SUCCESS KEY TEST SERIES

First Term Examination

Std: 11th Science **Subject: Mathematics & Statistics** **Time: 3Hrs**

Date : **Math-1 & 2 (Ch-1 to 4)** **Max Marks: 80**

Section A (MCQ & VSA 1 MARKS Questions)

Q.1 Select and write the correct answer: **16**

(i) In ΔABC if cotA cotB cotC > 0 then the triangle is....
(a) Acute angled (b) right angled
(c) obtuse angled (d) isosceles right angled

(ii) The sum of a certain number of terms of an AP series -8, -6, -4, …….. is 52. The number of terms is
(a) 12 (b) 14 (c) 11 (d) 13

(iii) Law, which does not hold in multiplication of matrices is known as
(a) distributive law (b) Inverse law
(c) Associative law (d) Communicative law

(iv) Given $A = \begin{bmatrix} 1 & 3 \\ 2 & 2 \end{bmatrix}$, $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ if $A - \lambda I$

is a singular matrix then.....
(a) $\lambda = 0$ (b) $\lambda^2 - 3\lambda - 4 = 0$
(c) $\lambda^2 + 3 - 4 = 0$ (d) $\lambda^2 - 3\lambda - 6 = 0$

(v) What is imaginary part of $7 + \sqrt{3}$?

(a) 7 (b) $\sqrt{3}$ (c) 1 (d) 0

(vi) The central angle of a sector of circle of area 16π sq.cm is 45°, the perimeter of the sector is
(a) $(6 + \pi)$ cm (b) $(4 + \pi)$ cm (c) $(5 + \pi)$ cm (d) $(8 + \pi)$ cm

(vii) The value of matrix $A = \begin{vmatrix} 2 & -3 \\ 4 & 7 \end{vmatrix}$ is

(a) 20 (b) 32 (c) 26 (d) None of these

(viii) Compute to two decimal places of decimal by use of binomial formula for $(0.98)^6$.
(a) 0.98 (b) 0.88 (c) 0.78 (d) 0.48

Q.2 Answer the following: **4**

(i) Find the signs of the following: cos 400°

(ii) Express the following as a sum or difference of two trigonometric function.
2cos35° cos75°

(iii) Evaluate $(i^{131} + i^{49})$

(iv) Write the conjugates of the following complex number

$-\sqrt{-5}$

Section B (2 MARKS EACH)

Attempt any Eight: **16**

Q.3 Four parallel lines intersect another set of five parallel lines. Find the number of distinct parallelograms formed.

Q.4 Construct a matrix $A = \left[a_{ij}\right]_{3x2}$ whose elements a_{ij} are given by

$a_{ij}=i-3j$

Q.5 If $A=\begin{bmatrix}\cos\alpha & \sin\alpha \\ -\sin\alpha & \cos\alpha\end{bmatrix}$ show that $A^TA = I$,

where I is the unit matrix of order 2

Q.6 Construct a matrix $A = \left[a_{ij}\right]_{3x2}$ whose elements a_{ij} are given by

$a_{ij}=\frac{(i+j)^3}{5}$

Q.7 You have 2 identical books on English, 3 identical books on Hindi, and 4 identical books on Mathematics. Find the number of distinct ways of arranging them on a shelf.

Q.8 In the following expansions, find the indicated term.

$\left(\frac{4x}{5}-\frac{5}{2x}\right)^9$, 7^{th} term

Q.9 State first four terms in the expansion of

$\frac{1}{(a-b)^4}$ where $|b|<|a|$

Q.10 If $\tan A=\frac{4}{3}$, find the value of $\frac{2\sin A-3\cos A}{2\sin A+3\cos A}$

Q.11 Find the modulus and amplitude for each of the following complex numbers.
1+i

Q.12 Determine the number of arrangements of letters of the word ALGORITHM if.
O is the first and T is the last letter.

Q.13 If $A=\begin{bmatrix}2 & -1 \\ -1 & 2\end{bmatrix}$

show that $A^2 - 4A + 3I = 0$

Q.14 Check whether the following sequences are G.P. If so, write t_n
3,4,5,6,…

Section C (3 MARKS EACH)

Attempt any Eight: **24**

Q.15 How many four digit numbers will not exceed 7432 if they are formed using the digits 2,3,4,7 without repetition?

Q.16 Show that the lines x - y = 6, 4x - 3y = 20 and 6x + 5y + 8 = 0 are concurrent .Also find the point of concurrence

Q.17 Insert 4 terms between 2 and 22 so that the new sequence is in AP.

Q.18 Using properties of determinants show that

$$\begin{vmatrix} 1 & \log_x y & \log_x z \\ \log_y x & 1 & \log_y z \\ \log_z x & \log_z y & 1 \end{vmatrix} = 0$$

Q.19 Prove that tan 20° tan 40° tan 60° tan 80° = 3

Q.20 Express the following in the form a + ib, a, bϵ R, using De Moivre's theorem.
$(1 - i)^5$

Q.21 Find the sum to n terms of the sequence
0.5, 0.05, 0.005,…..

Q.22 $$\text{If } \tan\theta = \frac{1}{\sqrt{7}} \text{ then evaluate } \frac{\text{cosec}^2\theta - \sec^2\theta}{\text{cosec}^2\theta + \sec^2\theta}$$

Q.23 A question paper has two sections, section I has 5 questions and section II has 6 questions. A student must answer at least two question from each section among 6 questions he answers. How many different choices does the student have in choosing questions ?

Q.24 If $2\sin^2\theta + 7\cos\theta = 5$ then find the permissible values of $\cos\theta$.

Q.25 Find the value of $x^3 - x^2 + 2x + 10$ when $x = 1 + \sqrt{3}i$

Q.26 A pendulum of length 21cm oscillates through an angle of 36°. Find the length of its path.

Section D (4 MARKS EACH)

Attempt any Five: **20**

Q.27 Prove by method of induction

$$\begin{pmatrix} 3 & -4 \\ 1 & -1 \end{pmatrix}^n = \begin{pmatrix} 2n+1 & -4n \\ n & -2n+1 \end{pmatrix}, \forall n \in N$$

Q.28 The measures of the angles of the triangle are in A.P. The smallest angle is 40. Find the angles of the triangle in degree and in radians.

Q.29 If sinA + sinB = x and cosA + cosB = y then show that

$$\sin(A+B) = \frac{2xy}{x^2 + y^2}$$

Q.30 Determine whether the sum of all the terms in the series is finite. In case it is finite find it.

$$\frac{1}{3}, \frac{1}{3^2}, \frac{1}{3^3}, \ldots\ldots$$

Q.31

$$\text{If } A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 1 & 2 & 3 \end{bmatrix}, B = \begin{bmatrix} 1 & -1 & 1 \\ -3 & 2 & -1 \\ -2 & 1 & 0 \end{bmatrix}$$

show that AB and BA are both singular matrices

Q.32 Find 2 x 5 x 8 + 4 x 7 x 10 + 6 x 9 x 12 + ….. Upto n terms.

Q.33 In ΔABC Prove that

$$\frac{\cos A - \cos B + \cos C + 1}{\cos A + \cos B + \cos C - 1} = \cot\frac{A}{2}\cot\frac{C}{2}$$

Q.34 Prove that tanA + 2tan2A + 4tan4A + 8cot8A = cotA

-------- All the Best --------