11th CLASS – 1st Annual 2024

ATHEMATICS	SUBJECTIVE PART	TIME: 2 HRS 30 MINUTES
GROUP : SECOND		MARKS: 80

SECTION–I

DAK-2-24

QUESTION NO. 2 Write short answers any Eight (8) of the following 16

i	Simplify $(5, -4)(-3, -2)$
ii	Separate into real and imaginary parts $\frac{2-7i}{4+5i}$
iii	Prove that $\bar{Z} = Z$ if Z is real
iv	Simplify $(a + bi)^2$
v	Write two proper subsets of $\{a, b, c\}$
vi	Show that $(p \wedge q) \rightarrow p$ is a tautology
vii	Find x and y if $\begin{bmatrix} 2 & 0 & x \\ 1 & y & 3 \end{bmatrix} + 2\begin{bmatrix} 1 & x & y \\ 0 & 2 & -1 \end{bmatrix} = \begin{bmatrix} 4 & -2 & 3 \\ 1 & 6 & 1 \end{bmatrix}$
viii	Find the matrix X if $\begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix} X = \begin{bmatrix} 2 & 1 \\ 5 & 10 \end{bmatrix}$
ix	If $A = \begin{bmatrix} 1 & 2 & -3 \\ 0 & -2 & 0 \\ -2 & -2 & 1 \end{bmatrix}$, then find A_{12} and A_{32}
x	Evaluate $\omega^{28} + \omega^{29} + 1$
xi	Use remainder theorem to find the remainder when $x^2 + 3x + 7$ is divided by $x + 1$
xii	Discuss the nature of the roots of equation $2x^2 - 5x + 1 = 0$

QUESTION NO. 3 Write short answers any Eight (8) of the following 16

i	Define partial fraction resolution
ii	Suppose $\frac{7x+25}{(x+3)(x+4)} = \frac{A}{x+3} + \frac{B}{x+4}$ Find the values of A and B
iii	Write the first four terms of the following sequence, if $a_n = (-1)^n n^2$
iv	Which term of the A.P 5, 2, -1, ... is -85 ?
v	If $\frac{1}{a}, \frac{1}{b}$ and $\frac{1}{c}$ are in G.P. Show that the common ratio is $\pm\sqrt{\frac{a}{c}}$
vi	Show that $G^2 = AH$ If $a = 2i$, $b = 4i$
vii	Find the value of n if ${}^nP_2 = 30$
viii	Find the number of the diagonals of a 6-sided figure
ix	A die is rolled. What is the probability that the dots on the top are greater than 4 ?
x	Prove that $4^k > 3^k + 4$ is true for $k = 2, 3$
xi	Calculate $(0.97)^3$ by means of binomial theorem
xii	Expand up to 4 terms $(1 - x)^{1/2}$, taking the values of x such that the expansion is valid

(P.T.O)

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DGK-2-24

QUESTION NO. 4 Write short answers any Nine (9) of the following 18

i	Find ℓ , when $\theta = 65^\circ 20'$, r = 18 mm
ii	Verify that $2 \sin 45^\circ + \frac{1}{2} \operatorname{cosec} 45^\circ = \frac{3}{\sqrt{2}}$
iii	Without using the tables , find the value of sec (- 300)
iv	Prove that $\frac{\cos 8^\circ - \sin 8^\circ}{\cos 8^\circ + \sin 8^\circ} = \tan 37^\circ$
v	Prove that $1 + \tan \alpha \tan 2\alpha = \sec 2\alpha$
vi	Write down the domain and range of $\sin x$
vii	Find the period of $\cot \frac{x}{2}$
viii	Draw the graph of $y = \cos x$ for $0 \leq x \leq 360^\circ$
ix	What is difference between right angle triangle and oblique triangle
x	Find the area of the triangle ABC , if a = 200 , b = 120 , $\gamma = 150^\circ$
xi	Find the radius of in-circle if a = 13 , b = 14 , c = 15
xii	Without using calculator , show that $\tan^{-1} \frac{5}{12} = \sin^{-1} \frac{5}{13}$
xiii	Solve the equation $\sin x + \cos x = 0$

SECTION-II

Note: Attempt any Three questions from this section 10 x 3 = 30

Q.5- (A)	Solve the equation $\sqrt{5x^2 + 7x + 2} - \sqrt{4x^2 + 7x + 18} = x - 4$
(B)	Use matrices to solve the following system of equation $2x_1 + x_2 + 3x_3 = 3$ $x_1 + x_2 - 2x_3 = 0$ $-3x_1 - x_2 + x_3 = -4$
Q.6- (A)	Resolve the following into partial fractions $\frac{x^2}{(x-2)(x-1)^2}$
(B)	Find n so that $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ may be the A.M. between a and b
Q.7-(A)	A natural number is chosen out of the first fifty natural numbers. What is the probability that the chosen number is multiple of 3 or 5 ?
(B)	Expand $\left(\frac{x}{2} - \frac{2}{x^2}\right)^6$ by using binomial theorem
Q.8-(A)	Show that $\cos 20^\circ \cos 40^\circ \cos 80^\circ = \frac{1}{8}$
(B)	The sides of triangle are $x^2 + x + 1$, $2x + 1$ and $x^2 - 1$ Prove that the greatest angle of the triangle is 120°
Q.9-(A)	Prove that : $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$ Where θ is not an odd multiple of $\frac{\pi}{2}$
(B)	Prove that : $\cos^{-1} A + \cos^{-1} B = \cos^{-1} [AB - \sqrt{1 - A^2}\sqrt{1 - B^2}]$