Roll No. _____

END SEMESTER EXAMINATION
SEMESTER- I (Old Course)

COURSE CODE : G 103 | **DURATION : 3 (THREE)HRS**
COURSE TITLE : MATHEMATICS-I | **MAXIMUM MARKS : 75**
SESSION : JULY-DEC'2021 | **PASS MARKS : 35 %**

NOTE:
1. *All the questions are compulsory*
2. *Attempt any 5 (five) questions.*
3. *Mark for each question is shown against it.*
4. *Assume suitable logical data wherever necessary.*

1.	**(a)**	If $A = diag\,(2,-5,9)$, $B = diag\,(-3,7,14)$ and $C = diag\,(4,-6,3)$ then find (i) $A-B$ (ii) $2A+B-5C$	**(5)**
	(b)	Convert the complex number in polar form $-1-i$.	**(5)**
	(c)	Show that $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$.	**(5)**
2.	**(a)**	Solve the quadratic equation $\frac{4z}{z+1}+\frac{5}{z}=\frac{6z+5}{z^2+z}$.	**(5)**
	(b)	Expand using binomial theorem $\left(\frac{2}{3}x-3\right)^5$.	**(5)**
	(c)	Calculate the Variance for the following data:	**(5)**

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	27	10	7	5	4	2

3.	**(a)**	Find the term independent of x in the expansion of $\left(1-\frac{1}{x}+3x^5\right)\left(2x^2-\frac{1}{x}\right)^8$.	**(5)**
	(b)	Show that $2\sin^2 x + 4\cos(x+y)\sin x \sin y + \cos 2(x+y) = \cos 2x$.	**(5)**
	(c)	If $A=\begin{bmatrix} 2 & 2 & 1 \\ -2 & 1 & 2 \\ 1 & -2 & 2 \end{bmatrix}$ and $B=\begin{bmatrix} 1 & 3 & 2 \\ 1 & 1 & 1 \\ 2 & -3 & -1 \end{bmatrix}$ verify that $(AB)^{-1} = B^{-1}A^{-1}$	**(5)**
4.	**(a)**	Two die are thrown together. What is the probability that the sum of the numbers on the two faces is divisible by 3 or by 4?	**(5)**
	(b)	Which term of the G.P 25, 125, 625, ……. is 390625?	**(5)**
	(c)	Find the value of $\cos 200^0 \sin 160^0 + \sin(-340^0)\cos(-380^0)$.	**(5)**
5.	**(a)**	If $\omega \neq 1$ is a cube root of unity, then find the roots of the equation $(z-1)^3+8=0$.	**(5)**
	(b)	Let U be a universal set and *A, B* and *C* be subsets of U defined as *U={a,b,c,d,e,f}, A={a,b,c}, B={c,d,e}, C={d,e,f}.* Find (i) $(B\cup C)'$ (ii) $A\cup(B\cup C)'$ (iii) $A'\cap(B\cap C')$	**(5)**
	(c)	Compute the Harmonic mean for the data:	**(5)**

Speed of the car	130	135	140	145	150
No of cars	3	4	8	9	2

6.	**(a)**	Find the value of r, if the coefficients of $(r-5)^{th}$ and $(2r-1)^{th}$ terms in the expansion of $(1+x)^{34}$ are equal.	**(5)**
	(b)	A and B are mutually exclusive events of an experiment. If $P(not\ A)=0.65$, $P(AUB)=0.65$ and $P(B)=x$, find the value of x.	**(5)**
	(c)	Prove that $\dfrac{\cos 2x}{(1+\sin 2x)}=\tan(\dfrac{\pi}{4}-x)$	**(5)**
7.	**(a)**	If ${}^{n}P_{r}={}^{n}P_{r+1}$ and ${}^{n}C_{r}={}^{n}C_{r-1}$ then find the values of n and r.	**(5)**
	(b)	If the median of the following frequency distribution is 28.5, find the missing frequencies	**(5)**

Class	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	f_1	8	20	15	7	f_2	60

	(c)	Using matrix method, solve the following system of linear equations: $2x+y-3z=13$ $x+y-z=6$ $2x-y+4z=-12$	**(5)**
8.	**(a)**	How many multiples of 4 lie between 10 and 250?	**(5)**
	(b)	If $\tan\alpha=\dfrac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta}$, then show that $\sin\theta+\cos\theta=\sqrt{2}\cos\alpha$.	**(5)**
	(c)	Let $f=\{(x,y)\mid x,y\in N\ \ and\ \ y=2x\}$ be a relation on N. Find the domain, co-domain and range.	**(5)**

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