

## Sample Question Paper

**Program:** SE Information Technology

**Curriculum Scheme:** R-2012

**Examination:** Second year semester III

**Course Name:** Applied Mathematics-III

Time: 1 Hour

Max. Marks: 50

Q1.	$L[ t^{\frac{5}{2}} ]$ is
Option A:	$\frac{3}{4s^{\frac{3}{2}}}$
Option B:	$\frac{3\sqrt{\pi}}{4s^{\frac{5}{2}}}$
Option C:	$\frac{5\sqrt{\pi}}{4s^{\frac{5}{2}}}$
Option D:	$\frac{15\sqrt{\pi}}{8s^{\frac{7}{2}}}$
Q2.	$L [ f(t) ] = \frac{1}{s\sqrt{s+1}}$ then $L [ e^{-2t} f(t) ]$ is
Option A:	$\frac{1}{(s+2)\sqrt{s+3}}$
Option B:	$\frac{1}{(s+2)\sqrt{s+2}}$
Option C:	$\frac{1}{(s-2)\sqrt{s-1}}$
Option D:	$\frac{1}{(s-1)\sqrt{s}}$
Q3.	$L [ t \sin t ]$ is
Option A:	$\frac{2}{(s^2+1)^2}$
Option B:	$\frac{2s}{(s^2+1)^2}$
Option C:	$\frac{-2}{(s^2+1)^2}$
Option D:	$\frac{2s^2}{(s^2+1)^2}$

Q4.	$L\left[\int_0^t \cosh 4x \, dx\right]$ is
Option A:	$\frac{1}{(s^2+16)}$
Option B:	$\frac{1}{(s^2-16)}$
Option C:	$\frac{1}{s} \frac{1}{(s^2+16)}$
Option D:	$\frac{1}{s} \frac{1}{(s^2-16)}$
Q5.	$L\left[\frac{\cos t}{t}\right]$
Option A:	exists
Option B:	is zero
Option C:	doesn't exist
Option D:	is 1
Q6.	Find $L^{-1}\left[\frac{s-3}{(s-3)^2+9}\right]$
Option A:	$e^{3t} \cos 3t$
Option B:	$e^{-3t} \sin 3t$
Option C:	$e^{3t} \sin 3t$
Option D:	$e^{-3t} \cos 3t$
Q7.	Find $L^{-1}\left[\frac{s+2}{(s+2)^2-16}\right]$
Option A:	$e^{2t} \cosh 4t$
Option B:	$e^{-2t} \sinh 4t$
Option C:	$e^{-2t} \cosh 4t$
Option D:	$e^{2t} \sinh 4t$
Q8.	Find $L^{-1}\left[\frac{2}{(s-1)^2+4}\right]$
Option A:	$e^t \sin 2t$
Option B:	$e^t \cos 2t$
Option C:	$e^{-t} \sin 2t$
Option D:	$e^{-t} \cos 2t$
Q9.	Find $L^{-1}\left[\frac{1}{(s+4)^{3/2}}\right]$

Option A:	$2e^{4t} \sqrt{\frac{\pi}{t}}$
Option B:	$e^{-4t} \sqrt{\frac{\pi}{t}}$
Option C:	$e^{4t} \sqrt{\frac{t}{\pi}}$
Option D:	$2e^{-4t} \sqrt{\frac{t}{\pi}}$
Q10.	Find $L^{-1} \left[ \frac{1}{3s-4} \right]$
Option A:	$\frac{4}{3} e^{\frac{4}{3}t}$
Option B:	$\frac{1}{3} e^{\frac{4}{3}t}$
Option C:	$\frac{1}{3} e^{-\frac{4}{3}t}$
Option D:	$\frac{4}{3} e^{-\frac{4}{3}t}$
Q11.	$Z(a^n)$ is
Option A:	$\frac{z}{z-a}$
Option B:	$\log \left( \frac{z}{z-a} \right)$
Option C:	$\frac{a}{a-z}$
Option D:	$\frac{n}{z-a}$
Q12.	The function $f(z) = e^z$ is
Option A:	Analytic
Option B:	Harmonic
Option C:	Not Analytic
Option D:	Not Harmonic
Q13.	The imaginary part of $f(z) = \cos z$ is
Option A:	$-\sin x \cosh y$
Option B:	$\cosh x \cos y$
Option C:	$-\sin x \sinh y$
Option D:	$\sin x \sinh y$

