FORM 2 END TERM

TIME 2 HOURS.

1 Use Logarithms to evaluate (4mks)

$$\sqrt{\frac{415.2 \times 0.0761}{135}}$$

Ans.

No	Log
415.2	2.6182
0.0761	$\bar{2}.8814$ +
	1.4996 ✓
135	2.1303
	$\frac{\bar{3}.3693}{2}$ ✓ $= \frac{\bar{4}}{2} + \frac{1.3693}{2}$
	$\bar{1}.0.6847$

0.48378 ← Antilog $\bar{1}.6847$

Ans = 0.48378

2. Three similar bars of length 200cm, 300 cm and 360 cm are cut into equal pieces. Find the largest possible area of square which can be made from any of the three pieces (3mks)

Ans.

10	200	300	360
2 ✓	20	30	36
	10	15	18

GCD = 10 x 20 = 20 ✓

Area = 20 x 20 = 400 cm^2 ✓

3 A triangle has vertices A(2,5), B(1,-2) and C(-5,1) Determine

a, the equation of the line BC (3mks)

Ans

$$\frac{y_1 - y_2}{x_1 - x_2} = \frac{1+2}{-5-1} = -\frac{3}{6} = -\frac{1}{2}$$

$$\frac{y+2}{x-1} = \frac{1}{-2} \checkmark$$

$$-2(y+2) = 1(x-1)$$

$$-2y - 4 = x - 1$$

$$-2y = x + 3$$

$$-2y = x + 3 \quad \text{or} \quad y = -x/2 - 3/2 \checkmark$$

b) the equation of the perpendicular line from A to BC (3mks)

Ans

$$M_1 m_2 = -1$$

$$-\frac{1}{2} m_2 = -1 \quad m_2 = 2 \checkmark$$

$$\frac{x_1 + x_2}{2} \quad \frac{y_1 + y_2}{2}$$

$$\frac{1-5}{2} = \frac{-4}{2} \quad \frac{-2+1}{2} = \frac{-1}{2}$$

$$= (-2, -\frac{1}{2})$$

$$\frac{y + 1/2}{x+2} = 2 \checkmark$$

$$y + \frac{1}{2} = 2(x+2)$$

$$y = 2x + (4 - \frac{1}{2}) \checkmark$$

$$y = 2x + 3\frac{1}{2}$$

$$y = 2x + \frac{7}{2} \checkmark \quad \text{or} \quad 2y = 4x + 7$$

4 The ratio of the radii of two spheres is 2:3 Calculate the volume of the first sphere if the volume of the second is $20\ cm^3$ (3mks)

Ans

LSF: 2:3

VSF = $(LSF)^3$.

VSF = $(2:3)^3 = 8:27$ ✓

27 - $20\ cm^3$

8 - $\frac{2018}{27}$ ✓

$= 5.926\ cm^3$. ✓

5 Without using a ~~calculator or a mathematical table~~ mathematical table or calculator solve the following (3mks).

$$\sqrt[3]{\frac{0.729 \times 409.6}{0.1728}}$$

Ans

$\frac{729 \times 4096}{1728}$ ✓

$\sqrt[3]{1728}$ ✓

$= 12$ ✓

6 Three boys shared some money, the youngest boy got 1/12 of it and the next got 1/9, and the eldest got the remainder. What fraction of money did the eldest recieve? If the eldest got ~~Sh~~ Sh 330, what was the original sum of money? (4mks)

Ans

x

Younger - $\frac{1}{12}x$

Middle - $\frac{1}{9}x$

$\frac{1}{12}x + \frac{1}{9}x = \frac{7}{36}$ ✓

$\frac{36}{36} - \frac{7}{36} = \frac{29}{36}$ eldest ✓

$\frac{29}{36} = 330$

original = $\frac{330 \times 36}{29}$ ✓

$= 409.65$ ✓

7 Ten men working 6 hours a day take 12 days to complete a job. How long will it take 8 men working 12 hours a day to complete the same job (3mks)

Ans

No of men decrease 8 : 10 ✓

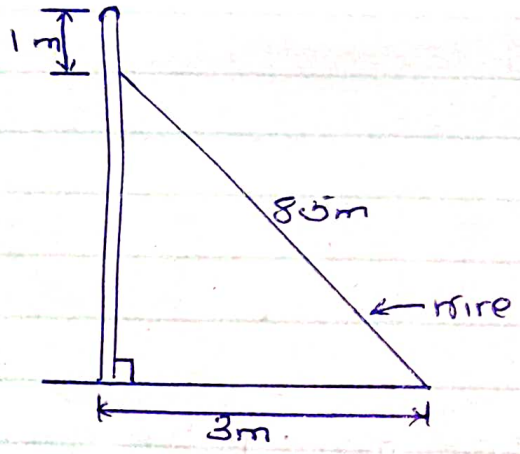
No of days increase 10 : 8 ✓

No of hours increase 12 : 6 ✓

No of days taken = $12 \times {}^{10}/_{8} \times {}^{6}/_{12}$ ✓

$= 7\frac{1}{2}$ days. ✓

8 An electric pole is supported to stand vertically by a tight wire as shown below. Find the height of the pole, leave your answer to 2 decimal places. (3mks)



