PAPER CODE - 6192
(11th CLASS - 12018)

DGK-G2-11-18

MATHEMATICS , GROUP SECOND

TIME: 30 MINUTES , MARKS: 20

OBJECTIVE

NOTE: You have four choices for each objective type question as A , B , C and D . The choice which you think is correct , fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question.

QUESTION NO. 1

(1) Multiplicative inverse of complex number (0,-1) is
(A) (-1,0) (B) (0,1) (C) (1,0) (D) (0,-1)

(2) The contra-positive of $p \rightarrow q$ is
(A) $q \rightarrow p$ (B) $\sim q \rightarrow p$ (C) $q \rightarrow \sim p$ (D) $\sim q \rightarrow \sim p$

(3) If the matrix $\begin{bmatrix} \lambda & 1 \\ -2 & -1 \end{bmatrix}$ is singular then $\lambda =$
(A) 2 (B) 1 (C) -1 (D) - 2

(4) If matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 1 & -1 & 1 \end{bmatrix}$ then the cofactor $A_{32} =$
(A) 1 (B) 2 (C) -1 (D) -2

(5) The roots of equation $x^2+2x+3 = 0$ will be
(A) Complex (B) Equal (C) Rational (D) Irrational

(6) If w is the cube root of unity then $(1+w-w^2)^8 =$
(A) 256 (B) -256 (C) -256 w (D) 256 w

(7) The fraction $\frac{x^2-3}{3x+1}$ is
(A) Proper fraction (B) Improper fraction (C) Equation (D) Polynomial

(8) If $a_{n-2} = 3n-11$ then nth term is
(A) 3n+5 (B) 3n-3 (C) 3n-5 (D) 3n+2

(9) Arithmetic mean between $2+\sqrt{2}$ and $2-\sqrt{2}$ is
(A) 2 (B) 4 (C) $2\sqrt{2}$ (D) 0

(10) A die is rolled once then the probability of 3 or 4 dots on the top is
(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) $\frac{1}{6}$

(11) If in usual notations ${}^nC_6 = {}^nC_8$ then n is equal to
(A) 6 (B) 8 (C) 2 (D) 14

(12) The expansion of $(3-5x)^{1/2}$ is valid if
(A) $|x| < 5/2$ (B) $|x| < 5/3$ (C) $|x| < 1$ (D) $|x| < 3/5$

(13) In the expansion of $(1+x)^{-3}$ the 4th term is
(A) $-3x$ (B) $-10x^3$ (C) $6x^2$ (D) $10x^3$

(14) If $\tan\theta = 8/15$ and $\pi \leq \theta \leq \frac{3\pi}{2}$ then $\cos\theta =$
(A) $-17/15$ (B) $17/15$ (C) $15/17$ (D) $-15/17$

(15) The value of $\cos 75^\circ =$
(A) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (B) $\frac{-\sqrt{3}+1}{2\sqrt{2}}$ (C) $\frac{\sqrt{3}+1}{2\sqrt{2}}$ (D) $\frac{-\sqrt{3}-1}{2\sqrt{2}}$

(16) The period of 3 sin x is
(A) 3π (B) π (C) 2π (D) $\pi/3$

(17) If $\propto = 90^\circ$ then by law of cosine
(A) $c^2 = a^2+b^2$ (B) $a^2 = b^2 + c^2$ (C) $b^2 = a^2 + c^2$ (D) $a^2 = b^2 - c^2$

(18) Radius of escribed circle opposite to vertex B in Δ ABC is
(A) $\frac{\Delta}{S}$ (B) $\frac{\Delta}{S-a}$ (C) $\frac{\Delta}{S-C}$ (D) $\frac{\Delta}{S-b}$

(19) Domain of principal sine function is
(A) $[0, \pi/2]$ (B) $[0, \pi]$ (C) $[-\pi/2, \pi/2]$ (D) $[0, 2\pi]$

(20) The solution of $\sin x + \cos x = 0$ in $[0, \pi]$ is
(A) $\frac{3\pi}{4}$ (B) $\pi/4$ (C) $\pi/6$ (D) $\pi/3$

MATHEMATICS
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SUBJECTIVE
SECTION-I

DGK-G2-11-18

TIME : 2.30 HOURS
MARKS : 80

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

1	Define terminating decimal ; Give one example
2	Find multiplicative inverse of $(-4, 7)$
3	Show that $\forall Z \in C$, $Z^2 + \overline{Z^2}$ is a real number
4	Write $\{x \mid x \in O \wedge 5 \leq x < 7\}$ in the descriptive and tabular form
5	Write converse , contra positive of $q \rightarrow p$
6	State Domain and range of relation $\{(x, y) \mid x+y > 5\}$ in $A = \{1,2,3,4\}$
7	If $B = \begin{bmatrix} 5 & -2 & 5 \\ 3 & -1 & 4 \\ -2 & 1 & -2 \end{bmatrix}$, find cofactor B_{21} and B_{22}
8	Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} y & 1 \\ -3 & 2x \end{bmatrix}$
9	Without expansion show that $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \gamma+\alpha & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix} = 0$
10	Solve : $x^2 - x = 2$ by factorization
11	Find four fourth roots of 16
12	If α , β are roots of $3x^2 - 2x + 4 = 0$, find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$

