(IT BRANCHES)

Discrete and Integral Transforms (DIT)

Subject Code : 18MA3GCDIT

Module – 1 (Curve Fitting & Statistics Modelling)

Q.No	QUESTIONS
1.	The method of finding the curve of best fit is called the ______ fitting. a) Curve b) Straight line c) Parabola d) None of these
2.	The method of least square provides a relationship y = f(x) such that the sum of squares of the residuals is ________. a) Maximum b) Minimum c) maximum and Minimum d) None of these
3.	Curve fitting is a method of finding a suitable relation or law in the form y = f(x) for a set of observed values (x_i , y_i) , i = 1,2,3, ……. Such relationship of connecting x and y is known as _____. a) Linear law b) Gauss law c) Empirical Law d) None of these
4.	Average scores of two batsmen A and B are respectively 40, 45 and their S. D.'s are respectively 9, 11. Which batsman is more consistent? a) Batsman – A b) Batsman – B c) Batsmen – A & B d) None of these
5.	The mean of the numbers {11, 10, 12, 13, 9} is _____. a) 11 b) 10 c) 12 d) 13
6.	The numerical measure of correlation between two variables x and y is known as _____. a) Correlation coefficient b) Regression c) mean d) variance
7.	The coefficient of correlation numerically does not exceed _____. a) Zero b) unity c) two d) None of these
8.	The product of the regression coefficients is equal to _____. a) r b) r^3 c) r^4 d) r^2
9.	If the correlation coefficient is zero then the two regression lines are _______ a) Parallel b) perpendicular c) equal d) None of these
10.	The equations of regression lines are $y = 0.5x + a$ and $x = 0.4y + b$, then the correlation coefficient is _______ a) ± 0.5224 b) ± 0.4472 c) ± 0.5210 d) ± 0.4452

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Module – 2 (Z - Transform)

Q.No	QUESTIONS
1.	Z-transform of a function u_n where n is an integer, $n \geq 0$ is ________. a) $Z_T(u_n) = \sum_{n=0}^{\infty} u_n z^{-n}$ c) $Z_T(u_n) = \sum_{n=1}^{\infty} u_n z^{-n}$ b) $Z_T(u_n) = \sum_{n=0}^{\infty} u_n z^{n}$ d) $Z_T(u_n) = \sum_{n=1}^{\infty} u_n z^{n}$
2.	The value of $z_T(1)$ is __________. a) $\frac{z}{z+1}$ b) $\frac{z}{z-1}$ c) $\frac{z^2}{z-1}$ d) $\frac{z^2}{z+1}$
3.	Damping rule states that if $Z_T(u_n) = \bar{u}(z)$, then $Z_T(k^n u_n) =$__________. a) $\bar{u}\left(\frac{1}{k}\right)$ b) $\bar{u}\left(\frac{1}{kz}\right))$ c) $\bar{u}\left(\frac{z}{k}\right)$ d) $\bar{u}\left(\frac{k}{z}\right)$
4.	The value of $z_T(k^n)$ is ________. a) $\frac{z}{z+k}$ b) $\frac{z^2}{z+k}$ c) $\frac{z^2}{z-k}$ d) $\frac{z}{z-k}$
5.	The value of $z_T(sinn\theta)$ is __________. a) $\frac{z\ sin\theta}{z^2-2z\ cos\theta+1}$ b) $\frac{z\ sin\theta}{z^2+2z\ cos\theta+1}$ c) $\frac{z\ sin\theta}{z^2-2z\ cos\theta-1}$ d) $\frac{z\ sin\theta}{z^2+2z\ cos\theta-1}$
6.	If $Z_T(u_n) = \bar{u}(z)$ then $Z_T(u_{n-k}) =$ ___________. a) $z^k\,\bar{u}(z)$ b) $z^{-k}\bar{u}(z)$ c) $z^k\bar{u}(kz)$ d) $z^{-nk}\bar{u}(nz)$
7.	Initial Value theorem states that, if $Z_T(u_n) = \bar{u}(z)$, then _______. a) $\lim_{z\to 1} \bar{u}(z) = u_0$ c) $\lim_{z\to \infty} \bar{u}(z) = u_0$ b) $\lim_{z\to 0} \bar{u}(z) = u_0$ d) $\lim_{z\to -\infty} \bar{u}(z) = u_0$
8.	The value of $Z_T(u_{n+1}) =$ ______. a) $z[\bar{u}(z) + u_0]$ b) $z[\bar{u}(z) - u_1]$ c) $z[\bar{u}(z) + u_1]$ d) $z[\bar{u}(z) - u_0]$
9.	The value of ${Z_T}^{-1}\left[\frac{z}{z^2+1}\right]$ is __________. a) $\sin\left(\frac{n\pi}{2}\right)$ b) $\sin\left(\frac{n\pi}{3}\right)$ c) $\sin\left(\frac{n\pi}{6}\right)$ d) $\sin\left(\frac{n\pi}{4}\right)$
10.	The value of ${Z_T}^{-1}\left[\frac{kz}{(z-k)^2}\right] =$ _________. a) $k^{-n}n$ b) $k^n n$ c) $k^n n^2$ d) $k^{-n}n^2$

