Roll No.												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST 1

Sem & AY: Odd Sem. 2019-20 | **Date**: 27.09.2019

Course Code: MAT 103 | **Time**: 11:00AM to 12:00PM

Course Name: Engineering Mathematics-III | **Max Marks**: 40

Program & Sem: B.Tech (All Program) & III | **Weightage**: 20%

Instructions:

(i) Read the questions properly and answer accordingly.

(ii) Scientific and non-programmable calculators are permitted

(iii) Question paper consists of 3 parts.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries six marks. [2Qx6M=12M]

1. Expand $f(x) = x$ as the Fourier series over the interval $-\pi < x < \pi$.

[C.O.NO.1] [Comprehension]

2. Expand $f(x) = \begin{cases} x & 0 < x < 2 \\ 0 & elsewhere \end{cases}$ as the Fourier Cosine transform.

[C.O.NO.2] [Comprehension]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries eight marks. [2Qx8M=16M]

3. Expand $f(x) = \begin{cases} \pi x & 0 \le x \le 1 \\ \pi(2-x) & 1 \le x \le 2 \end{cases}$ as the Fourier series over the interval $0 < x < 2$. Hence deduce $\frac{\pi^2}{8} = 1 + \frac{1}{3^2} + \frac{1}{5^2} + \frac{1}{7^2} + \cdots$

[C.O.NO.1] [Comprehension]

4. Expand $f(x)=2x-1$ as a half range Fourier Cosine Series over the interval $0<x<2$. [C.O.NO.1] [Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The Question carries twelve marks. (1Qx12M=12M)

5. Find the Fourier series expansion of period 2π for the function y=f(x) which is defined in (0, 2π) by means of the table values given below. Express y as Fourier series neglecting the harmonic above the second.

X	0	60	120	180	240	300
Y	1.0	1.4	1.9	1.7	1.5	1.2

[C.O.NO.1] [Comprehension]

SCHOOL OF ENGINEERING

Semester: III semester

Course Code: MAT103

Course Name: Engineering Mathematics -III

Date: 27-09-2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	1	Module-1 Fourier series		6								6
2	2	Module-2 Fourier Transform		6								6
3	1	Module-1 Fourier series					8					8
4	1	Module-1 Fourier series					8					8
5	1	Module-1 Fourier series								12		12
6	2	Module-2								12		12

		Fourier Transform										
	Total Marks			12			16			12		40

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

[I hereby certify that All the questions are set as per the above guide lines. Ms. Bhavya K]

Reviewers' Comments

SCHOOL OF ENGINEERING

SOLUTION

Semester: III semeter
Course Code: MAT 103
Course Name: Engineering Mathematics-III

Date: 27-09-2019
Time: 1 Hour
Max Marks: 40
Weightage: 20%

Part A (2Q x6 M =12 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	F(x) is odd function, hence $a_0 = 0$ and $a_n = 0$ $b_n = \frac{-2(-1)^n}{n}$ Substitute in the series	1M 1M 3M 1M	**10**
2	Fourier Cosine transform formula $F_c(S) = \frac{2sSin2s + \cos 2s - 1}{S^2}$	1M 5M	**10**

Part B (2Q x8 M = 16 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
3	Formula $a_0 = \pi \ \ and \ \ a_n = \frac{2\ [(-1)^n - 1]}{n^2\pi}, b_n = 0$ Substitution and deduction	1M 6M 1M	12
4	Half range Cosine series Formula $a_0 = 0 \ \ a_n = \frac{4[(-1)^n - 1]}{n^2\pi}$	1M 1M 2·4M	12

Part C (1Q x 12M =12 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
5	Formula $a_0 = 2.9$ $a_1 = -0.367$, $b_1 = 0.173$ $a_2 = -o.1$ $b_2 = -0.0577$ Substitution	1M 9M 2M	15
6	Fourier Cosine transform formula $F(S) = \frac{2Sins}{s}$ Evalauation i)x=0 ii) change s to x iii) limits $Ans = \frac{\pi}{2}$	1M 7M 4M	15

Roll No.													

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING

TEST – 2

Sem & AY: Odd Sem. 2019-20 **Date:** 16.11.2019

Course Code: MAT 103 **Time:** 11:00 AM to 12:00 PM

Course Name: ENGINEERING MATHEMATICS-III **Max Marks:** 40

Program & Sem.: B.Tech. (All Programs) & III **Weightage:** 20%

Instructions:

I. Read the questions properly and answer accordingly.
II. Scientific and non-programmable calculators are permitted
III. Question paper consists of 3 parts.

