + xy$ |
| Answer | B |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **136** |
| Question | The partial differential equation obtained from $z= ax+by+ab$ is |
| A | $px+qy=z$ |
| B | $px+qy+z^2=0$ |
| C | $px-qy=z$ |
| D | $px+qy+pq=z$ |
| Answer | D |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **137** |
| Question | The partial differential equation obtained from $z = e^y f(x+y)$ is |
| A | $p+z=q$ |
| B | $p-z=q$ |
| C | $p-q=z$ |
| D | none of these |
| Answer | A |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **138** |
| Question | By eliminating arbitrary constants from the function $(x-a)^2+(y-b)^2+z^2=1$, with $(x-a)=-z\frac{\partial z}{\partial x};(y-b)=-z\frac{\partial z}{\partial y}$ then the partial differential equation is |
| A | $z^2(p^2-q^2+1)=1$ |
| B | $z^2(p^2+q^2+1)=0$ |
| C | $z^2(p^2+q^2)=1$ |
| D | $z^2(p^2+q^2+1)=1$ |
| Answer | D |
| Marks | 1 |
| Unit | 4 |

| | |
|---|---|
| **Id** | **139** |
| Question | The solution of partial differential equation $\frac{\partial u}{\partial x} = 4\frac{\partial u}{\partial y}$ is |
| A | u = 4 $e^{-12x+3y}$ |
| B | u = 8 $e^{-12xy}$ sin $y$ |
| C | u = 4$e^{-12x-3y}$ |
| D | u = 8 $e^{-12x-3y}$ |
| Answer | D |
| Marks | 1 |
| Unit | 4 |

| Id | **140** |
|---|---|
| Question | By eliminating an arbitrary constant from the function $z = ax^2 + bxy + cy^2$ with $a = \frac{r}{2}; b = s; c = \frac{t}{2}$ where $r = \frac{\partial^2 z}{\partial x^2}; s = \frac{\partial^2 z}{\partial x \partial y}; t = \frac{\partial^2 z}{\partial y^2}$ then the partial differential equation is |
| A | $2z = rx^2 + 2xys + ty^2$ |
| B | $z = rx^2 + xys + ty^2$ |
| C | $z = rx^2 - 2xys + ty^2$ |
| D | $z = rx^2 - 2xys + ty^2$ |
| Answer | A |
| Marks | 1 |
| Unit | 4 |