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Module – 3 (Fourier Series)

Q.No	QUESTIONS
1.	A real valued function f(x) is said to be periodic of period T if __________ a) $f(x-T)=-f(x)$ b) $f(x+T)=-f(x)$ c) $f(x+T)=f(x)$ d) $f(x-T)=f(Tx)$
2.	If $f(x)$ is discontinuous at x then the Fourier series converges to ________ where $f(x^+)$, $f(x^-)$ are respectively right hand and left hand limits of $f(x)$ a) $\frac{f(x^+)+f(x^-)}{2}$ b) $\frac{f(x^+)-f(x^-)}{2}$ c) $\frac{f(x^+)+f(x^-)}{-2}$ d) $\frac{f(x^+)-f(x^-)}{-2}$
3.	A function $f(x)$ is said to be EVEN in the interval (-a , a) if _________ a) $f(-x)=-f(x)$ b) $f(-x)=f(x)$ c) $f(a-x)=f(ax)$ d) $f(a+x)=f(ax)$
4.	A function $f(x)$ is said to be ODD if ________in the interval $(0,2l)$ a) $f(2l-x)=f(x)$ b) $f(2l+x)=f(x)$ c) $f(2l-x)=-f(x)$ d) $f(2l+x)=-f(x)$
5.	Half range cosine series contains only _________ a)Cosine term b) Sine term c) Both cosine and Sine d) None of these
6.	In the Fourier series $\frac{a_0}{2}$ is called _________term a) Positive term b) negative term c) Remainder term d) Constant term
7.	In Fourier Series a_0 , a_n , b_n are called __________ a) Fourier constants b) Fourier coefficients c) Half range values d) None of these
8.	In Fourier Series expansion, if f(x) is ODD then __________ a) $a_0=0$, $a_n=0$ b) $a_0\neq 0$, $a_n=0$ c) $a_0=0$, $a_n\neq 0$ d) $a_0\neq 0$, $a_n\neq 0$
9.	__________is the process of finding the constant term and first few cosine and sine term numerically a) Numerical analysis b) Harmonic Analysis c) Theoretical analysis d) None of these
10.	In harmonic analysis , $a_0 =$ ______- a) $a_0=\frac{N}{2}\sum x$ b)$a_0=\frac{N}{2}\sum y^2$ c) $a_0=\frac{2}{N}\sum x$ d) $a_0=\frac{2}{N}\sum y$

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Module – 4 (Integral Transform - I)