Part A [Memory Recall Questions]

Answer both the Questions. Each Question carries four marks. (2Qx4M=8M)

1. Find $L[e^{2t} + 4t^3 - 2\sin 3t + 3\cos 3t]$. (C.O.NO.3) [Knowledge]

2. Find inverse Laplace transform of $\frac{s+3}{s^2+4s+13}$. (C.O.NO.3) [Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each Question carries ten marks. (2Qx10M=20M)

3. Express the function $f(t) = \begin{cases} t^2, & 0 < t < 2 \\ 4t, & 2 \le t < 4 \\ 8, & t \ge 4 \end{cases}$ in terms of unit step function and hence find $L[f(t)]$. (C.O.NO.3) [Comprehension]

4. Using convolution theorem, find $L^{-1}\left[\frac{1}{(s^2+1)(s^2+9)}\right]$. (C.O.NO.3) [Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The Question carry twelve marks. (1Qx12M=12M)

5. Apply Laplace technique to solve $y'''(t) + 2y''(t) - y'(t) - 2y(t) = 0$ with $y(0) = 0$, $y'(0) = 0$ and $y''(0) = 6$. (C.O.NO.3) [Application]

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

Semester: III semester

Course Code: MAT103

Course Name: Engineering Mathematics -III

Date: 16-11-2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	3	Module-3 Laplace Transforms		4								4
2	3	Module-3 Laplace Transforms		4								4
3	3	Module-3 Laplace Transforms					10					10
4	3	Module-3 Laplace Transforms					10					10
5	3	Module-3 Laplace Transforms								12		12
	Total Marks			8			20			12		40

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE REACH GREATER HEIGHTS

SOLUTION

Semester: III semeter

Course Code: MAT 103

Course Name: Engineering Mathematics-III

Date: 16-11-2019

Time: 1 Hour

Max Marks: 40

Weightage: 20%

Part A (2Q x 4 M =8 Marks)

Q. No	Solution	Scheme of Marking	Max. Time required for each Question
1	$L[e^{2t}+4t^3-2\sin 3t+3\cos 3t]$ $=\frac{1}{s-2}+\frac{24}{s^4}-\frac{6}{s^2+9}+\frac{3s}{s^2+9}$	1M+1M+1M+1M	5
2	$L^{-1}\left[\frac{s+3}{s^2+4s+13}\right]=L^{-1}\left[\frac{(s+2)+1}{(s+2)^2+9}\right]$ $=e^{-2t}L^{-1}\left[\frac{s+1}{s^2+9}\right]$ $=e^{-2t}\left[\cos 3t+\frac{1}{3}\sin 3t\right]$	1M 1M 2M	5

Part B (2Q x 10 M = 20 Marks)

Q. No	Solution	Scheme of Marking	Max. Time required for each Question
3	$f(t)$ formula $f(t)$= Substitution in the formula $L[t^2]=\frac{2}{s^3}$ $L[(4t-t^2)u(t-2)]=e^{-2s}\left(\frac{4}{s}+\frac{2}{s^2}-\frac{2}{s^3}\right)$ $L[(8-4t)u(t-4)]=e^{-4s}\left(-\frac{8}{s}-\frac{4}{s^2}\right)$ $L[f(t)]$=Substitution	1M 1M 1M 3M 3M 1M	13
4	$f(t)=\sin t$ $g(t)=\frac{1}{3}\sin 3t$ Convolution Formula Substitution in the Formula	2M 2M 1M 1M	13

	$L^{-1}\left[\frac{1}{(s^2+1)(s^2+9)}\right]=\frac{1}{8}(\sin t-\frac{1}{3}\sin 3t)$	4M	

Part C (1Q x 12M =12 Marks)

Q. No	Solution	Scheme of Marking	Max. Time required for each Question
5	$(s^3+2s^2-s-2)L[y(t)]=6$ $y(t)=L^{-1}\left[\frac{6}{(s^3+2s^2-s-2)}\right]$ $\frac{6}{(s^3+2s^2-s-2)}=\frac{2}{s+2}+\frac{1}{s-1}+\frac{-3}{s+1}$ $L^{-1}\left[\frac{6}{(s^3+2s^2-s-2)}\right]=2e^{-2t}+e^{t}-3e^{-t}$ $y(t)=2e^{-2t}+e^{t}-3e^{-t}$	3M 1M 4M 3M 1M	24

Roll No.													

