

ASJK-11-19

Sign. Dy. Supdnt.

Fictitious Roll No. (For Office Use)

Sign. Candidate

MATHEMATICS
(PART - I)
(OBJECTIVE PART)

(INTERMEDIATE)
 019/1

(☆)
 Marks : 20
 Time : 30 Minutes

Note:- Write your Roll No. in space provided. Over writing, cutting, using of lead pencil will result in loss of marks. All questions are to be attempted.

1- Each question has four possible answers, Tick (✓) the correct answer. (20)

1	The number $\sqrt{13}$ is known as;						
A	Rational number	B	Prime number	C	Irrational number	D	Imaginary number
2	If ω is cube root of unity and $\{1, \omega, \omega^2\}$ is a group under multiplication then inverse of ω^2 is;						
A	1	B	ω	C	ω^2	D	$-\omega^2$
3	If A is a matrix of order 3×2 then order of matrix $A^t A$ is						
A	2×3	B	3×2	C	3×3	D	2×2
4	If $\begin{bmatrix} 2\lambda & 1 \\ 4 & 2 \end{bmatrix}$ is singular matrix then λ will be;						
A	0	B	1	C	4	D	2
5	If α, β are the roots of $x^2 - 4x + 3 = 0$ then $(\alpha + \beta)^2 =$						
A	16	B	4	C	4	D	3
6	Four 4 th roots of 16 are;						
A	$\pm 4, \pm 4i$	B	$\pm 1, \pm i$	C	$\pm 2, \pm 2i$	D	$\pm 16, \pm 16i$
7	Partial fraction of $\frac{1}{x^3+1}$ will be of the form;						
A	$\frac{Ax+B}{x^3+1}$	B	$\frac{A}{x+1} + \frac{Bx}{x^2-x+1}$	C	$\frac{A}{x+1} + \frac{Bx+C}{x^2+x+1}$	D	$\frac{A}{x+1} + \frac{Bx+C}{x^2-x+1}$
8	The series $1+2x+4x^2+8x^3+\dots$ will converge only if;						
A	$ x < \frac{1}{2}$	B	$ x > \frac{1}{2}$	C	$ x > 1$	D	$ x > 2$
9	Harmonic mean between 3 and 7 is;						
A	21	B	$\frac{21}{5}$	C	5	D	$\frac{5}{21}$
10	A fair coin is tossed 3 times then probability of getting 3 tails is;						
A	$\frac{3}{8}$	B	1	C	$\frac{1}{8}$	D	$\frac{1}{2}$

11	A die is rolled once then probability of getting even number of dots is;						
A	$\frac{1}{2}$	B	$\frac{1}{3}$	C	$\frac{1}{6}$	D	$\frac{1}{4}$
12	Sum of binomial co-efficient in the expansion of $(a+b)^6$ is ;						
A	16	B	32	C	48	D	64
13	The middle term in the expansion of $(x-y)^{12}$ will be;						
A	6 th	B	5 th	C	7 th	D	8 th
14	The angle in standard position whose terminal arm lies on x-axis or y-axis is called;						
A	Acute angle	B	Quadrantal angle	C	General angle	D	Obtuse angle
15	$\text{Cot}\left(\frac{3\pi}{2} - \theta\right) =$						
A	$\text{Cot}\theta$	B	$-\text{Cot}\theta$	C	$-\tan\theta$	D	$\tan\theta$
16	The range of the function $y = \text{Sin}x$ is;						
A	$-1 \leq y \leq 1$	B	$-1 \leq y < 0$	C	$0 \leq y \leq 1$	D	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$
17	In ΔABC if $m \angle B = 90^\circ$ then law of cosines will become;						
A	$a^2 = b^2 + c^2$	B	$b^2 = a^2 + c^2$	C	$c^2 = a^2 + b^2$	D	$b^2 = a^2 - c^2$
18	The circle which passes through the vertices of triangle is called;						
A	e-circle	B	In-circle	C	Circum circle	D	Point circle
19	If $y = \text{cot} x$ is principal cotangent function then;						
A	$-\pi < x < \pi$	B	$-\pi < x < 0$	C	$-2\pi < x < 2\pi$	D	$0 < x < \pi$
20	If $\text{Sin}2x = \frac{\sqrt{3}}{2}$ and $0 < x < \pi$ then x will be						
A	$\frac{\pi}{6}, \frac{\pi}{3}$	B	$\frac{\pi}{6}, \frac{\pi}{4}$	C	$\frac{\pi}{4}, \frac{\pi}{3}$	D	$\frac{\pi}{3}, \frac{2\pi}{3}$

(The End)

SECTION - I

2- Write short answers of any eight questions. (2 x 8 = 16)