Q.No	QUESTIONS
1.	Laplace transform is a ________ (a) Definite integral (b) Indefinite integral (c) Improper integral (d) None of these
2.	L[f(t)] is a function of ______ (a) s (b) t (c) x (d) None of these
3.	A function f(t) is said to be periodic function of period T if ______ (a) f(t+T)=f(t) (b) f(t-T)=f(t) (c) f(t+nT)=f(t) (d) all of these
4.	Laplace transform of e^{at} ________ (a) $\frac{1}{s+a}$ (b) $\frac{s}{s+a}$ (c) $\frac{1}{s-a}$ (d) None of these
5.	$L[\delta(t-2)] =$_____ (a) e^{2s} (b) e^{-2s} (c) e^{-s} (d) None of these
6.	$L^{-1}\left[\frac{s^2-3s+4}{s^3}\right]$= (a)1-3t+2$t^2$ (b) 1+3t+2t^2 (c) 1-3t-2t^2 (d) 1+3t-2t^2
7.	$L^{-1}[F(s+a)] =$ (a)$e^{-at}L^{-1}(F(s))$ (b) $e^{at}L^{-1}(F(s))$ (c) $e^{at}L^{-1}(F'(s))$ (d) $e^{-at}L^{-1}(F'(s))$
8.	From convolution we have f(t)* g(t) is (a)g(t) * f(t) (b) f ’(t) * g’(t) (c) g’(t) * f ‘(t) (d) None of these
9.	If $L^{-1}[F(s)] = f(t)$ then $L^{-1}[-F'(s)] =$ (a) –t f(t) (b) t f(t) (c) s f(s) (d) –s f(s)
10	L[f ’(t)]= _______ (a) sL[f(t)]-f(0) (b) s^2 L[f(t)]-f(0) (c) s^2 L[f(t)]-sf(0) (d) None of these

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Module – 5 (Integral Transform – II)

Q.No	QUESTIONS
1.	Definition of Fourier transform is given by mathematical expression: a) $\int_0^\infty f(x)cosux\,dx$ b) $\int_0^\infty f(x)sinux\,dx$ c) $\int_{-\infty}^\infty f(x)e^{iux}\,dx$ d) $\int_{-\infty}^\infty f(x)e^{-iux}dx$
2.	Definition of Inverse Fourier transform is given by mathematical expression: a) $\frac{2}{\pi}\int_0^\infty F(u)cosux\,du$ b) $\frac{2}{\pi}\int_0^\infty F(u)sinux\,du$ c) $\int_{-\infty}^\infty F(u)e^{-iux}\,ds$ d) $\frac{1}{2\pi}\int_{-\infty}^\infty F(u)e^{-iux}\,du$
3.	Fourier transform of f(x)=1 in $-1 \le x \le 1$ a) $\frac{2sinu}{u}$ b) $\frac{2sinu}{\pi u}$ c) $\frac{sinu}{\pi u}$ d) $\frac{sinu}{u}$
4.	Boundary –value problem is a differential equation with a) no conditions b) conditions at one point c) conditions at more than one point d) none of these
5.	Definition of cosine Fourier transform is given by mathematical expression: a) $\int_0^\infty f(x)cosux\,dx$ b) $\int_0^\infty f(x)sinux\,dx$ c) $\int_0^\infty f(x)e^{iux}\,dx$ d) $\int_{-\infty}^\infty f(x)cosux\,dx$
6.	Fourier sine transform of $f(x) = \begin{cases} 1 & 0 < x < a \\ 0 & x > a \end{cases}$ a) $\frac{1-cosau}{u}$ b) $\frac{tanau}{u}$ c) $\frac{cosau}{u}$ d) $\frac{1-cosau}{au}$
7.	Inverse cosine Fourier transform is given by mathematical expression: a) $\frac{2}{\pi}\int_0^\infty F(u)cosux\,du$ b) $\frac{2}{\pi}\int_0^\infty F(u)sinux\,du$ c) $\int_{-\infty}^\infty F(u)cosux\,du$ d) $\frac{1}{2\pi}\int_{-\infty}^\infty F(u)e^{-iux}\,du$
8.	Fourier transform is employed to solve a) Initial- value problem b) Boundary-value problem c) initial-boundary value problem d) none of these
9.	Convolution of f=f(x) and g=g(x) denoted by f*g is defined as a) $\int_{-\infty}^\infty f(x-t)g(t)dt$ b) $\int_0^\infty f(x-t)g(t)dt$ c) $\int_{-\infty}^\infty f(t)g(t)dt$ d) $\int_{-\infty}^\infty f(xt)g(t)dt$
10.	If the Fourier transform of $f(x)$ and $g(x)$ are $F(s), G(s)$ then $\frac{1}{2\pi}\int_{-\infty}^\infty [F(s)]^2\,ds =$ ________ a) $\int_{-0}^\infty \lvert f(x)\rvert^2 dx$ b) $\int_{-\infty}^\infty \lvert f(x)\rvert^2 dx$ c) $\int_{-\infty}^\infty \lvert f(x)\rvert dx$ d) $\int_{-\infty}^\infty \lvert f(x)g(x)\rvert^2 dx$