

UNIVERSITIES OF MANCHESTER, LIVERPOOL,  
LEEDS, SHEFFIELD AND BIRMINGHAM.

SCHOOL CERTIFICATE EXAMINATION.

TWO HOURS.

Answer ALL questions in Section A and any THREE  
questions from Section B.

*In Questions 1, 2 and 3 a candidate need not write  
down more of his working than he finds it convenient  
to do; in all other questions full explanations and  
all necessary details of working are required.*

SECTION A.

*Mathematical tables must NOT be used in this section.*

A 1. (a) Simplify  $(12\frac{1}{2} + 1\frac{1}{2}) - (3\frac{1}{2} \times 2\frac{1}{2})$ .

(b) Divide 9.03 by 0.021.

(c) Find the square root of 49.1401.

A 2. (a) Find the cost of 5 tons 13 cwt. of  
coal at £3. 15s. ton.

(b) After a discount of 5% is made,  
the price of an article is £4. 0s. 9d. What was  
the original price of the article?

(c) On what sum of money is £5. 15s. 6d.  
the simple interest for 7 months at  $2\frac{1}{2}\%$  per  
annum?

**A 3.** (a) A piece of wire 34.2 cm. long weighs 5.7 gm. Find, in metres, the length of a piece of wire of the same cross-section which would weigh three-quarters of a kilogramme.

(b) In an examination two papers were set and the marks awarded on the two papers were in the ratio 2 : 3. A candidate obtained 80 % on the first paper and 65 % on the second. What percentage did he obtain of the total marks?

(c) The average of 12 numbers is 7.80. The average of 8 of them is 7.76. What is the average of the remaining 4?

**A 4.** What is the cost of lining the inside of a closed cylindrical tank of internal diameter 7 ft. and internal length 8 ft. 6 in., at 2s. 6d. per sq. ft., assuming that  $\pi = \frac{22}{7}$ ?

**A 5.** When butter costs 2.85 kronen a kilogramme in Denmark it is estimated that the equivalent price in England would be 1s. 4d. a lb. What is the rate of exchange in kronen to the £, correct to three significant figures, assuming that 1 kilogramme = 2.20 lb.?

## SECTION B.

Answer any **THREE** questions in Section B.

*Mathematical tables must NOT be used in Questions 6, 7 and 8.*

**B 6.** A and B work similar machines but A's rate of working is to B's in the ratio 11 : 10. A works a 5-day week of 9 hours a day and B a 5½-day week of 8 hours a day. A deduction of 2s. 6d. a week is made from each man's wages for insurance, etc. If A then receives £5. 1s. a week, what should B then receive?

**B 7.** A retailer sold radio sets at £25 each at a profit of 25 % on the cost price. If the price to the retailer is increased by £1 what should now be his selling price in order to make the same percentage profit as previously?

After the increase in price the number of sets sold in a week decreased by 10 %. Express the profit now made in a week by the retailer as a percentage of the weekly profit made before the increase in price.

**B 8.** (a) Calculate, correct to two places of decimals, the rate per cent. per annum received on money invested in a  $3\frac{1}{2}$  % stock at 92.

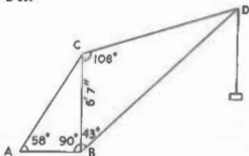
(b) A man sold his holding of £4,200 of  $3\frac{1}{2}$  % stock at 93 and invested the proceeds in a  $4\frac{1}{2}$  % stock, thus increasing his income by £6. What was the price of the new stock?

[Turn over.

**B 9.** (a)  $A = 37^\circ 34'$ ; use tables to find the values of  $\sin(90^\circ - A)$ ,  $\cos(90^\circ + A)$  and  $\tan(180^\circ - A)$ .

(b)  $A$  and  $B$  are acute angles. Find  $A$  and  $B$  if  $\sin(A - 2B) = 0.4168$  and  $\cos(2A + B) = -0.9119$ .

**B 10.**



In the crane shown in the figure,  $BC = 6$  ft.  $7$  in. Calculate the length of (i)  $AB$ , (ii)  $AC$ , (iii)  $CD$ , each to the nearest inch.

**B 11.**  $ABCD$  is a rectangular board in which  $AB = 4$  ft. and  $BC = 3$  ft.  $AB$  rests on horizontal ground and the board is inclined to the ground.  $CP$  is the perpendicular from  $C$  to the ground and the angle  $CBP$  is  $70^\circ$ . Calculate

- (i) the acute angle between the diagonals of the board,
- (ii) the angle  $OAP$ ,
- (iii) the angle  $BAP$ .