

Model Paper Class 11th Class: 11th

Exam: Hr. Sec. Part I

Max Marks: 100

Subject: Applied Mathematics

Time: 3 Hours

Section (A) Long Answer Type Questions (5Q X 6M = 30Marks)

Q.No.1. If α and β are different complex number with $|\beta|=1$. Find; $\left| \frac{\beta - \alpha}{1 - 2\beta} \right|$

Or

Convert the complex number $Z = \frac{i-1}{\cos\frac{\pi}{3} + i \sin\frac{\pi}{3}}$ in the polar form.

Q.No.2. Sum of first p, q and r terms of an A.P are a, b and c respectively. Prove that; $\frac{a}{q}(q-r) + \frac{b}{q}(r-p) + \frac{c}{r}(p-q) = 0$

Or

Find the sum of the sequence 7, 77, 777, ... to n terms.

Q.No.3. Solve for general and principal solution of the equation;

$$\sin 2x - \sin 4x + \sin 6x = 0$$

Or

Prove that; $\cos x \cos \frac{x}{2} + \cos 3x \cos \frac{9x}{2} = \sin 5x \sin \frac{5x}{2}$

Q.No.4. Find 'n' if; (I) $(n-1)P_3 : nP_4 = 1:9$

$$(II) 2n_{c_3} : n_{c_3} = 12:1$$

Or

The coefficient of $(r-1)^{th}$, r^{th} and $(r+1)^{th}$ terms in the expansion of $(x+1)^n$ are in the ratio 1:3:5. Find n and r

Q.No.5. Find the equation of a line passing through the points (2,2) and cutting off intercepts on the axes whose sum is

Or

If p and q are the lengths of perpendiculars from the origin to the line $x \cos \theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \operatorname{cosec} \theta = k$ respectively. Prove that $p^2 + 4q^2 = k^2$

Section (B) Short Answer Type Questions (10QX4M=40Marks)

Q.No.6. Find the subsets of the set $A = \{1,2,3\}$

Q.No.7. If $f = \left\{ \left(x, \frac{x^2}{1+x^2} \right) : x \in R \right\}$ be a function from R to R . Determine the range of f

Q.No.8. Express the following in the form of $a + ib$

$$\frac{(3+i\sqrt{5})(3-i\sqrt{5})}{(\sqrt{3}+2i)(\sqrt{3}-2i)}$$

Q.No.9. Find the sum of 'n' terms of an A.P whose k^{th} term is $5k = 1$

Q.No.10. How many 3-digit numbers can be formed using the digits 1 to 9 if no digit is repeated.

Q.No.11. Find the middle term in the expansion of; $\left(3 - \frac{x^3}{6}\right)^7$

Q.No.12. Point $R(h, k)$ divides a line segment between the axes in the ratio 1:2.

Find the equation of the line.

Q.No.13. A letter is chosen at random from the word "ASSASSINATION". Find the probability that letter is:

(I) a vowel (II) a consonant

Q.No.14. If A and B are the events such that $P(A) = 0.42, P(B) 0.48$ and

$P(A \text{ and } B) = 0.16$. Determine;

(I) $P(\text{not } A)$ (II) $P(A \text{ or } B)$

Q.No.15. Find:

(I) Dot product of $\vec{a} = 3\hat{i} + 2\hat{j} - 6\hat{k}$ and $\vec{b} = 2\hat{i} + 4\hat{j} + 6\hat{k}$

(II) Cross product of; $\vec{a} = 2\hat{i} + \hat{k}$ and $\vec{b} = \hat{i} - \hat{j}$

Section (C) Very Short Answer Type Questions (10QX2M=20Marks)

Q.No.16. If $A = \{a, b, c, d\}, B = \{c, d, e, f\}$ Find $A \cup B$

Q.No.17. If $\left(\frac{x}{3} + 1, y - \frac{2}{3}\right) = \left(\frac{5}{3}, \frac{1}{3}\right)$. Find 'x' and 'y'

Q.No.18. Find the multiplicative inverse of $Z = \sqrt{5} + 3i$

Q.No.19. Find first four terms of sequence $a_n = (-1)^{n-1}5^{n+1}$

Q.No.20. Find the degree measure of $\frac{5\pi}{3}$ radians

Q.No.21. Find the value of $\sin \frac{-11\pi}{3}$

Q.No.22. Find the slope of the line passing through origin and (2,3)

Q.No.23. Find the sample space when a coin is tossed twice.

Q.No.24. Define unit vector. Give an example.

Q.No.25. Check if the vectors $\vec{a} = 3\hat{i} + 2\hat{j}$ and $\vec{b} = 2\hat{i} - 3\hat{j}$ are orthogonal.

Section (C) Very Short Answer Type Questions (10QX1M=10Marks)

Q. No. 26. Do as directed.

(I) If A set has n elements. Then the number of subsets is

- (a) n^2 (b) 2^n
(c) $An + 2$ (d) $2n$

(II) Polynomial equation of degree n has n roots. (True/False)

(III) The nth term of the sequence $1 \times 2 \times 3 + 2 \times 3 \times 4 + 3 \times 4 \times 5 + \dots$ is

(IV) For any real numbers 'x' and 'y', $\sin x = \sin y$, implies

- (a) $x = y$ (b) $x = n\pi + (-1)^n y$
(c) $n\pi + (-1)^n y$ (d) $x = \frac{\pi}{2} + y$

(V) The value of $n_{C_r} + n_{C_{r-1}}$ is

- (a) n_{C_r} (b) n_{C_0}
(c) n_{C_r} (d) $n_{C_{r+1}}$

(VI) Two lines are perpendicular if the product of their slopes is;

- (a) 0 (b) -1
(c) 1 (d) either 1 or 0

(VII) If P is the probability of an event E . Then which of the following is true?

(a) $0 < P < 1$

(b) $0 \leq p < 1$

(c) $0 < p \leq 1$

(d) $0 \leq P \leq 1$

(VIII) If A and B are two independent events, then $P(A \cap B) = \dots$

(a) $P(A)P(B)$

(b) $P(A) + P(B)$

(c) 0

(d) *None of these*

(IX) The commutativity of dot product of two vectors \vec{a} and \vec{b} implies

(a) $\vec{a} + \vec{b} = \vec{b} + \vec{a}$

(b) $\vec{a} \cdot \vec{b} = \vec{b} \cdot \vec{a}$

(c) $\vec{a} \times \vec{b} = \vec{b} \times \vec{a}$

(d) $\vec{a} \cdot \vec{b} = \vec{b} \times \vec{a}$

(X) The magnitude of the vector $\vec{a} = \vec{i} + \vec{j} + \vec{k}$ is

(a) $\sqrt{3}$

(b) $\sqrt{5}$

(c) 0

(d) $\sqrt{3}$

Model Question paper Designed by;

1. Mr. Gulzar Ahmad Dar (Lec. Mathematics GHSS Magam) 9419562742
2. Mr. Muzafar Ahmad Bhat (Lec. Mathematics GHSS Nunar) 9906323874
3. Mr. Nazir Ahmad Mir (Lec. Mathematics BHSS Bomai HSS Sopore) 7051811400
4. Mr. Bashir Ahamd Sheikh (Teacher Zone Beerwah) 9596559111