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Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)



III SEMESTER B.TECH (PRINTING AND MEDIA) END SEMESTER EXAMINATIONS, NOV/DEC 2015

SUBJECT: ENGG. MATHEMATICS III [MAT 2106]

REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitable assumed.

1A.	Calculate the mean and standard deviation for the following data															
	Cla	ISS			0-5		5 - 10		10	- 15	15 - 2	0 20	-25			04
	Free	quenc	сy		6		10		12		10	8				
1B.	Find the Fourier series expansion of $f(x) = 2x - x^2$ in (0, 3) and hence deduce that											hat				
	1	<u>1</u> +	<u>1</u>	<u>1</u>		∞ =	<u>π</u> .									03
	12	2 ²	32	42			12									
1C.	The displacement v of a part of mechanism is tabulated with corresponding angular															
	momentum $x^{o}(dearee)$ of the crank Express v as harmonic series neglecting															
	harmonics above second															
	ro		30	60	90	120	150		180	210	240	270	300	330		03
	r	U	50	00	70	120	150		100	210	240	270	500	550		
	Y	1.8	1.1	0.3	0.16	1.5	0 1.30)	2.16	1.25	1.30	1.52	1.76	2		
24	E al a	1					1 f . 11.									
27.	Find	the qu	Jartii	$\frac{10}{20}$	$\frac{1}{5}$	$\frac{rom t}{20}$	$\frac{120}{20}$	$\frac{W1}{25}$		stribut	$\frac{100}{40}$ 45	15	50			
	Class $20-25$ $25-30$ $30-35$ $35-40$ $40-45$ $45-50$								04							
	Inter	vai		01		10	00		10	0	146	1.0				
	Freq	uenc	У	21		40	90		13	0	146	16	06			
2B.									$\left(\frac{1}{-}\right)$	-x; ($0 \leq x$	$< \frac{1}{2}$				
	Find	the h	alf ra	ange si	ne ser	ies fo	rf(x)	=	{4	3	1	2				03
	$\left(x - \frac{3}{4}; \frac{1}{2} < x \le 1\right)$															
20	Calculate the coefficient of correlation for the following data															
20.		x	105		1 1	02	101	10	$\frac{10}{10}$	99	98	96	93	92		03
		~	105	10		02	101	1		//	70		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			03
	у	7	10	1 10)3	100	<u>9</u> 8	(95	96	104	92	97	94	4	
3A.	State and prove the Green's theorem in the plane.										04					
																1

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3B.	Find the Kurtosis for the following data.											
	Class	1 – 10	10 - 20	20-30	30-40		03					
20	Frequency	1	3	4	2							
3C.	Show that $\nabla \vec{r} ^n = n \vec{r} ^{n-2} \vec{r}$											
4A.	Determine whether $\vec{F} = (y^2 \cos x + z^3)i + (2y \sin x - 4)j + (3xz^2 + 2)k$ is conservative? If so find scalar potential											
4B.	Fit a straight line in t	he least square	e sense for the	following da	ata							
	X	1	2	3	4 5		03					
	Y	14	13	9	5 2							
4C.	Find a unit normal to the surface $-x^2yz^2 + 2xy^2z = 1$ at the point P(1, 1, 1)											
5A.	Derive one dimensio	nal wave equa	tion with neces	ssary assum	ptions.		04					
5B.	Solve $z_{xy} = sinx siny$ for which $\frac{\partial z}{\partial y} = -2siny$ when $x = 0$ and $z = 0$ if y is an odd multiple of $\frac{\pi}{2}$.											
5C.	Solve $U_{xx} + 2U_{xy} +$	$U_{yy} = 0$ giv	en v = x and 2	z = x - y.			03					