# Unit 05 Functions of Complex variable

| | |
|---|---|
| **Id** | **141** |
| Question | Cauchy-Riemann equations are |
| A | $u_x = v_y$ and $u_y = -v_x$ |
| B | $u_x = v_y$ and $u_y = v_x$ |
| C | $u_x = v_x$ and $u_y = -v_y$ |
| D | $u_x = -v_y$ and $u_y = v_x$ |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **142** |
| Question | If f(z)=u+iv in polar form is analytic then $\frac{\partial u}{\partial r} =$ |
| A | $\frac{\partial v}{\partial \theta}$ |
| B | $r\frac{\partial v}{\partial \theta}$ |
| C | $\frac{1}{r}\frac{\partial v}{\partial \theta}$ |
| D | $-\frac{\partial v}{\partial \theta}$ |
| Answer | C |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **143** |
| Question | A function u is said to be harmonic if and only if |
| A | $u_{xx}+u_{yy} = 0$ |
| B | $u_{xy}+u_{yy} = 0$ |
| C | $u_x+u_y = 0$ |
| D | $u_x^2 + u_y^2 = 0$ |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **144** |
| Question | If $f(z) = x+ay+i(bx+cy)$ is analytic then a, b,c equals to |
| A | $c = 1$ and $a = -b$ |
| B | $a = 1$ and $c = -b$ |
| C | $b = 1$ and $a = -c$ |
| D | $a = b = c = 1$ |
| Answer | A |
| Marks | 2 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **145** |
| Question | A point at which a function ceases to be analytic is called as |
| A | Singular point |
| B | Non-Singular point |
| C | Regular point |
| D | Non-Singular point |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **146** |
| Question | The function $f(z) = \|z\|$ is a non-constant |
| A | Analytic function |
| B | Nowhere analytic function |
| C | Non-analytic function |
| D | Entire function |
| Answer | B |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **147** |
| Question | The mapping W = $\frac{1}{Z}$ is known as |
| A | Inversion |
| B | Translation |
| C | Rotation |
| D | None of these |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **148** |
| Question | If $f(z) = z(2-z)$, then $f(1+i) =$ |
| A | 0 |
| B | I |
| C | -i |
| D | 2 |
| Answer | D |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **149** |
| Question | The mapping $w = \alpha z+\beta$, where $\alpha$ and $\beta$ are complex constants, is known as |
| A | Translation |
| B | Magnification |
| C | Linear transformation |
| D | Bilinear transformation |
| Answer | C |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **150** |
| Question | $w = \frac{a+bz}{c+dz}$ is a bilinear transformation when |
| A | ad-bc = 0 |
| B | ad - bc $\neq$0 |
| C | ab-cd $\neq$ 0 |
| D | None of these |
| Answer | B |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **151** |
| Question | The transformation w=cz represents a transformation called |
| A | Magnification and Rotation |
| B | Translation |
| C | Inversion |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **152** |
| Question | If $f(z) = u + iv$ is analytic function, then $f'(z)$ is equal to |
| A | $\frac{\partial u}{\partial x} - i\frac{\partial v}{\partial x}$ |
| B | $\frac{\partial u}{\partial x} + i\frac{\partial v}{\partial x}$ |
| C | $\frac{\partial u}{\partial x} - i\frac{\partial v}{\partial y}$ |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **153** |
| Question | If a function $\emptyset(x, y)$ satisfies the Laplace equation $\frac{\partial^2 \emptyset}{\partial x^2} + \frac{\partial^2 \emptyset}{\partial y^2} = 0$<br>Then $\emptyset(x, y)$ is called…………………………… |
| A | Analytic |
| B | Conjugate |
| C | Harmonic |
| D | Holomorphic |
| Answer | C |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **154** |
| Question | If the function $2x + x^2 + \alpha x y^2$ is to be harmonic, then value of $\alpha$ will be …………………………… |
| A | 1 |
| B | -1/x |
| C | x |
| D | None of these |
| Answer | B |
| Marks | 2 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **155** |
| Question | Given that $f(z) = e^x(cosy + isiny)$, Which one of the following is true? |
| A | $f(z)$ satisfies C-R Equations |
| B | $f(z)$ is not holomorphic |
| C | $f(z)$ does not satisfies C-R Equations. |
| D | None |
| Answer | A |
| Marks | 2 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **156** |
| Question | A bilinear transformation maps circles into……. |
| A | Triangle |
| B | Straight line |
| C | Circle |
| D | Rectangle |
| Answer | C |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **157** |
| Question | State whether following statement is true or false<br>$f(z) = \|z\|^2$ is not analytic at any point. |
| A | True |
| B | False |
| C | Neither True nor False |
| D | None of the above |
| Answer | A |
| Marks | 2 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **158** |
| Question | State whether following statement is true or false<br>$u = x^2 - y^2 - y$ is not harmonic function. |
| A | True |
| B | False |
| C | Neither True nor False |
| D | None of the above |
| Answer | **B** |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **159** |
| Question | Derivative of analytic function is always ………………….. |
| A | Harmonic |
| B | Not Harmonic |
| C | Not Analytic |
| D | Analytic |
| Answer | D |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **160** |
| Question | If $f(z) = \bar{z}$ is differentiable |
| A | nowhere |
| B | Only at z=0 |
| C | everywhere |
| D | Only at z=1 |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **161** |
| Question | If $e^{ax} cosy$ is harmonic, then a = |
| A | 0 |
| B | i |
| C | -1 |
| D | 2 |
| Answer | B |
| Marks | 1 |
| Unit | 5 |

