Roll No LHR (To be filled in by the candidate)

MATHEMATICS **(Academic Sessions 2015 – 2017 to 2018 – 2020)**

Q.PAPER – I (Objective Type) 219-(INTER PART – I) Time Allowed : 30 Minutes

GROUP – II Maximum Marks : 20

PAPER CODE = 6194

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	$\cos\left(\frac{3\pi}{2}-\theta\right)$ is equal to : (A) $-\sin\theta$ (B) $\sin\theta$ (C) $\cos\theta$ (D) $-\cos\theta$
2	Probability of impossible event is : (A) $\frac{1}{2}$ (B) 1 (C) 0 (D) 2
3	$2\tan^{-1}A$ equals : (A) $\tan^{-1}\left(\frac{A}{1-A^2}\right)$ (B) $\tan^{-1}\left(\frac{2A}{1-A^2}\right)$ (C) $\tan^{-1}\left(\frac{2A}{1+A^2}\right)$ (D) $\tan^{-1}\left(\frac{A}{1+A^2}\right)$
4	Which angle is quadrantal angle : (A) 45^o (B) 60^o (C) 270^o (D) 120^o
5	Solution of equation $\tan x=\frac{1}{\sqrt{2}}$ lies in the quadrants : (A) I and II (B) II and III (C) I and III (D) I and IV
6	Middle terms in the expansion of $(x+y)^{11}$ are : (A) T_6, T_7 (B) T_5, T_6 (C) T_7, T_8 (D) T_8, T_9
7	If Δ is the area of a triangle ABC, then with usual notation $\Delta =$: (A) $\frac{1}{2}bc\sin\beta$ (B) $\frac{1}{2}ab\sin\alpha$ (C) $\frac{1}{3}bc\sin\alpha$ (D) $\frac{1}{2}bc\sin\alpha$
8	Range of cotangent function is : (A) N (B) Z (C) R (D) C
9	Expansion of $(3-5x)^{\frac{1}{2}}$ is valid if : (A) $\lvert x\rvert<\frac{3}{5}$ (B) $\lvert x\rvert<\frac{5}{3}$ (C) $\lvert x\rvert<5$ (D) $\lvert x\rvert<3$
10	With usual notation R = : (A) $\frac{b}{2\sin\gamma}$ (B) $\frac{a}{2\sin\alpha}$ (C) $\frac{c}{2\sin\alpha}$ (D) $\frac{a}{2\sin\beta}$
11	The sum of the four fourth roots of 81 is : (A) 0 (B) 81 (C) – 81 (D) 3

Roll No LHR (To be filled in by the candidate)

(Academic Sessions 2015 – 2017 to 2018 – 2020)

MATHEMATICS 219-(INTER PART – I) Time Allowed : 2.30 hours

PAPER – I (Essay Type) GROUP – II Maximum Marks : 80

SECTION – I

2. Write short answers to any EIGHT (8) questions : **16**

(i) Prove the rule of addition $\frac{a}{c}+\frac{b}{c}=\frac{a+b}{c}$

(ii) Find the multiplicative inverse of $\left(\sqrt{2}\ ,-\sqrt{5}\right)$

(iii) Express the complex number $1+i\sqrt{3}$ in polar form.

(iv) Write the power set of $\{a,\{b,c\}\}$

(v) Show that the statement $p\rightarrow(p\vee q)$ is tautology.

(vi) Prove that the identity element e in a group G is unique.

(vii) If $A=\begin{bmatrix}1 & -1\\ a & b\end{bmatrix}$ and $A^2=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$, find a and b

(viii) If $B=\begin{bmatrix}5 & -2 & 5\\ 3 & -1 & 4\\ -2 & 1 & -2\end{bmatrix}$. find cofactor B_{21}

(ix) If A is a skew-symmetric matrix, then show that A^2 is a symmetric matrix

(x) Solve $x^{-2}-10=3x^{-1}$.

(xi) If α, β are the roots of $x^2-px-p-c=0$ then prove that $(1+\alpha)(1+\beta)=1-c$

(xii) Discuss the nature of roots of the equation $x^2-5x+6=0$

3. Write short answers to any EIGHT (8) questions : **16**

(i) Define proper fraction.

(ii) If $\frac{x^2-10x+13}{(x-1)(x^2-5x+6)}=\frac{A}{x-1}+\frac{B}{x-2}+\frac{C}{x-3}$, find value of A

(iii) If $\frac{x}{(x-a)(x-b)(x-c)}=\frac{A}{x-a}+\frac{B}{x-b}+\frac{C}{x-c}$, find value of B

(iv) If the numbers $\frac{1}{k}$, $\frac{1}{2k+1}$ and $\frac{1}{4k-1}$ are in harmonic sequence, find k

(v) Find sum of infinite geometric series 2 + 1 + 0.5 + ----

(vi) Define geometric mean.

(vii) If 5, 8 are two A.Ms between a and b , find a and b

(viii) If $\frac{1}{a}$, $\frac{1}{b}$ and $\frac{1}{c}$ are in A.P , show that $b=\frac{2ac}{a+c}$

(ix) Prove that ${}^nC_r={}^nC_{n-r}$

(x) Expand $(1+x)^{\frac{-1}{3}}$ upto 3 terms.

(xi) Evaluate $\sqrt[3]{30}$ correct to three places of decimal.

(xii) Check whether the statement 5^n-2^n is divisible by 3 for n = 2 , 3 is true or false.

(Turn Over)