Q14.	The analytic function corresponding to real part $e^{-x} \sin y$ is
Option A:	$f(z) = e^z + c$
Option B:	$f(z) = e^{-z} + c$
Option C:	$f(z) = ie^z + c$
Option D:	$f(z) = ie^{-z} + c$
Q15.	The analytic function corresponding to imaginary part $3x^2y - y^3$ is
Option A:	$f(z) = z^2 + c$
Option B:	$f(z) = z^3 + c$
Option C:	$f(z) = -z^2 + c$
Option D:	$f(z) = -z^3 + c$
Q16.	At a point $x=c$ of continuity of $f(x)$ the sum of the Fourier series $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx + \sum_{n=1}^{\infty} b_n \sin nx$ is
Option A:	$f(x)$
Option B:	$f(c)$
Option C:	$f(0)$
Option D:	$\frac{f(0^-) + f(0^+)}{2}$
Q17.	Which of these is not Dirichlet's conditions for a function $f(x)$ to be expanded in a Fourier series in the interval $(0, 2L)$
Option A:	$f(x)$ may have discontinuities, finite in number
Option B:	$f(x)$ may have maxima and minima, finite in number
Option C:	$f(x)$ is single valued
Option D:	$f(x)$ is always an even function
Q18.	If $f(x)$ is an odd function, then the Fourier series for $f(x)$ is a
Option A:	Cosine series
Option B:	Sine series
Option C:	Contains both sine series and cosine series
Option D:	neither sine series nor cosine series
Q19.	The fourier series for $f(x) =  \sin x $ in $[-\pi, \pi]$
Option A:	Will have sine terms
Option B:	Will have cosine terms
Option C:	Is zero

Option D:	Doesn't exist
Q20.	If $f(x) = x^2$ in $[-\pi, \pi]$ then what is the value of the first term in the series $\frac{a_0}{2} + \sum_{n=1}^{\infty} a_n \cos nx + \sum_{n=1}^{\infty} b_n \sin nx$
Option A:	$\frac{\pi^2}{3}$
Option B:	$\frac{\pi^2}{6}$
Option C:	$\frac{\pi^2}{2}$
Option D:	$\frac{\pi}{3}$
Q21.	If $\vec{F} = x^2 \mathbf{i} + xy \mathbf{j} + y^2 \mathbf{k}$ then $\text{div} \vec{F}$ is
Option A:	x
Option B:	2x
Option C:	3x
Option D:	4x
Q22.	Find $\text{grad}(\phi)$ if $\phi = 2x^2 + y^2$
Option A:	$x \mathbf{i} - y \mathbf{j} - z \mathbf{k}$
Option B:	$4x \mathbf{i} + 2y \mathbf{j}$
Option C:	$x \mathbf{i} + y \mathbf{j} + z \mathbf{k}$
Option D:	$x \mathbf{i} - z \mathbf{k}$
Q23.	If $\text{div} \vec{F} = 0$ then $\vec{F}$ is
Option A:	Solenoidal
Option B:	Irrotational
Option C:	Convergent
Option D:	Constant
Q24.	If $\vec{F} = \mathbf{i} - xy \mathbf{j} + y^2 \mathbf{k}$ then $\text{curl} \vec{F}$ is
Option A:	$(2y - x) \mathbf{i} + y \mathbf{j} - 2y \mathbf{k}$
Option B:	$x \mathbf{i} + y \mathbf{j} + z \mathbf{k}$
Option C:	$z \mathbf{i} - y \mathbf{k}$
Option D:	$\mathbf{i} + 3 \mathbf{j} + 2 \mathbf{k}$

Q25.	A vector $\vec{F}$ is Irrotational if $\text{curl}\vec{F}$ is
Option A:	1
Option B:	0
Option C:	2
Option D:	4