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING SET B

END TERM FINAL EXAMINATION

Semester: Odd Semester: 2019-20 **Date**: 20 December 2019

Course Code: MAT 103 **Time**: 1:00 PM to 4:00 PM

Course Name: ENGINEERING MATHEMATICS-III **Max Marks**: 80

Program & Sem: B.Tech (All Programs) & III **Weightage**: 40%

Instructions:

(i) Read the questions properly and answer accordingly.
(ii) Scientific and non-programmable calculators are permitted
(iii) Question paper consists of 3 parts.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 05 marks. (4Qx5M=20M)

1. a. The value of b_n in the Fourier series of an even function is ___________.

[1M](C.O.No.1)[Knowledge]

b. The Laplace transform of $\log 2 + \cos 5t$ is ___________. [2M](C.O.No.3)[Knowledge]

c. The inverse Laplace transform of $\frac{s}{s^2-25}+\frac{2}{s}$ is ___. [2M](C.O.No.3)[Knowledge]

2. a. The value of a_0 for the function f(x) = x^2 in Half range Cosine series in (0,2) is___ .

[1M](C.O.No.1)[Knowledge]

b. The Z- transform of $k^n + 9n^3$ is _______ . [2M](C.O.No.4)[Knowledge]

c. The inverse Z-transform of $\frac{6z}{(z-1)^2}$ is _____. [2M](C.O.No.4)[Knowledge]

3. Expand $f(x)=\begin{cases} x & 0<x<2 \\ 0 & elsewhere \end{cases}$ as the Fourier Cosine transform.

[5M](C.O.No.2)[Knowledge]

4. Let the random variable X represent the number of defective parts for a machine. When 3 parts are sampled from a production line and tested. The following is the probability distribution of X. Calculate Variance. [5M](C.O.No.5)[Knowledge]

X	0	1	2	3
F(x)	0.51	0.38	0.10	0.01

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries 10 marks. (3Qx10M=30M)

5. Find the Complex Fourier transform of the function $f(x)=\begin{cases} x & for|x| \le \alpha \\ 0 & for|x| > \alpha \end{cases}$, where α is +ve constant. (C.O.No.2)[Comprehension]

6. Express the following function in terms of unit-step function and hence find its Laplace transform $f(t)=\begin{cases} 0 & 0<t<1 \\ t-1 & 1<t<2 \\ 1 & t>2 \end{cases}$ (C.O.No.3)[Comprehension]

7. In a test on electric bulbs, it was found that the life time of a particular brand was distributed normally with an average life of 2000hours and standard deviation of 60 hours. Find the probability of bulbs that are likely last for (i) more than 2100 hours. (ii) less than 1950 hours. (iii) between 1900 to 2100 hours.

(C.O.No.5)[Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each Question carries 15 marks. (2Qx15M=30M)

8. Find the Fourier series to represent y(x) upto the second harmonic from the following data:

X	0	π/3	2 π/3	π	4 π/3	2π
y(x)	1.0	1.4	1.9	1.7	1.5	1.2

(C.O.No.1)[Application]

9. Use Z- transform method to solve $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$, given that $u_0 = 0,\ u_1 = 1$.

(C.O.No.4)[Application]

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1a	1	Module-1		1								5
b	3	Module-3		2								
c	3	Module-3		2								
2 a	1	Module-1		1								5
b	4	Module-4		2								
c	4	Module-4		2								
3	2	Module-2		5								5
4	5	Module-5		5								5
5	2	Module-2					10					10

6	3	Module-3					10					10
7	5	Module-5					10					10
8	1	Module-1								15		15
9	4	Module-4								15		15
	Total Marks			20			30			30		80

K =Knowledge Level   C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature:

Reviewer Commend:

SCHOOL OF ENGINEERING

SOLUTION

Semester: III semester
Course Code: MAT 103
Course Name: Engineering Mathematics-III

Date: 20-12-2019
Time: 3 Hour
Max Marks: 80
Weightage: 40%

Part A (4Q x5 M =20 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	a) 0 b) $\frac{\log 2}{s}+\frac{s}{s^2+25}$ c) Cosh5t + 2	1M 2M 2M	**10**
2	a) 8/3 b) $\frac{z}{z-k}+9\frac{z^3+4z^2+z}{(z-1)^4}$ c) 6n -8 $\cos\left(\frac{n\pi}{2}\right)$	1M 2M 2M	**10**
3	Fourier Cosine transform $F_c(s)=\frac{2Sin2s}{s}+\frac{Cos2s-1}{s^2}$	2M 3M	**10**
4	Mean=0.61 Variance=0.4979	3M 2M	**10**

