



Mahavir Education Trust's
SHAH & ANCHOR KUTCHHI ENGINEERING COLLEGE
Chembur, Mumbai - 400 088

Subject: Applied Mathematics – III

Branch: Information Technology

Sem – III (CBCS)

Time: 1-hour

Max. Marks: 50

Sample Question Paper

Instructions: 1] All the Questions are compulsory and carry equal marks

2] All Questions are Multiple Choice Questions

3] Select the correct answer from the Choices

Q1.	If $L[f(t)] = \frac{1}{s\sqrt{s+1}}$ 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:	$\frac{1}{(s-1)\sqrt{s}}$
Q2.	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:	$e^{-3t}\cos 3t$
Q3.	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:	$f(z) = ie^{-z} + c$

Q4.	How many numbers must be selected from the set $\{1, 2, 3, 4, 5, 6\}$ to guarantee that at least one pair of these numbers adds up to 7?
Option A:	3
Option B:	4
Option C:	2
Option D:	1
Q5.	If $f(x) = \frac{4x+3}{5x-2}$ then $f^{-1}(x) = \underline{\hspace{2cm}}$
Option A:	$\frac{3x+2}{5x-4}$
Option B:	$\frac{2x+3}{4x-5}$
Option C:	$\frac{2x+3}{5x-4}$
Option D:	$\frac{3x+2}{4x-5}$
Q6.	How many four-digit numbers greater than 3000 can be formed out of the digits 1, 2, 3, 5, 7, 8, 9 if no digit is repeated?
Option A:	480
Option B:	840
Option C:	600
Option D:	780
Q7.	$L[\int_0^t \cosh 4x \, dx]$ 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:	$\frac{1}{s} \frac{1}{(s^2-16)}$
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.	The Harmonic Conjugate of the function $e^x \cos y$ is
Option A:	$e^x \sin y + c$
Option B:	$e^x \cos y + c$
Option C:	$e^{-x} \sin y + c$
Option D:	$e^{-x} \cos y + c$
Q10.	Among the integers 1 and 300, how many of them are divisible by 3, 5, and 7?
Option A:	162
Option B:	150
Option C:	147
Option D:	198
Q11.	Let $A = \{1, 2, 3, 4\}$ and R is a relation on set A defined by $a R b$ iff a divides b . Which pair from the following is not a member of the relation R ?
Option A:	(1, 3)
Option B:	(2, 3)
Option C:	(2, 4)
Option D:	(1, 2)
Q12.	A box contains 6 white balls and 5 red balls. In how many ways 4 balls can be drawn from the box such that two balls are white and two balls are red?
Option A:	124
Option B:	165
Option C:	184
Option D:	150
Q13.	The value of the integral $\int_0^\infty e^{-t} t dt$ is
Option A:	1
Option B:	$\frac{1}{s^2}$
Option C:	0
Option D:	∞
Q14.	Find $L^{-1} \left[\log \left(\frac{s+a}{s+b} \right) \right]$
Option A:	$\frac{e^{-bt} + e^{-at}}{t}$

Option B:	$\frac{e^{-at} - e^{bt}}{t}$
Option C:	$\frac{e^{-bt} - e^{-at}}{t}$
Option D:	$\frac{e^{-bt} + e^{at}}{t}$
Q15.	The Orthogonal Trajectories of the family of curves $2xy = c$ is
Option A:	$x^2y^2 = c'$
Option B:	$x^2 - y^2 = c'$
Option C:	$x^2 + y^2 = c'$
Option D:	$x^3y^3 = c'$
Q16.	How many persons must you have to guarantee that at least five of them have their birthday in the same month?
Option A:	35
Option B:	42
Option C:	49
Option D:	29
Q17.	Let $A = \{1, 2, 3\}$. From following relations on set A which relation is not symmetric?
Option A:	$R = \{(1,1), (2,3), (3,2)\}$
Option B:	$R = \{(1,2), (2,3), (3,2)\}$
Option C:	$R = \{(2,2), (2,3), (3,2)\}$
Option D:	$R = \{(1,2), (2,1), (3,3)\}$
Q18.	A can hit a target 2 times in 5 shots, B 3 times in 4 shots, C 2 times in 3 shots. They fire a volley. What is the probability that at least 2 shots hit the target?
Option A:	$\frac{2}{3}$
Option B:	$\frac{1}{3}$
Option C:	$\frac{5}{3}$
Option D:	$\frac{4}{3}$

Q19.	$L[\int_0^t \cosh 4x dx]$ 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:	$\frac{1}{s} \frac{1}{(s^2-16)}$
Q20.	Find $L^{-1} \left[\frac{2s+2}{s^2+2s+10} \right]$
Option A:	$2e^{-t} \sin 2t$
Option B:	$e^t \cos 3t$
Option C:	$e^t \sin 2t$
Option D:	$2e^{-t} \cos 3t$
Q21.	The fixed points of a Bilinear Transformation $w = \frac{1+3iz}{3i+z}$ are
Option A:	$z = 1, i$
Option B:	$z = -i, i$
Option C:	$z = 1, 2$
Option D:	$z = -1, 1$
Q22.	A bag contains five balls, the colors of which are not known. Two balls were drawn from the bag and they were found to be white. What is the probability that all balls are white?
Option A:	$\frac{3}{4}$
Option B:	$\frac{1}{2}$
Option C:	$\frac{2}{3}$
Option D:	$\frac{3}{4}$
Q23.	Let Z be a set of integers. A function $f: Z \rightarrow Z$ defined by $f(x) = x^2 + x + 1$ is
Option A:	Injective

Option B:	Surjective
Option C:	Both Injective and Surjective
Option D:	Neither Injective nor Surjective
Q24.	In how many ways can a committee of 3 ladies and 4 gentlemen be chosen from 8 ladies and 7 gentlemen?
Option A:	700
Option B:	840
Option C:	1960
Option D:	1540
Q25.	Find $L^{-1} \left[\frac{1}{(s+1)(s+2)} \right]$
Option A:	$e^{-t} - e^{-2t}$
Option B:	$e^{-t} + e^{-2t}$
Option C:	$e^{-t} - e^{2t}$
Option D:	$e^t + e^{-2t}$