| Id | **162** |
| --- | --- |
| Question | A function v is called conjugate harmonic for a harmonic function u in a region R whenever |
| A | u is analytic |
| B | If f(z)=u+iv is analytic |
| C | vis analytic |
| D | None of the above |
| Answer | B |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **163** |
| Question | The points at which $f(z) = \frac{(z^2-z)}{(z^2-3z+2)}$ is not analytic are |
| A | 0 and 1 |
| B | 1 and -1 |
| C | i and 2 |
| D | 1 and 2 |
| Answer | D |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **164** |
| Question | The harmonic conjugate of $u = \log\sqrt{x^2+y^2}$ is |
| A | $\frac{x}{x^2+y^2}$ |
| B | $\frac{y}{x^2+y^2}$ |
| C | $\tan^{-1}\frac{y}{x}$ |
| D | $\tan^{-1}\frac{x}{y}$ |
| Answer | C |
| Marks | 2 |
| Unit | 5 |

| Id | **165** |
| --- | --- |
| Question | A transformation of the form w=az+b , where a and b are called complex constants is called |
| A | Linear Transformation |
| B | Bilinear Transformation |
| C | Inverse Transformation |
| D | Complex Transformation |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **166** |
| Question | A mapping that preserves angles between oriented curves both in magnitude and direction is called ……. |
| A | isogonal |
| B | conformal |
| C | informal |
| D | formal |
| Answer | B |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **167** |
| Question | The mapping defined by an analytic function f(z) is conformal at all points z except at points where |
| A | $f'(z) = 0$ |
| B | $f'(z) \neq 0$ |
| C | $f'(z) > 0$ |
| D | $f'(z) < 0$ |
| Answer | A |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **168** |
| Question | The bilinear transformation that maps the points $z = 0, i, \infty$ respectively into $w = 0,1,\infty$ is |
| A | $w = \frac{1}{z}$ |
| B | $w = -z$ |
| C | $w = -iz$ |
| D | $w = iz$ |
| Answer | C |
| Marks | 2 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **169** |
| Question | The bilinear transformation that maps the points z= $1,0,-1$ respectively into $w = i, 0, -1$ is |
| A | $w = iz$ |
| B | $w = z$ |
| C | $w = i(z + 1)$ |
| D | None |
| Answer | A |
| Marks | 2 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **170** |
| Question | Under the transformation $w = \frac{1}{z}$ , the image of the line $y = \frac{1}{4}$ is |
| A | circle $u^2 + v^2 = 0$ |
| B | circle $u^2 + v^2 + 4v = 0$ |
| C | circle $u^2 + v^2 = 2$ |
| D | None of these |
| Answer | B |
| Marks | 2 |
| Unit | 5 |

| Id | 171 |
|---|---|
| Question | If the real part of an analytic function f(z) is $x^2 - y^2 - y$ then the imaginary part is |
| A | $2xy$ |
| B | $2xy - y$ |
| C | $2xy + x^2$ |
| D | $2xy + x$ |
| Answer | D |
| Marks | 2 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **172** |
| Question | If $f(z) = r^2 cos2\theta + ir^2 sinp\theta$ is an analytic function, then value of p is |
| A | 1 |
| B | 3 |
| C | 4 |
| D | 2 |
| Answer | D |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **173** |
| Question | Function $f(z) = e^z$ is ….. |
| A | Not analytic |
| B | Not a regular |
| C | Analytic |
| D | None |
| Answer | C |
| Marks | 1 |
| Unit | 5 |

| | |
|---|---|
| **Id** | **174** |
| Question | linear transformation is a ……………….. transformation. |
| A | isogonal |
| B | conformal |
| C | orthogonal |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 5 |

| Id | 175 |
|---|---|
| Question | A point at which $f'(z) = 0$ is called |
| A | Singular Point |
| B | Pole |
| C | Intersection point |
| D | Critical Point |
| Answer | D |
| Marks | 1 |
| Unit | 5 |