Part B (3Q x10 M = 30 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
5	Formula $F(s)=\frac{2\sin s}{s}$	**1M** **4M**	**20**

	Inverse formula $\frac{\pi}{2}=\int_0^\infty \frac{\sin s}{s}ds$	**1M** **4M**	
6	Formula $L[0]=0$ $L[(t-1)u(t-1)]=\frac{e^{-s}}{s^2}$ $L[(1-(t-1))u(t-2)]=e^{-2s}\left(-\frac{1}{s^2}-\frac{2}{s}\right)$ $L[f(t)]=Subtitution$	2M 1M 3M 3M 1M	20
7	$z=\frac{x-\mu}{\sigma}$ $P(z>1.66)=0.0485$ $P(z<-1)=0.1587$ $P(-2<z<1.66)=0.9287$	1M 3M 3M 3M	20

Part C (2Q x 15M =30 Marks)

Q No	**Solution**	**Scheme of Marking**	**Max. Time required for each Question**
8	Formula Table Values of summation $a_0=2.9, a_1=-0.37, a_2=-0.1, b_1=0.17,$ $b_2=-0.06$ Y=1.45+(-0.37 cos x+0.17 sin x)- (0.1cos 2x+0.06 sin2x)	2M 5M 2M 5M 1M	40

9	$u(z)\left[z^2+4z+3\right]-z=\frac{z}{z-3}$ $u(z)=\frac{z}{(z+1)(z+3)(z-3)}+\frac{z}{(z+1)(z+3)}$ $u(z)=\frac{3}{8}\frac{z}{z+1}+\frac{1}{24}\frac{z}{z-3}-\frac{5}{12}\frac{z}{z+3}$ $u_n=\frac{3}{8}(-1)^n+\frac{1}{24}(3)^n-\frac{5}{12}(-3)^n$	4M 2M 3M 2M 4M	40

Roll No.													

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING　　　SET A

END TERM FINAL EXAMINATION

Semester: Odd Semester:2019-20
Course Code: MAT 103
Course Name: ENGINEERING MATHEMATICS-III
Program & Sem: B.Tech (All Programs) & III

Date: 20 December 2019
Time: 1:00 PM to 4:00 PM
Max Marks: 80
Weightage: 40%

Instructions:

(i) Read the questions properly and answer accordingly.
(ii) Scientific and non-programmable calculators are permitted
(iii) Question paper consists of 3 parts.

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 05 marks. **(4Qx5M=20M)**

1. a) The Laplace transform of u (t-a) is.................... [2M](C.O.No.3)[Knowledge]

   b) $L^{-1}\left(\frac{1}{s^2+9}\right)=$............... [2M](C.O.No.3)[Knowledge]

   c) If f(x) is an even function in $(-l,l)$, then the value of $b_n=$..........
   [1M](C.O.No.1)[Knowledge]

2. a) The Z-transform of n^3 is .... [2M](C.O.No.4)[Knowledge]

   b) $Z_T^{-1}\left(\frac{z^2}{z^2+1}\right)=$............... [2M](C.O.No.4)[Knowledge]

   c) .... is called as first harmonic. [1M](C.O.No.1)[Knowledge]

3. Find the Fourier sine transform of $f(x)=\begin{cases} x, 0<x<2 \\ 0, elsewhere \end{cases}$

   [5M](C.O.No.2)[Knowledge]

4. A shipment of 15 similar laptop computers to a retail outlet contains 3 that are defective. If a school makes a random purchase of 2 of these computers, find the expected value of the number of defectives.

[5M](C.O.No.5)[Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries 10 marks. (3Qx10M=30M)

5. Find the Fourier transform of $f(x)=\begin{cases}1 & for|x|\le 1\\ 0 & for|x|>1\end{cases}$. Hence evaluate $\int_0^\infty \frac{\sin x}{x}dx$.

(C.O.No.2)[Comprehension]

6. Express the function $f(t)=\begin{cases}1, & 0<t\le 1\\ t, & 1<t\le 2\\ t^2, & t>2\end{cases}$ in terms of unit step function and hence find $L[f(t)]$.

