TERM TEST 02

2023 A/L TERM TEST PRACTICE

COMBINED MATHS

English Medium

ONLINE PAPER CLASS

1. Proving Identities
2. Solving Triangles
3. General Solutions
4. Algebraic Application
5. Logarithms & Indices
6. Partial Fractions
7. Real Numbers / Functions & Mappings
8. Quadratics (Part 1)
9. Elementary Geometry
10. Straight Line (Part - 1)
11. Inequalities

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G.C.E. (A/L) 2023

TERM TEST PAPER

NO. 02

COMBINED MATHS – PURE MATHS

Grade - 12 (1st Term Exam) Duration : 1 hour

Marks
25 × 10 =250

♦ **answer all the questions.**

Part A

Short Questions

01. Find domain and range of following fu^{n}s

i) $f(x)=\dfrac{(2x+1)}{(2x^2-1)}$ ii) $g(x)=-x^2+4x+8$

02. a) Solve the eq^{n} $\log_2 x+\log_x 8=4$

b) Express $\dfrac{2.3\dot{2}}{0.\dot{1}\dot{7}}$ as a rational number

03. Solve the equation $\sqrt{3-x}-\sqrt{7+x}=\sqrt{16+2x}$

04. $f(x)=\cos^2 x+2\sqrt{3}\sin x\cos x-\sin^2 x+3$.Find the greatest and least values of f(x).

05. If $f(x)=\frac{5^x-5^{-x}}{5^x+5^{-x}}$ then show that $x=\frac{1}{2}\log_5\left[\frac{f(x)+1}{1-f(x)}\right]$

06. B (3 ,1) , D (t-1, t+1) , where t is a parameter. If $BD=\sqrt{10}$ find possible values of t. If D is on the y axis and the mid point of BD is $\left(\frac{a}{2},\frac{a}{2}\right)$. Evaluate a.

07. If $2A + B = \frac{\pi}{3}$ then prove that $\tan B = \frac{\sqrt{3} - 2\tan A - \sqrt{3}\tan^2 A}{1 + 2\sqrt{3}\tan A - \tan^2 A}$

08. A (2,5) , B (7,1), C (4,3) , D (-1,7). show that diagonal AC divides the area of the quadrilateral ABCD into two equal parts.

09. An arc of length $\frac{11\pi}{3}$ cm of a circle of radius 2 cm subtends θ angle at the centre.

i) Find θ

ii) Find the area of the sector

iii) Find the area of the segment

iv) Find the length of the chord.

10. Show that $3(\sin\theta - \cos\theta)^4 + 6(\sin\theta + \cos\theta)^2 + 4(\sin^6\theta + \cos^6\theta)$ expression is independent of θ

Term Test Paper - 02 (Pure Maths)

Part B

Essay Questions

Grade - 12

1st Term Exams

Time Durations - $2\frac{1}{2}$ hours

Marks
150 × 5 = 750
Total = 1000

11. a) Show that $(\cos\alpha+\cos\beta)^2+(\sin\alpha+\sin\beta)^2=4\cos^2\left(\frac{\alpha-\beta}{2}\right)$ .Hence show that $\cos 15^0=\frac{\sqrt{2}+\sqrt{6}}{4}$

b) If $\sin x+\sin y=a$ and $\cos x+\cos y=b$, then show that $\sec^2\left(\frac{x-y}{2}\right)=\frac{4}{a^2+b^2}$

c) using usual notations show that $\frac{\sin(B-C)}{bc}+\frac{\sin(C-A)}{ca}+\frac{\sin(A-B)}{ab}=0$

12. a) Resolve $\frac{4x^2+11}{(x^2+1)^2-x^2-3}$ into partial fractions using a suitable substitution (once you removed the substitution , you need to leave the answer in a standard form)

b) Find the range of $x\in\mathbb{R}$ satisfying the inequality,

$$\frac{(x^3-x^2-5x-3)(x^2+2x-4)}{x^3-3x^2-4x+12}\le 0$$

13. Equations of sides AB, BC and CA are $x + y +4 = 0$, $7x + y -8 = 0$ and $x + 7y -8 = 0$ respectively.

i) Find equations of perpendicular bisectors.

ii) Hence find the circumcentre of the triangle ABC

14. In the parallelogram ABCD, eq^{n}s of sides AB & BC are $x + 4y - 14 = 0$ and $5x + y -13 = 0$ respectively . D is (-1 , 1).

i) Find eq^{n}s of sides AD and DC

ii) AC and BD diagonals are meeting at E . Find coordinates of E. The line drawn parallel to BC, along the point E cuts AB and CD at points P and Q respectively

iii) Find the area of the triangle OPQ.

iv) If point R is placed on PQ such that PR:RQ = 3:2, find the coordinates of R.

15. a) Solve the eq^n $\tan^3 x-3\tan^2 x-3\tan x+1=0$

b) Prove the identity $\frac{\tan x-\sin x}{\sin^3 x}=\frac{\sec x}{1+\cos x}$

c) Show that if $y=\tan\left(x+\frac{\pi}{12}\right)\cot\left(x-\frac{\pi}{12}\right)$ then $y+1=2(y-1)\sin 2x$

d) Express $f(\theta)=32\cos^6\theta-48\cos^4\theta+18\cos^2\theta$ in the form of $f(\theta)=A\cos B\theta+C$ where A, B, C are constants to be determined. Hence solve $f(\theta)=\frac{1}{2}$

Student's Details

Name :- ..... School :- .....

Mobile No :- .....

Marks

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	**Total Marks**
Part A																
Part B																
															Final Marks	