# Unit 06 Functions of Complex Variable (Integral Calculus)

| | |
|---|---|
| **Id** | **176** |
| Question | If $f(a) = 0$ and $f'(a) \neq 0$, then $z = a$ is called as |
| A | Simple zero |
| B | Simple curve |
| C | Zero of order n |
| D | None of these |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| Id | **177** |
| --- | --- |
| Question | A singular point $z = z_0$ is said to be an ......... singular point of f(z) if $\lim_{z \to z_0} f(z)$ exists and finite |
| A | Poles |
| B | Isolated |
| C | Essential |
| D | Removable |
| Answer | D |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **178** |
| Question | The residue of $f(z)=\dfrac{1+e^{z}}{\sin z+z\cos z}$ at the pole z =0 is |
| A | 0 |
| B | 1 |
| C | 2 |
| D | Not defined |
| Answer | B |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **179** |
| Question | The order of the pole z =3 for the function $f(z)=\frac{z}{(z-2)(z-3)^3}$ is |
| A | 2 |
| B | 0 |
| C | 3 |
| D | None of these |
| Answer | C |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **180** |
| Question | The poles of $f(z)=\dfrac{z^2+1}{1-z^2}$ |
| A | 1 |
| B | -1 |
| C | $\pm 1$ |
| D | 4 |
| Answer | C |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **181** |
| Question | The residue of $f(z)=\dfrac{z+3}{(z-1)(z-2)}$ at z = 2 is |
| A | 3 |
| B | 2 |
| C | 1 |
| D | 5 |
| Answer | D |
| Marks | 2 |
| Unit | 6 |

| **Id** | **182** |
|---|---|
| Question | A point $z_0$ at which function f(z) is not analytic is called as |
| A | Residue |
| B | Singularity |
| C | Integrals |
| D | None of these |
| Answer | B |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **183** |
| Question | If f(z) is analytic within and on a closed contour C and a is any number within C, then $\oint_C \frac{f(z)}{z-a}$ dz is |
| A | $2\pi i$ |
| B | 0 |
| C | $2\pi i$ f(a) |
| D | None of these |
| Answer | C |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **184** |
| Question | The value of the integration $\oint_C \frac{z}{z-3}\,dz$, where C is the circle $\lvert z \rvert = 1$. |
| A | 0 |
| B | 3 |
| C | 9 |
| D | 6 |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **185** |
| Question | A continuous curve which does not have a point of self intersections is called |
| A | Simple curve |
| B | Multiple curve |
| C | Integral curve |
| D | None of these |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **186** |
| Question | The value of the line integral $I = \int_c \frac{dz}{z-1}$ , where C being $\|z\| = 2$ ,is |
| A | $\pi i$ |
| B | $2\pi$ |
| C | $2\pi i$ |
| D | None |
| Answer | C |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **187** |
| Question | If $\lim_{z \to a} f(z)$ exists then a singularity z=a is called …………………….. |
| A | Multiple pole |
| B | Simple Pole |
| C | Essential Singularity |
| D | Removable Singularity |
| Answer | D |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **188** |
| Question | If $f(z) = \frac{e^z}{(z-1)^3}$ Then z =……………….is a pole of order………………….. |
| A | 1,3 |
| B | 3,1 |
| C | 0,3 |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **189** |
| Question | If $f(z)$ is analytic within and on a closed curve, then by Cauchy's Integral Theorem $\oint f(z)dz=$………………. |
| A | 1 |
| B | 0 |
| C | 2 |
| D | -1 |
| Answer | B |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **190** |
| Question | If $f(z) = \frac{3z^2+2}{z-1}$ then singular point lies outside the circle $\lvert z-1 \rvert = 1$ Then above statement is ……………… |
| A | True |
| B | False |
| C | Neither True nor False |
| D | None of the Above |
| Answer | |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **191** |
| Question | If $f(z)$ is analytic function within and on a region D, Then the line integral $\iint_{z_1}^{z_2} f(z)dz$ is independent of the path joining $z_1$ $and$ $z_2$ Then above statement is ……………… |
| A | True |
| B | False |
| C | Neither True nor False |
| D | None of the Above |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| Id | **192** |
| --- | --- |
| Question | Residue of $f(z) = \frac{cosz}{z}$ is |
| A | 1 |
| B | 2 |
| C | 0 |
| D | None |
| Answer | A |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **193** |
| Question | Line integral of $\int_{-2}^{-2+i}(2+z)^2dz$ along a straight-line joining z=-2 |
| A | to z=-2+i, is equal to |
| B | -2i |
| C | 0 |
| D | i/2 |
| Answer | D |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **194** |
| Question | $f(z) = -x + y - 3x^2 i$ and C is the straight-line joining origin to (1,1) Then $\int_c f(z)dz =$…….. |
| A | 1-i |
| B | 1+i |
| C | 2-i |
| D | None |
| Answer | A |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| Id | **195** |
| Question | If $f(z) = \|z\|$ and C is the $\|z+1\| = 1$ Taken in anticlockwise sense. Then $\int_c f(z)dz =$…….. |
| A | i |
| B | 0 |
| C | 2-i |
| D | None |
| Answer | B |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **196** |
| Question | If $f(z) = \frac{e^z}{cosz}$ and if C is circle $\lvert z \rvert = 1$ then total number of Poles which lies inside the circle are………… |
| A | 1 |
| B | 3 |
| C | 0 |
| D | 2 |
| Answer | D |
| Marks | 1 |
| Unit | 6 |