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

1	Resolve $\frac{7x+25}{(x+3)(x+4)}$ into partial fractions
2	Write the first four terms of $a_n = \frac{n}{2n+1}$
3	Find the Arithmetic Mean (A.M) between x-3 and x+5
4	Sum up to 13-terms of the Arithmetic series $\frac{3}{\sqrt{2}} + 2\sqrt{2} + \frac{5}{\sqrt{2}} + \ldots\ldots\ldots\ldots$
5	Find two Geometric mean between 1 and 8
6	Calculate the sum of 8-terms of the Geometric series $2+(1-i)+\frac{1}{i}+\ldots\ldots\ldots\ldots$
7	Evaluate $\frac{9!}{2!(9-2)!}$
8	Find the value of n , when (a) ${}^nC_5 = {}^nC_4$ and (b) ${}^nC_{10} = \frac{12\times11}{2!}$, (C stands for combination)
9	There are 5-green and 3-red balls in a box. What is the probability of getting a green ball
10	Use mathematical induction to verify the result for $n = 1,2$ $1+2+4+\ldots\ldots\ldots\ldots + 2^{n-1} = 2^n - 1$
11	Calculate $(2.02)^4$ by means of Binomial theorem
12	Expand up to 3-terms , taking the value of x such that the expansion is valid $(8-2x)^{-1}$

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

1	Find r if $\ell = 56$ cm , $\theta = 45^\circ$
2	Find x if $\tan^2 45^\circ - \cos^2 60^\circ = x \sin 45^\circ \cos 45^\circ \tan 60^\circ$
3	Prove $\cos^2\theta - \sin^2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$
4	Prove that $\cos 306^\circ + \cos 234^\circ + \cos 162^\circ + \cos 18^\circ = 0$
5	Prove $\tan(\frac{\pi}{4} - \theta) + \tan(\frac{3\pi}{4} + \theta) = 0$
6	Prove $\frac{1-\cos\alpha}{\sin\alpha} = \tan\frac{\alpha}{2}$
7	Find the period of $\tan\frac{x}{7}$
8	In the right triangle Δ ABC , $\alpha = 37^\circ 20'$, $a = 243$, $\gamma = 90^\circ$, Find "β" and "C"
9	Find the area of a Δ ABC , in which $a = 18$, $b = 24$, $c = 30$
10	Prove that $R = \frac{abc}{4\Delta}$, with usual notations
11	Prove $\tan^{-1}A + \tan^{-1}B = \tan^{-1}\left(\frac{A+B}{1-AB}\right)$
12	Find the solutions of the equation $\sec x = -2$, $x \in [0, 2\pi]$
13	Find the values of θ , satisfying the equation $3\tan^2\theta + 2\sqrt{3}\tan\theta + 1 = 0$

(P.T.O)

D.Cr-K

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SECTION-II

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

5-(A)	Give logical proof of $(A \cup B)' = A' \cap B'$ when A , B are two sets
(B)	Without expansion , Prove that $\begin{vmatrix} x & a+x & b+c \\ x & b+x & c+a \\ x & c+x & a+b \end{vmatrix} = 0$
6-(A)	Show that the roots of $(mx+c)^2 = 4ax$ will be equal if $c = \frac{a}{m}$
(B)	Resolve $\frac{x^2}{(x-2)(x-1)^2}$ into partial fractions
7-(A)	If S_2 , S_3 , S_5 are the sum of 2n , 3n , 5n terms of Arithmatic Progression (A.P) , Show that $S_5 = 5\,(S_3 - S_2)$
(B)	If $y = \frac{2}{5} + \frac{1.3}{2!}\left(\frac{2}{5}\right)^2 + \frac{1.3.5}{3!}\left(\frac{2}{5}\right)^3 + \ldots\ldots\ldots\ldots$ then prove that $y^2+2y-4=0$
8-(A)	If $\cot\theta = 15/8$ and the terminal arm of the angle is not in quadrant-I , Find the values of $\cos\theta$ and $\operatorname{cosec}\theta$
(B)	Reduce $\sin^4\theta$ to an expression involving only function of multiples of θ , raised to the first power
9-(A)	Solve the triangle Δ ABC , using first law of tangent and then of law of sines : $a = 93$, $c = 101$ and $\beta = 80°$
(B)	Prove that : $\sin^{-1}A - \sin^{-1}B = \sin^{-1}\left(A\sqrt{1-B^2} + B\sqrt{1-A^2}\right)$