

## INTERMEDIATE CERTIFICATE EXAMINATION, 1981

## MATHEMATICS - LOWER COURSE - PAPER I (150 marks)

WEDNESDAY, 10 JUNE, MORNING - 9.45 to 12.15

## SECTION A (45 marks)

Examination Number

Attempt all questions. You should not spend more than 45 minutes on this section. Answer each question by writing one of (a), (b), (c), (d) in the box under each question number. If you wish to change an answer, cross out your first choice and write your new answer near the box.

Mathematics tables may be obtained from the Superintendent.

**THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK**

1.  $\frac{1}{2} + \frac{1}{4} - \frac{1}{8} =$

(a)  $\frac{2}{3}$

(b)  $\frac{5}{8}$

(c)  $\frac{3}{8}$

(d)  $\frac{1}{3}$

2.  $\frac{1}{40} =$

(a) 0.25

(b) 0.025

(c) 0.0025

(d) 2.5

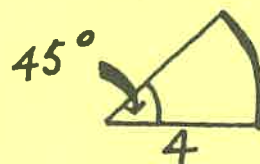
3. The length of the arc is

(a)  $\frac{\pi}{2}$

(b)  $\pi$

(c)  $2\pi$

(d)  $4\pi$



4. A car travels 24 km in 40 minutes. In 1 hour 10 minutes it will travel

(a) 48 km

(b) 36 km

(c) 42 km

(d) 32 km

5. How many edges has a cube ?

(a) 6

(b) 8

(c) 10

(d) 12

6. One triangle is the image of the other under

(a) a projection

(b) a translation

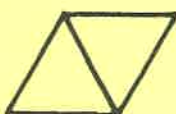
(c) a central symmetry

(d) an axial symmetry



7. Which diagram is not its own image under a central symmetry ?

(a)



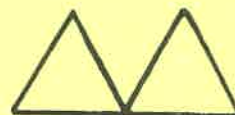
(b)



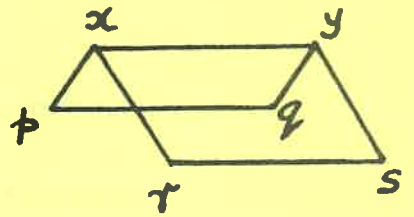
(c)



(d)



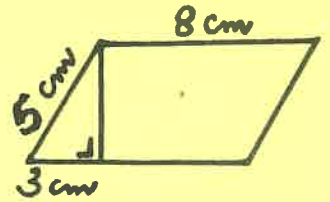
8.  $xpqy$  and  $xrsy$  are parallelograms. Which one of the following is false ?




- (a)  $(x, r) \uparrow (y, q)$                       (b)  $(x, r) \uparrow (y, s)$   
 (c)  $(x, p) \uparrow (y, q)$                       (d)  $(p, q) \uparrow (r, s)$

9. The area of the parallelogram in  $\text{cm}^2$  is

- (a) 16                      (b) 32                      (c) 40                      (d) 38

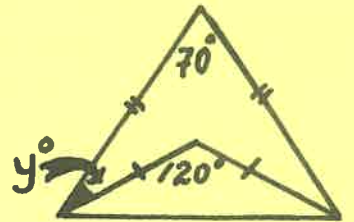


10.  $\cos 63^\circ 10'$  is

- (a) 0.4519                      (b) 0.4534                      (c) 0.4514                      (d) 0.8923

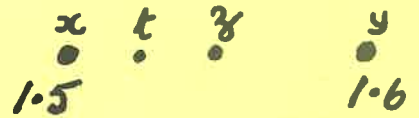
11. The value of  $y$  is

- (a) 25                      (b) 30                      (c) 50                      (d) 55



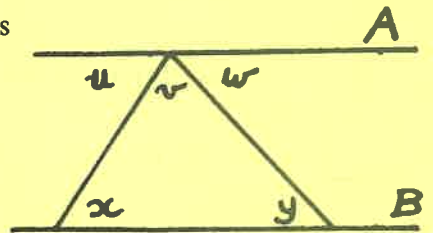
12.  $x$  and  $y$  on the number line represent 1.5 and 1.6, respectively,  $z$  is the centre of  $(x, y)$  and  $t$  is the centre of  $(x, z)$ . Then  $t$  represents

- (a) 1.55                      (b) 1.65                      (c) 1.555                      (d) 1.525



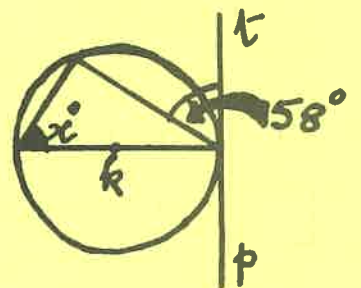
13.  $A \parallel B$  and  $u, v, w, x, y$  are the measures in degrees of the angles indicated. Which one of the following is false ?

