AN   ROINN   OIDEACHAIS

68819

INTERMEDIATE   CERTIFICATE   EXAMINATION, 1988

MATHEMATICS – LOWER COURSE – PAPER I (150 marks)

THURSDAY, 9 JUNE – MORNING – 9.30 to 12.00

Examination Number

SECTION A (45 marks)

Attempt <u>all</u> questions.   You should not spend more than <u>45 minutes</u> 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.
Mathematical tables may be obtained from the Superintendent.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1. $5.2 \times 3.6 =$

    (a) 1·872   (b) 18·72   (b) 187·2   (d) 1872

2. 120% of IR£60 in IR£ is

    (a) 48   (b) 50   (c) 72   (d) 80

3. In 12 weeks 1488 children visit the library.   The average number of children visiting the library each week is

    (a) 120   (b) 124   (c) 148   (d) 188

4. The diameter of circle is 14 cm in length.   A semi-circle has length

    (a) 7 cm   (b) 14 cm   (c) 7π cm   (d) 14π cm

5. If IR£1 $=$ $1·50, then $15·00, in IR£, is

    (a) 10   (b) 15   (c) 7·5   (d) 22·50
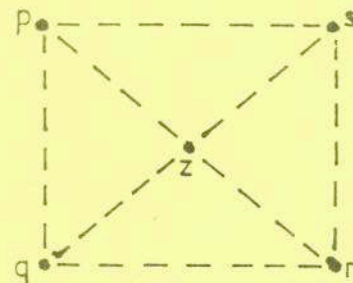
6. a, b, c, d, p, q are six points.
    If $(a, b) \uparrow (c, d) \uparrow (p, q)$, then the greatest number of parallelograms which can be formed with these points is

    (a) 0   (b) 1   (c) 2   (d) 3

7. The set of all couples such that each is equipollent to (x, y) is
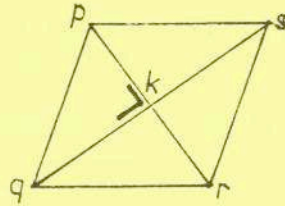
    (a) a projection   (b) a central symmetry
    (c) an axial symmetry   (d) a translation

8. The points p, q, r, s, are the vertices of a square.
    The image of the couple (p, s) under S_z,
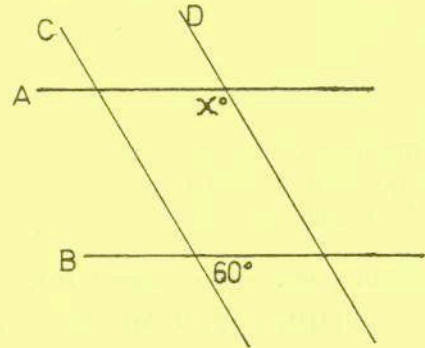   the central symmetry in z, is

    (a) (q, p) (b) (q, r) (c) (r, q) (d) (r, s)

OVER →

9. *pqrs* is a parallelogram.
The image of $\triangle qkr$ under the
axial symmetry in the line *pr*
is

(a) $\triangle qpk$ (b) $\triangle pks$ (c) $\triangle skr$ (d) $\triangle rkq$

10. $A \parallel B$ and $C \parallel D$.
The value of $x° - 60°$ is

(a) 60°   (b) 120°

(c) 180°   (d) −60°

11. $40° 12' - 16° 20' =$

(a) 56° 32'   (b) 23° 52'   (c) 24° 32'   (d) 24° 52'

12. *k* is the circumcentre in
the isosceles triangle *abc*.
The perimeter of the triangle is
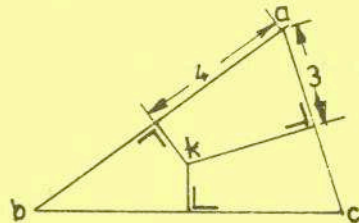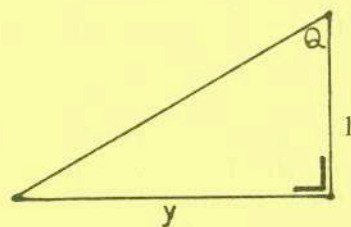
(a) 22   (b) 18

(c) 14   (d) 11

13. *k* is the centre of the circle.
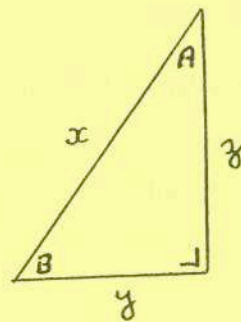The value of *x* is
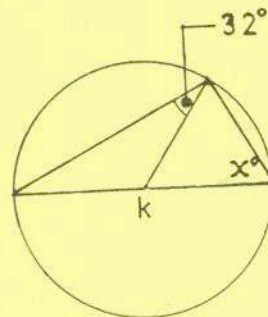
(a) 60   (b) 58

(c) 45   (d) 32

14. If $Q = 44° 41'$, then *y* is

(a) 0·9861   (b) 0·7032

(c) 0·7110   (d) 0·9890

15. $\operatorname{Sin} A =$

(a) $\cos A$ (b) $\cos B$

(c) $\tan A$ (d) $\tan B$

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MATHEMATICS – LOWER COURSE – PAPER I (150 marks)

THURSDAY, 9 JUNE, MORNING – 9.30 to 12.00

SECTION B (105 marks)
Attempt **QUESTION 1** (30 marks) and **THREE** other questions (25 marks each)
Marks may be lost if all your work is not clearly shown

1. (a) Calculate the value of $(1 + 0.02)(1 - 0.02)$.

