

MATHEMATICS 2021

(AS PER CONDENSED SYLLABUS)

TIME: 2 Hours

(100 Marks)

NOTE:

- This section consists of 25 part questions and all are to be answered. Each question carries 02 marks.
- Do not copy the part questions in your answer book. Write only the answer in full against the proper number of the question and its part.
- The use of calculator is allowed. All notations are used in their usual meanings.

SECTION 'A' (Multiple Choice Questions)(50)

1. Choose the correct answer for each from the given options:

(i) Let $A = \{0, 1\}$, $B = \{1, 2\}$, $C = \{2, 3\}$, then $A \times (B \cap C)$:

- * ϕ
- * $\{(1,3), (0, 1)\}$
- * $\{(0, 2), (1, 2)\}$ ✓
- * $\{(2, 3), (1:1)\}$

(ii) If A and B are two non-empty sets, then $A \cap (B \cup \phi)$ is equal to:

- * A
- * B
- * $A \cap B$ ✓
- * ϕ

(iii) The real and imaginary parts of $\frac{\sqrt{5} + i}{\sqrt{5} - i}$ are:

- * $-\frac{2}{3}$ and $\frac{\sqrt{5}}{3}$
- * $\frac{2}{3}$ and $\frac{\sqrt{5}}{3}$ ✓
- * $-\frac{2}{3}$ and $-\frac{\sqrt{5}}{3}$
- * $\frac{2}{3}$ and $-\frac{\sqrt{5}}{3}$

(iv) The multiplicative inverse of (a, b) is:

- * $\left(\frac{-a}{a^2 + b^2}, \frac{-b}{a^2 + b^2}\right)$
- * $\left(\frac{a}{a^2 + b^2}, \frac{-b}{a^2 + b^2}\right)$ ✓
- * $\left(\frac{-a}{a^2 + b^2}, \frac{b}{a^2 + b^2}\right)$
- * $\left(\frac{a}{a^2 + b^2}, \frac{b}{a^2 + b^2}\right)$

(v) If $Z = 3i + 2$, then $Z + \bar{Z}$:

- * 6i
- * 6
- * 0
- * 4 ✓

(vi) If the product of the roots of equation $px^2 - 4x + 4 = 0$ is 2, then the value of p is:

- * 1
- * 2 ✓
- * 4
- * -4

(vii) The value of $i^{57} + \frac{1}{i^{125}}$ is:

- * 0 ✓
- * 2i
- * -2i
- * 2

(viii) If $\omega^3 = 1$ and $\omega \neq 1$ then $(1 - \omega)(1 + \omega^2)(1 + \omega)(1 + \omega^2) \dots =$:

- * 3
- * -3 ✓
- * 1
- * -1

(ix) If the sum of the roots of $6x^2 - 3mx + 5 = 0$ is equal to the product of its roots, then the value of m is:

- * $-\frac{3}{5}$
- * $\frac{3}{5}$
- * $\frac{5}{3}$ ✓
- * $-\frac{3}{5}$

(x) The next term of the sequence 1, 2, 4, 7, 11, is:

- * 15
- * 16 ✓
- * 17
- * 18

(xi) The 15th term of an A.P. is -15, -22, -29, -36, is:

- * 106
- * -106
- * 113
- * -113 ✓

(xii) $1, x^2, 6 - x^2$ will form a G.P if $x =$:

- * 2
- * $\sqrt{2}$ ✓
- * 4
- * 8

(xiii) The H.M between $\frac{1}{3}$ and $\frac{2}{5}$ is:

- * $\frac{11}{4}$
- * $\frac{4}{11}$ ✓
- * $\frac{-4}{11}$
- * $\frac{-11}{4}$

(xiv) The number of ways of sitting n persons at a round table is:

- * $(n - 1)!$ ✓
- * $(n + 1)!$
- * $\frac{1}{2}(n + 1)!$
- * $\frac{1}{2}(n - 1)!$

(xv) The middle term in the expansion of $(1 + x)^{10}$ is:

- * 6 ✓
- * 5
- * 4
- * 3

(xvi) If $(a + b)^n$, where n is an even number then the number of middle term/terms are:

- * One
- * Two
- * Three
- * Four

(xvii) If $(a - b)^{13}$, then it will contain:

- * 14 terms ✓
- * 13 terms
- * 15 terms
- * 16 terms

(xviii) The central angle of an arc of a circle whose length is equal to the radius of the circle is called:

- * radian ✓
- * degree
- * minute
- * second

(xix) In ΔABC , $\frac{\cos \alpha}{a} = \frac{\cos \beta}{b} = \frac{\cos \gamma}{c}$, then ΔABC is a/an:

- * equilateral triangle ✓
- * isosceles triangle
- * right angled triangle
- * obtuse angled

(xx) $\cos \frac{\pi}{2} \cos \frac{\pi}{6} - \sin \frac{\pi}{2} \sin \frac{\pi}{6}$ is equal to:

- * $\frac{1}{2}$
- * $-\frac{\sqrt{3}}{2}$
- * $\frac{\sqrt{3}}{2}$
- * $\frac{1}{2}$ ✓

(xxi) $\cos 2\theta =$:

- * $1 - 2\sin^2 \theta$
- * $2\cos^2 \theta - 1$ ✓
- * $\cos^2 \theta + \sin^2 \theta$
- * $2\sin \theta \cos \theta$

(xxii) If $\sin \theta < 0$ and $\cos \theta > 0$, then $\rho(\theta)$ lies in this quadrant:

- * 1st
- * 2nd
- * 3rd
- * 4th ✓

(xxiii) In a triangle ABC, $\sin \frac{\alpha}{2} =$:

- * $\sqrt{\frac{(s-b)(s-c)}{bc}}$ ✓
- * $\sqrt{\frac{(s-a)(s-b)}{ab}}$
- * $\sqrt{\frac{(s-a)(s-c)}{ac}}$
- * $\frac{\Delta}{s-a}$

(xxiv) $\cos(270 + \theta) =$:

- * $\cos \theta$
- * $\tan \theta$
- * $\sin \theta$ ✓
- * $\sec \theta$

(xxv) The Principal value of $\arcsin \left(\frac{-\sqrt{3}}{2}\right) =$:

- * $\frac{\pi}{3}$
- * $\frac{\pi}{6}$
- * $-\frac{\pi}{3}$ ✓
- * $-\frac{\pi}{6}$