- (a)  $u + v = 180^\circ - w$                       (b)  $u = x$   
 (c)  $u + v + y = 180^\circ$                       (d)  $w = x + y$



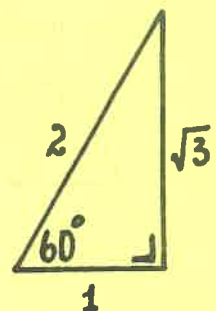
14.  $pt$  is a tangent to the circle of centre  $k$ . The value of  $x$  is

- (a) 32                      (b) 42                      (c) 90                      (d) 58



15.  $\sin 60^\circ =$

- (a)  $\frac{\sqrt{3}}{2}$                       (b)  $\frac{1}{2}$                       (c)  $\frac{2}{\sqrt{3}}$                       (d) 2



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## SECTION B (105 marks)

Attempt QUESTION 1 and THREE other questions

Marks may be lost if all your work is not clearly shown

1. Using your tables page 20 to page 27, or otherwise, find

(i)  $(8.325)^2$

(ii)  $\frac{1}{8.325}$

(iii)  $\sqrt{72.25} + \sqrt{8.41}$

(iv)  $\sqrt{72.25 + 8.41}$

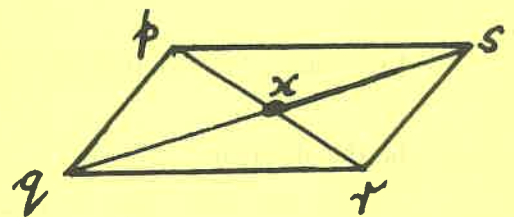
(25 marks)

2. A cylindrical tank is full of oil. If the tank is 2.8 m high and has a diameter of 1 m, find, taking  $\pi = \frac{22}{7}$ , the volume of oil in the tank.If oil costs 14.5p per litre, find in IR£ the cost of a full tank of oil.  
(Note: 1000 litres = 1 m<sup>3</sup>)

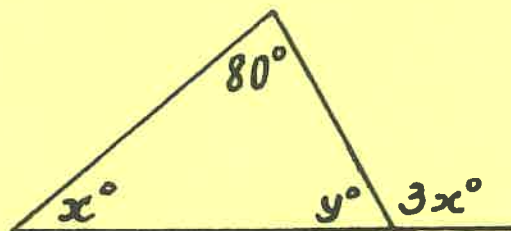
(20 marks)

3.  $pqrs$  is a parallelogram

- (i) Write down a pair of line segments equal in length. Name two other such pairs.
- (ii) What is the image of the  $\Delta pxq$  under the central symmetry in  $x$ ?
- (iii) Find the image of the  $\Delta sxr$  under the projection on the line  $qr$  parallel to  $sq$ .
- (iv) Show how to construct the image of the  $\angle pxq$  under the translation  $\vec{qx}$ .



(20 marks)

4. Prove that the sum of the measures of the three angles of a triangle is  $180^\circ$ .Calculate the value of  $x$  and the value of  $y$  as shown in the diagram.

(25 marks)

5. Show, with proof, how to construct the bisector of a given angle.  
 (Note: Use of protractor not allowed.  
 All construction lines must be clearly shown)

Using  $[bc]$  as base, construct the  $\Delta abc$  given

$$|bc| = 9 \text{ cm}; |ab| = 6 \text{ cm}; |ac| = 8 \text{ cm}.$$

Bisect the  $\angle abc$  and the  $\angle acb$  and let these bisectors meet at  $x$ .  
 Measure the distance of  $x$  from  $[bc]$ .

(25 marks)

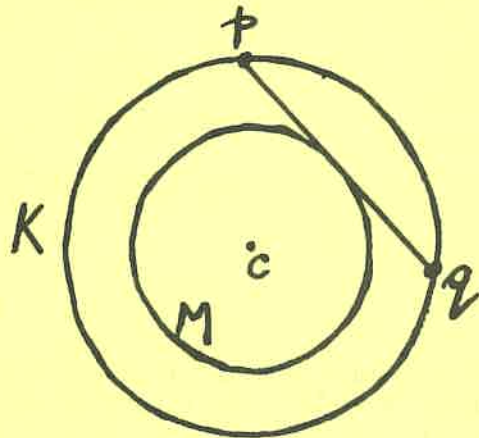
6. Prove that a diameter of a circle which is perpendicular to a chord of the circle bisects the chord.

$K$  is a circle of centre  $c$  and of radius 5 cm.

$M$  is a circle of centre  $c$  and of radius 3 cm.

$pq$  is a tangent to the circle  $M$ .

Calculate  $|pq|$ .



(25 marks)

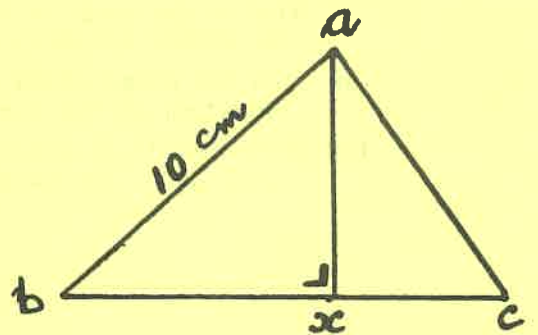
7. Use your tables to find  $\sin 43^\circ 33'$  and  $\tan 36^\circ 30'$ .

In the diagram

$$ax \perp bc \text{ and } |ab| = 10 \text{ cm}$$

$$|\angle abx| = 43^\circ 33' \text{ and } |\angle cax| = 36^\circ 30'.$$

Calculate  $|ax|$  and  $|xc|$ .



(30 marks)