General Mathematics Paper 2,May/June. 2008

QUESTION 1

(a) If x:y = 2:3, evaluate

$$\frac{x^2 - y^2}{y^2 + x^2}$$

(b) A man on the same level ground with a tree, stands at a distance of 12.82m away from the foot of the tree. He observes the angle of elevation of the top of the tree as 52o. If the man is 1.24m tall, calculate correct to two decimal places, the height of the tree.

OBSERVATION

Question 1(a) was reportedly popular among the candidates and many candidates performed well. However, quite a number of them displayed poor knowledge of ratio by substituting the values 2 and 3 for x and y respectively. They were expected to recognise that if x:y = 2:3 then x/y = 2/3 or x = 2y/3. Similarly, they can be expressed as x = 2k and y = 3k where k is a constant.

Question 1 (b) was also well attempted. However, it was noticed that many candidates could not draw the diagram. Others did not add the man's height to the calculated height and hence lost some marks.

QUESTION 2

(a) Simplify: $\frac{x^2 - 8x + 16}{x^2 - 7x + 12}$.

(b) If ½, 1/x, 1/3 are successive terms of an arithmetic progression (A.P.), show that $\frac{2 - x}{x - 3} = \frac{2}{3}$

OBSERVATION

Majority of the candidates found the question on simplification of quadratic expression very easy and scored full marks.

The question on Arithmetic progression was not well handled by the candidates. They were unable to recall that since ½, 1/x, 1/3 were terms of an A.P., hence 1/x - ½ = 1/3 - 1/x.

Thus $\frac{2 - x}{2x} = \frac{x - 3}{3x}$

which by cross multiplying and simplifying leads to $\frac{2 - x}{3 - x} = 2x/3x$

= 2/3 as required.

QUESTION 3

A bucket is 12cm in diameter at the bottom, 20cm in diameter at the open end and 16cm deep. If the bucket is filled with water and emptied into a cylindrical tin of diameter 28cm, calculate the depth of water in the tin.
(take π = 22/7)

OBSERVATION

Majority of the candidates found this question rather challenging because they could not manipulate the concept of similar figures to find h, the height of the removed cone i.e.

$$\frac{h}{6} = \frac{16 + h}{10}$$

which gives h = 24cm.

Very few of them were able to apply the formular for finding the volume of a frustum V = 1/3 π/ h (R2 + Rr + r2), where V = volume of a frustum.

QUESTION 4

(a) solve the equation: $2\log x - \log(1 - x) = \log(2 - x)$.
(b) If Ade gives N5 out of what he has to Chidi, the two of them will have equal amount. If Chidi gives out N5 to Ade, Ade will have twice as much as Chidi. How much did each of them have initially?

OBSERVATION

Many candidates attempted the (a) part of the question and the performance was fair. However, in expressing the logarithm, some candidates wrongly wrote

$$\frac{\log x^2}{\log(1-x)} = \log (2 - x) \text{ instead of } \log \frac{x^2}{1-x} = \log (2-x)$$

The part (b) of the question was poorly done. Their apparent difficulty was in reducing the word problem to simple equations. Candidates were expected to assign variables say x and y to represent the amount of money Ade and Chidi have respectively. The required equations are: $x - 5 = y + 5$ (or $x - y = 10$) and $x + 5 = 2(y - 5)$ i.e. $2y - x = 15$. On solving simultaneously, x = N35 and y = N25.

QUESTION 5

(a) A rectangular field is l metres long and *b* metres wide. Its perimeter Is 280 metres. If the length is two and a half times its breadth, find the values of l and *b*. ,
(b) The base of a pyramid is a 4.5 m by 2.5 *m* rectangle. The height of the pyramid is 4 m.
Calculate its volume.

OBSERVATION

(a).This is one of the questions where candidates performed very well. It required candidates to know the formula for the perimeter of a rectangle and apply it using correct substitution. This question involved calculating the volume of a rectangular pyramid given the values of the base and height. It was well answered by most candidates who were able to recall the relevant formula correctly or use the one provided in their booklet for Mathematical tables and formulae.

QUESTION 6

(a) If 2x+y = 16 and 4x+y = *1/32*, find the values of x and y.
(b) *P*, Q and *R* are related in such a way that *P* cc Q2 /R
When *P* = 36, Q = 3 and *R* = 4. Calculate Q when *P* = 200 and *R* = 2.

OBSERVATION

(a)This question involved the application of indices and simultaneous equation. A good number ofthe candidates were able to obtain the 2 simultaneous equations and solve them correctly.

(b) This was a question on variation. It involved finding the constant of variation and using the change of subject to find the unknown. It was fairly well handled by majority of the candidates.

QUESTION 7

(a) Solve, correct to two decimal places, the equation $4x^2 = l1x + 2l$.
(b)A man invests £1500 for two years at compound interest. After one year, his money amounts to £1560. Find the:
(i) Rate of interest;
(ii) Interest for the second year.
(c)A car costs N300,OOO.00. It depreciates by 25% in the first year and 20% in the second year. Find its value after 2 years.

OBSERVATION

Question 7(a) involves solving a quadratic equation either by completing the square or by formula. Majority of the candidates who attempted this question chose the formula method but were not able to quote the formula correctly, hence many got wrong answers. The question was not satisfactorily answered. Question 7(b) demanded knowledge of commercial topics of simple interest1and compound interest. While some candidates could not differentiate between simple interest and compound interest, others could not apply the formula correctly. rn the (c) part, the candidates were required to evaluate the value of a car at the end of 2 years, given the depreciation rates. It was very well handled however there were cases where candidates used the value at the beginning of the first year instead of the amount at the end of the first year. Hence missed some marks.