(C.O.No.3)[Comprehension]

7. An electric firm manufactures light bulbs that have a life before burn-out that is normally distributed with mean equal to 800 hours and a standard deviation of 40hours. Find the probability that a bulb burns (i) more than 834 hours (ii) less than 790 (iii) between 778 and 834 hours. (C.O.No.5)[Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each Question carries 15 marks. (2Qx15M=30M)

8. Obtain the Fourier series of y up to the second harmonics for the following values.

x^0	45	90	135	180	225	270	315	360
y	4.0	3.8	2.4	2.0	-1.5	0	2.8	3.4

(C.O.No.1)[Application]

9. Find the response of the system $y_{n+2}-5y_{n+1}+6y_n=1$ with $y_0=0, y_1=1$ by Z-Transform method.

(C.O.No.4)[Application]

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Extract of question distribution [outcome wise & level wise]

Q.NO.	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1a	3	Module-3		2								5
b	3	Module-3		2								
c	1	Module-1		1								
2 a	4	Module-4		2								5
b	4	Module-4		2								
c	1	Module-1		1								
3	2	Module-2		5								5
4	5	Module-5		5								5
5	2	Module-2					10					10
6	3	Module-3					10					10

7	5	Module-5					10					10
8	1	Module-1								15		15
9	4	Module-4								15		15
	Total Marks			20			30			30		80

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature: 11/12/19

Reviewer Commend:

SCHOOL OF ENGINEERING

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

	$\frac{\pi}{2}=\int_0^\infty \frac{\sin s}{s}ds$		
6	Formula $L[1]=\frac{1}{s}$ $L[(t-1)u(t-1)]=\frac{e^{-s}}{s^2}$ $L[(t^2-t)u(t-2)]=e^{-2s}\left(\frac{2}{s^3}+\frac{3}{s^2}+\frac{2}{s}\right)$ $L[f(t)]=Subtitution$	2M 1M 3M 3M 1M	20
7	$z=\frac{x-\mu}{\sigma}$ $P(z>1.67)=0.04746$ $P(z<-0.83)=0.20327$ $P(-1.67<z<1.66)=0.90408$	1M 3M 3M 3M	20

Part C (2Q x 15M =30 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
8	Formula Table $\sum y=16.9; \sum y\cos x=5.5718; \sum y\cos 2x=1.6;$ $\sum y\sin x=7.40621; \sum y\sin 2x=-2.7;$ $a_0=4.225, a_1=1.393, a_2=0.4, b_1=1.8516,$ $b_2=-0.6275$ Y=2.1125+1.393 cos x+1.8516 sin x+o.4cos 2x-0.675 sin2x	2M 5M 2M 5M 1M	40

SOLUTION

Semester: III semeter
Course Code: MAT 103
Course Name: Engineering Mathematics-III

Date: 20-12-2019
Time: 3 Hour
Max Marks: 80
Weightage: 40%

Part A

(4Q x5 M =20 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1	a) $\frac{e^{-as}}{s}$ b) $\frac{\sin 3t}{3}$ c) 0	2M 2M 1M	**10**
2	a) $\frac{z^3+4z^2+z}{(z-1)^4}$ b) $\cos\left(\frac{n\pi}{2}\right)$ c) $a_1\cos x+b_1\sin x$	2M 2M 1M	**10**
3	Fourier sine transform $\frac{-2\cos 2s}{s}+\frac{\sin 2s}{s^2}$	2M 3M	**10**
4	X: 0, 1, 2; f(x): 22/35, 12/35, 1/35 Mean=2/5	3M 2M	**10**

X	0	1	2
f(x)	22/35	12/35	1/35

Part B

(3Q x10 M = 30 Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
5	Formula $F(s)=\frac{2\sin s}{s}$ Inverse formula	**1M** **4M** **1M** **4M**	**20**

9	$\bar{y}(z)[(z-2)(z-3)]-z=\frac{z}{z-1}$ $\bar{y}(z)=\frac{z}{(z-1)(z-2)(z-3)}+\frac{z}{(z-2)(z-3)}$ $\frac{1}{(z-1)(z-2)(z-3)}=\frac{1}{2(z-1)}-\frac{1}{(z-2)}+\frac{1}{2(z-3)}$ $\frac{1}{(z-2)(z-3)}=-\frac{1}{(z-2)}+\frac{1}{(z-3)}$ $Y(z)=\frac{1}{2}-2(2^{n})+\frac{3}{2}(3^{n})$	4M 2M 3M 2M 4M	40