

DAY GROUP CERTIFICATE EXAMINATIONS, 1968

MATHEMATICS (OLD SYLLABUS)

PAPER I

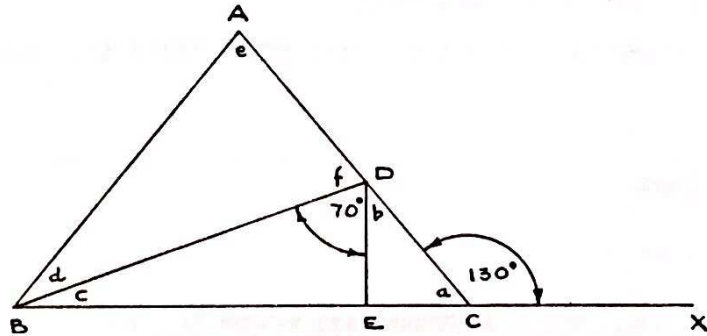
TUESDAY, 11th JUNE - 10 to 12 noon

Answer four questions

(All questions carry equal marks.)

1. (a) Simplify  $(a + b)^2 - 3(a^2 + ab)$  and then find its numerical value if  $a = 2$  and  $b = 3$ .
- (b) The hypotenuse of a right angled triangle is 26 inches and one of the other sides is 24 inches. Find the length of the third side.
- (c) Find the H.C.F. of 84, 112 and 140.
- (d) Simplify  $\frac{4\frac{1}{3} - 3\frac{1}{2} \div 2\frac{1}{3}}{1\frac{1}{2} + 2\frac{3}{4}}$ .

2. (a) Using a compass and ruler, show how to draw a perpendicular to a line from any point outside the line.
- (b) In the given diagram the sides AB and AC are equal and the line DE is perpendicular to BX. The angles BDE and ACX are given. Write down the number of degrees in the angles marked  $a, b, c, d, e, f$ .



3. (a) Simplify (i)  $a^2 \cdot a^3$ , (ii)  $16^{\frac{1}{4}}$ , (iii)  $\sqrt{a^9} \div \sqrt[3]{a^5}$

(b) If  $N = a\sqrt{\frac{b^2}{c}}$  then  $\log N = ?$

(c) Use logs to evaluate  $\sqrt{\frac{29.08 \times .00864}{13.92}}$ .

Give your answer (i) correct to 3 significant figures and (ii) in the form  $a \times 10^n$  where  $a$  is a number between 1 and 10 and  $n$  is a whole number.

4. (a) Solve the equations:-

(i)  $3(3x + 1) - (x - 1) = 6(x + 10)$ .

(ii)  $\begin{cases} 3x + 4y = 45 \\ 6x - 2y = 30 \end{cases}$ .

- (b) Factorise (i)  $6x^2 - 5x - 21$ , (ii)  $ac + bc - ad - bd$ .

5. (a) Prove that the angle in a semi-circle is a right angle.

(b) AB and CD are any two diameters of a circle: prove that the figure ACBD is a rectangle.

6. Draw a graph to convert Kilograms into pounds for any number of Kilograms up to 30. (Take 10 Kgs. as equivalent to 22 lbs).

From your graph find:-

(i) The number of lbs. equivalent to 25 Kgs.

(ii) The number of Kgs. equivalent to 50 lbs.

(iii) The difference in lbs. between 28 Kgs. and 28 lbs.

OR

6. (a) Change the denary number 23 into the corresponding binary number.

(b) Find the binary product of  $1101_2$  and  $101_2$  and change your answer to denary scale.

(c) If the replacement set for  $x$  is  $U = \{0, 1, 2, 3, 4, 5\}$  find the solution set of  $3(x - 2) > 3$  and graph it on the number line.

7. (a) Use tables to write down the sine, cosine and tangent of  $48^\circ 16'$ .

(b) Without using tables construct an angle  $\theta$  such that (i)  $\sin \theta = \frac{3}{4}$ , (ii)  $\tan \theta = \frac{5}{6}$ .

(c) Find the height of a tree casting a shadow 40 feet long when the sun's rays make an angle of  $37^\circ$  with the ground.

(Give your answer correct to two decimal places).

OR

7. Given  $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ .  $A = \{2, 4, 6, 8\}$ .  $B = \{2, 5, 8\}$ .  $C = \{3, 7, 8\}$ .

(a) Write all possible subsets of C.

(b) List the elements of (i)  $A \cup C$ , (ii)  $B \cap C$ , (iii)  $A^c$ , (iv)  $A \cap B$ , (v)  $A \cap (B \cup C)$ .