QUESTION 8

37	49	27	49	42	26	33	46	40
29	23	24	29	31	36	22	27	38
26	42	39	34	23	21	32	41	46
31	33	29	28	43	47	40	34	44
38	34	49	45	27	25	33	39	40

(a)Form a frequency distribution of the data using the intervals: 21 - 25, 26 - 30, 31 - 35, etc.

(b)Draw the histogram of the distribution.

(c)Use your histogram to estimate the mode.

(d)Calculate the mean age

QUESTION 9

(a) The triangle ABC has sides AB = 17m, BC = 12m and AC = 10m. Calculate the ;

(i) Largest angle of the triangle;

(ii) Area of the triangle.

(b) From a point *T* on a horizontal ground, the angle of elevation of the top *R* of a tower *RS*, 38 m high, is 63°. Calculate, correct to the nearest metre, the distance between *T* and *S* .

OBSERVATION

Many of the candidates who attempted this question (9) used the Cosine formula but were not able to obtain the correct angle since it is an obtuse angle having a negative value of Cosine. Some candidates could not recognise the largest angle as the angle
, opposite the longest side.
Candidates attempted the (b) part on angle of elevation satisfactorily. They were able to draw the diagram which aided their ability to solve the problem.

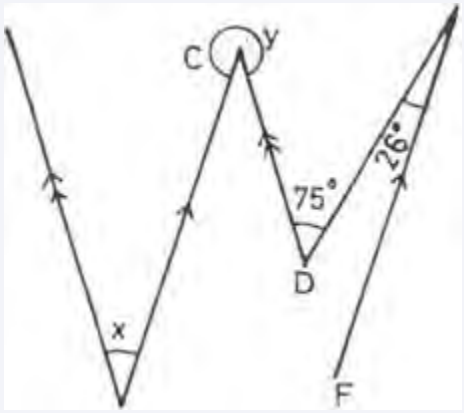
QUESTION 10

Using ruler and a pair of compasses only, construct:
(i) a quadrilateral PQRS such that /PO} = 7 cm, LOPS = 60°, /PS/ = 6.5 cm, LPQR = 135° and /QS/ = /QR/;
(H) locus 11 of points equidistant from P and Q;
(iii) locus 12 of points equidistant from P and S.
, ~.

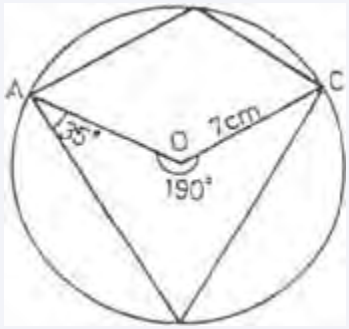
OBSERVATION

This question involved construction of a quadrilateral PQRS using ruler and compasses only, given the 4 sides and 2 angles and finding locH 1112and *13*, The question was avoided by majority of the candidates; but it was very well answered by the few who attempted it .

QUESTION 11



In the' diagtam, AB/ /eD and BC/ /FE, CDE = 75° and OEF = 26°.Find the angles marked x and y.



(b) The dia'gram shows a circle ABCD with centre O and radius *7cm*. The reflex angle AOC = 190 degrees and angle DAO = 35 degres
Find:
(i) <ABC;

(ii) <ADC;

OBSERVATION

Using the digram in 11(b) above, calculate, correct to 3 significant figures, the length of

(i) arc ABC;
(ii) the chord AD.

This question on geometry was not popular with the candidates. Majority of them avoided the question.

In l1(a), some of those who attempted this question failed to extend line CD to meet EF. Hence could not solve it properly.

In l1(b), many candidates could 'apply the circle theorems correctly. Question l1(c) was also satisfactorily handled by candidates who attempted it.

QUESTION 12

(a) Copy and complete the table of values for y = 3 sinx + 2 cos x for 0 degrees </ x</ 360 degrees

x	0°	60°	120°	180°	240°	300°	360°
y	2.00	-	-	-	-	-	2.00

Using a scale of 2 cm to 60° on x-axis and 2 cm to 1 unit on y-axis, draw the graph of $y = 3 \sin x + 2 \cos x$ for $0° \leq x \leq 360°$.

(c) Use your graph to solve the equation: 3sinx +2cosx +1.5.

(d) Find the range of values of x for which 3sin x + 2 cos x < - 1

OBSERVATION

This question was very unpopular with the candidates. Some of those who attempted this question could not plot the graph correctly. They also displayed significant weakness in reading from the graph.

QUESTION 13

(a) If 3,x,y, 18 are in Arithmetic progresion (A. P), find the values of x and y.

(b) (i) The sum of the second and third terms of a geometric progressio,n is six times the fourth term. Find the two possible values of the common ratio.
(ii) If the second term is 8 and the common ratio is positive, find the first six terms.

OBSERVATION

Question 13(a) was a good question on A.P and those who attempted it did well., In Question 13(b), some candidates were able to express the first equation correctly
i.e. ar + ar2 = 6(ar3) but could not go further to solve for r. Notwithstanding, the question was popular among the candidates and a good number of them performed well.