| Id | **197** |
| --- | --- |
| Question | If the principal part contains an infinite number of non-zero terms of (z-a) Then z=a is called……. |
| A | Multiple pole |
| B | Simple Pole |
| C | Essential Singularity |
| D | Removable Singularity |
| Answer | C |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **198** |
| Question | An integral taken along a simple closed curve is called a …… |
| A | Multiple Integral |
| B | Jordan Integral |
| C | Contour Integral |
| D | None of the above |
| Answer | C |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **199** |
| Question | The value of $\int_C \frac{3z+5}{z(2z+1)} dz$ where C is $\lvert z \rvert = 1$ |
| A | $2\pi i$ |
| B | $3\pi i$ |
| C | $\pi i$ |
| D | None |
| Answer | B |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **200** |
| Question | “The residue of a function can be found if the pole is an isolated singularity “<br><br>Above statement is |
| A | True |
| B | False |
| C | Partially True |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **201** |
| Question | The value of $\int_c \frac{e^{2z}}{(z-4)^2} dz$ where C is $\lvert z \rvert = 1$, is equal to |
| A | 0 |
| B | $2\pi i e^{\theta}$ |
| C | $-2\pi i e^{\theta}$ |
| D | None |
| Answer | A |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **202** |
| Question | The singularity of $f(z) = \frac{z}{(z-2)^2}$ is |
| A | z=3 |
| B | z=2 |
| C | z=0 |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **203** |
| Question | The value of $\int_C |z|\,dz$ where C is the contour represented by the straight line z=-i to z=i is…….. |
| A | i |
| B | -i |
| C | 0 |
| D | None |
| Answer | A |
| Marks | 2 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **204** |
| Question | The value of $\int_C \frac{1}{z-1}dz$ where C is $|z|=2$, is equal to |
| A | 0 |
| B | $2\pi i$ |
| C | $\pi i$ |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 6 |

| Id | **205** |
|---|---|
| Question | The singular points of $\frac{\cos \pi z}{(z-1)(z-2)}$ are |
| A | 0,1 |
| B | 1,2 |
| C | -1,-2 |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **206** |
| Question | The poles of $\frac{(z-1)^2}{z(z-2)}$ are at |
| A | z=1,2 |
| B | z=0,-2 |
| C | z=0,2 |
| D | None |
| Answer | C |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **207** |
| Question | For the function $f(z) = \frac{2z+1}{z^2-z-2}$ poles are z =…… |
| A | -1,2 |
| B | 1,-2 |
| C | -1,-3 |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **208** |
| Question | For the function $f(z) = \frac{1-e^{2z}}{z^4}$ pole is z =…… |
| A | 1 |
| B | 0 |
| C | -1 |
| D | None |
| Answer | B |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **209** |
| Question | For the function $f(z) = \frac{e^z}{z^2+\pi^2}$ poles are z =…… |
| A | $\pm i$ |
| B | $\pm \pi$ |
| C | $\pm \pi i$ |
| D | None |
| Answer | C |
| Marks | 1 |
| Unit | 6 |

| | |
|---|---|
| **Id** | **210** |
| Question | For the function $f(z) = \frac{z}{cosz}$ poles are z =…… |
| A | $(2n+1)\frac{\pi}{2}$ |
| B | $(2n-1)\frac{\pi}{2}$ |
| C | $(2n+1)\pi$ |
| D | None |
| Answer | A |
| Marks | 1 |
| Unit | 6 |