    (b) Using your Tables, p.20 to p. 27, or otherwise, evaluate

 $$\left[\frac{1}{4.048} - \frac{0.21}{30} \right] \times \frac{1}{0.06} .$$

    (c) A lorry-load of vegetables consists of an equal number of 10 kg, 25 kg and 50 kg bags.   If the total load has a mass of 3060 kg, how many bags of 10 kg mass are there on the lorry ?

2. Taking $\pi = 3$, calculate the volume of a solid plastic sphere of diameter of length 10 cm.

    If 1 cm^3 of plastic has a mass of 1.5 grammes, calculate, in grammes, the mass of this sphere.
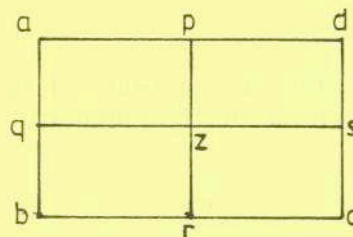
    The plastic spheres are packed into a closed box of internal dimensions as in diagram.

    Find the maximum number of plastic spheres which fit exactly into this closed box.
    Find the mass, in kg, of these spheres.
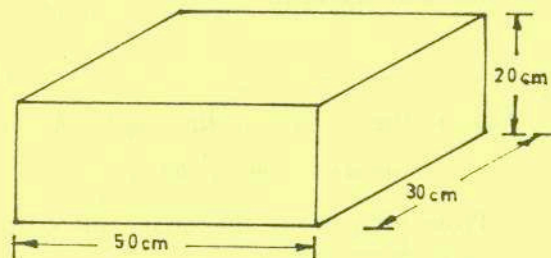
3. The diagram shows a rectangle $abcd$ divided into four smaller rectangles each of equal size.   The diagonals of the rectangle $abcd$ meet at z.

    (i) Name three couples equipollent to (d, s).

    (ii) Find the image of $[qz]$ under the translation $\vec{ds}$.

    (iii) What is the image of $\triangle aqp$ under the central symmetry in the point z ?

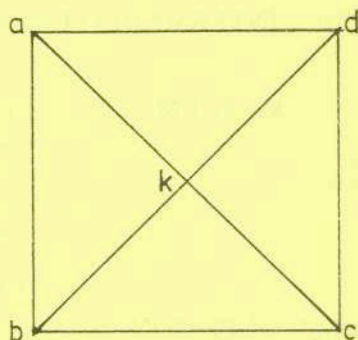   (iv) If the area of $\triangle aqp = 4$, what is the area of the rectangle $abcd$?

OVER →

4. Prove that the sum of the measures of the three angles of a triangle is $180°$.

abcd is a square whose diagonals intersect at *k*.

Prove that $|\angle acd| = 45°$.
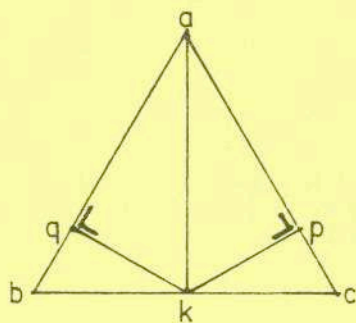
Hence, deduce $ac \perp bd$.

5. Prove that any point on the bisector of an angle is equidistant from the arms of the angle.

The line *ak* bisects the $\angle bac$ of the isosceles triangle *abc* where

$$|ab| = |ac|.$$

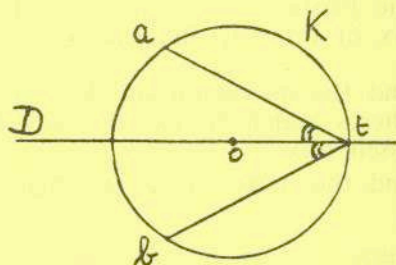If $kq \perp ab$ and $kp \perp ac$, prove that $\triangle aqp$ is also isosceles.

6. Prove that a circle is mapped onto itself under the axial symmetry in any line through its centre.

o is the centre of the circle *K* and

$$|\angle ato| = |\angle bto|.$$

Prove that *a* is the image of *b* under the axial symmetry in *D*.

7. (a) Find the measure of the angle through which the minute hand of a clock turns in $7\frac{1}{2}$ minutes.

(b) [*sp*] is a vertical pole of length $13\cdot6$ m. [*rt*] and [*rp*] are two wires tied to the pole. *r* is a point in the ground 8 m from *s*.

t is the mid-point of [*sp*].

Calculate

(i) $|\angle trs|$

(ii) $|\angle prt|$.