1	Define complex number.	2	Express the complex number $\sqrt{3} + i$ in polar form.
3	Find the multiplicative inverse of the complex number $-3 - 5i$	4	Convert the laws $(A \cap B)' = A' \cup B'$ and $(A \cup B)' = A' \cap B'$ in logical form.
5	Define on-to function.	6	Consider the set $S = \{1, -1, i, -i\}$. Set up the multiplication table.
7	Convert the equation $x^{\frac{1}{2}} - x^{\frac{1}{4}} - 6 = 0$ in quadratic form.	8	Prove that $1.\omega.\omega^2 = 1$.
9	Discuss the nature of roots of the equation $x^2 + 2x + 3 = 0$.	10	If A and B are matrices of same order then explain why in general $(A+B)^2 \neq A^2 + 2AB + B^2$
11	If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 1 \end{bmatrix}$ then find minor and co-factor of -3.	12	Find inverse of the matrix $\begin{bmatrix} 3 & -1 \\ 2 & 1 \end{bmatrix}$

3- Write short answers of any eight questions. (2 x 8 = 16)

1	What are partial fractions?	2	Differentiate between conditional equation and identity.
3	Write identity for $\frac{x^2 + x - 1}{(x+2)^3}$	4	Determine whether -19 is the term of A.P 17, 13, 9, ... or not.
5	Insert two G.Ms between 2 and 16.	6	Find the value of r if $a_4 = \frac{8}{27}$ and $a_7 = \frac{-64}{729}$ of a G.P
7	If 5 is the harmonic mean between 2 and a, find a.	8	If the nth term of the A.P is $3n-1$ find A.P
9	A die is rolled. What is the probability that the dots on the top are greater than 4?	10	State the principle of mathematical induction.
11	Calculate $(2.02)^4$ by binomial theorem.	12	Prove that for $n = 3, 4$ the statement $5^n - 2^n$ is divisible by 3, is true or false.

4- Write short answers of any nine questions. (2 x 9 = 18)

1	Define Radian.	2	Convert $54^{\circ}45'$ into radians.
3	If $\sin\theta = -\frac{1}{\sqrt{2}}$ and the terminal arm of the angle is not in quad. III find value of $\cos\theta$?	4	If α, β, γ are the angles of a triangle ABC, then prove that $\sin(\alpha + \beta) = \sin\gamma$
5	Prove that $\tan(45^{\circ} + A)\tan(45^{\circ} - A) = 1$	6	Show that $\sin 2\theta = \frac{2 \tan \theta}{1 + \tan^2 \theta}$
7	Write the Domain and Range of $\tan x$	8	A Vertical Pole is 8m high and the length of its shadow is 6m. What is the angle of elevation of the sun at that moment?
9	In triangle ABC if $\beta = 60^{\circ}, \gamma = 15^{\circ}, b = \sqrt{6}$ Find c.	10	Find α by using half angle formula when $a=283, b=317, c=428$.
11	Find the value of $\cos^{-1}\left(-\frac{1}{2}\right)$	12	Define trigonometric equation.
13	Solve the equation $1 + \cos x = 0$		

SECTION - II

Note:- Attempt any three questions. (10 x 3 = 30)

5	a	Construct truth table for the following statement $\sim(p \rightarrow q) \leftrightarrow (p \wedge \sim q)$	(05)
	b	If l, m, n are p th, q th and r th terms of an A.P, then show that $l(q-r) + m(r-p) + n(p-q) = 0$	(05)
6	a	Find x if $\begin{vmatrix} 1 & x-1 & 3 \\ -1 & x+1 & 2 \\ 2 & -2 & x \end{vmatrix} = 0$	(05)
	b	Prove from first principle that ${}^n P_r = {}^{n-1} P_r + r \cdot {}^{n-1} P_{r-1}$	(05)
7	a	Show that the roots of $x^2 + (mx+c)^2 = a^2$ will be equal, if $c^2 = a^2(1+m^2)$	(05)
	b	Use mathematical induction to prove $\frac{1}{2 \times 5} + \frac{1}{5 \times 8} + \frac{1}{8 \times 11} + \dots + \frac{1}{(3n-1)(3n+2)} = \frac{n}{2(3n+2)}$	(05)
8	a	If $\operatorname{Cosec} \theta = \frac{m^2+1}{2m}$ and $m > 0$ ($0 < \theta < \frac{\pi}{2}$), Find the values of the remaining trigonometric ratios.	(05)
	b	Reduce $\sin^4 \theta$ to an expression involving only function of multiples of θ raised to the first power.	(05)
9	a	The area of triangle is 121.34. If $\alpha = 32^{\circ}15', \beta = 65^{\circ}37'$ then find side c and angle γ	(05)
	b	Prove that $\sin^{-1} \frac{1}{\sqrt{5}} + \cot^{-1} 3 = \frac{\pi}{4}$	(05)

(The End)