Ans

$a^2 + b^2 = c^2$

$8.5^2 - 3^2 = b^2$ ✓

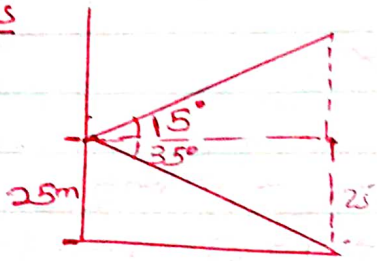
$b^2 = 63.25$ ✓

$b = 7.95 + 1 = 8.59$m. ✓

9 From a window 25m above a street, the angle of elevation of the top of a wall on the opposite side is 15°. If the angle of depression of the base of the wall from the window is 35° find.

a. The width of the street. (2mks)

Ans



$\cos 35 = \frac{x}{25}$ ✓

$x = 25 \cos 35$ ✓

$= 20.48\ m$

b) The height of the wall on the opposite side (2mks)

$\tan 15 = \frac{x}{20.48}$ ✓

$x = 20.48 \tan 15$

$= 5.49 + 25$ ✓

$= 30.49\ m.$

10 Simplify (2mks)

$$\frac{25^{\frac{3}{2}} \times 9^{\frac{1}{2}} \times 2^{2}}{5^{2} \times 3^{2}}$$

Ans

$\frac{5^2 \times 3 \times 4}{5^2 \times 3^2}$ ✓ $= \frac{5^{\cancel{2}} \times \cancel{3} \times 4}{\cancel{5^2} \times \cancel{3^2} 3}$

$= \frac{4}{3}$ ✓

11 Solve the In equality (3mks.)

$2x - 1 \leq 3x + 4 < 7 - x$

Ans

$2x - 1 = 3x + 4$

$2x - 3x = 4 + 1$

$-x = 5$ ✓

$3x + 4 < 7 - x$

$3x + x = 7 - 4$

$\frac{4x}{4} = \frac{3}{4}$

$x < \frac{3}{4}$ ✓

$-5 \leq x < \frac{3}{4}$

12. Solve the following

$x^2 + 3x - 54 = 0$ (3mks)

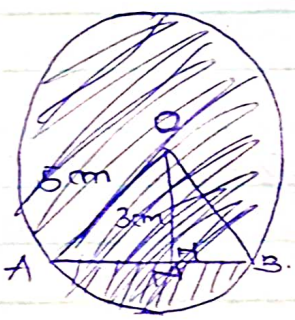
Ans

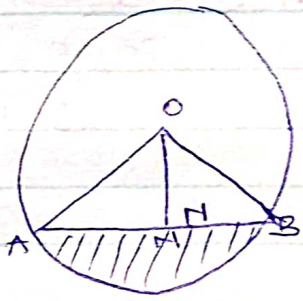
$x(x-6) + 9(x-6) = 0$

$(x-6)(x+9) = 0$

$x = -9$ or $x = 6$

13 The figure below shows a circle with centre O and radius 5cm. If ON = 3cm, AB = 8cm and $\angle AOB = 106.3°$ find the area of shaded region (3mks)





Ans

Area = Area of sector − Area of triangle

$\frac{106.3}{360} \times 3.142 \times 5^2$

$= \frac{1}{2} \times 8 \times 3$

$= 23.19 - 12$

$= 11.19\ cm^2$

14 Expand and Simplify (2mks).

$4(q+6)+7(q-3)$

Ans

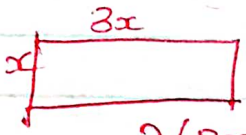
$4q+24+7q-21$ ✓

$11q+3$ ✓

15. The length of a rectangle is three times its breadth. If its perimeter is 24cm what is the

a) Length of the rectangle (2mks)

Ans



$2(3x+x)=24$ ✓

$8x=24$

$x=3$

$3x=3\times3=9\text{ cm}$ ✓

b) Area of rectangle. (2mks)

Ans

$l \times w = A$

$9 \times 3 = 27$ ✓

$= 27\text{cm}^2$ ✓

Section A = 50 mks

Section B: Answere any ~~three~~ two questions.

16 A rectangular tank whose internal dimensions are 1.7m by 1.4m by 2.2m is filled with milk

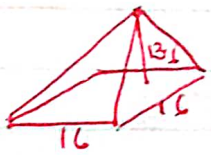
a) Calculate the volume of milk in the tank in cubic metres. (2mks)

$V = L \times W \times h$

$1.7 \times 1.4 \times 2.2$ ✓

$= 5.236\ m^3$ ✓

b) i) The milk is to be packed in small packets. Each ~~shape~~ packet is in the shape of a right pyramid on an equilateral triangular base of side 16 cm. The height of each packet is 13.6 cm. Calculate the volume of milk contained in each packet. (3mks)



$V = \frac{1}{3} bah$ ✓

$16 \times 16 = 256\ cm^2 \times 13.6 \times \frac{1}{3}$ ✓

$= 1160.5\ cm^3$ ✓

ii) If each packet was to be sold at ~~25~~ Sh 25 per packet, what is the sale realized from the sale of all exact packets of milk (5mks) (~~5mks~~).

$1000000\ cm^3 - 1\ m^3$

$5.236\ m^3$ ✓

$\frac{5236000}{1160.5} = 4511.848$ ✓ ✓

4511 packets

4511×25 ✓

= Sh 112,775 ✓

#7 A triangle ABC with vertices A(-2, 2), B(1, 4) and C(-1, 4) is mapped on to triangle A'B'C' by a reflection in the line $y = x + 1$

a) On the grid provided draw

i) Triangle ABC (1 mks)

iii) ~~line~~ The line $y = x + 1$ (2mks)

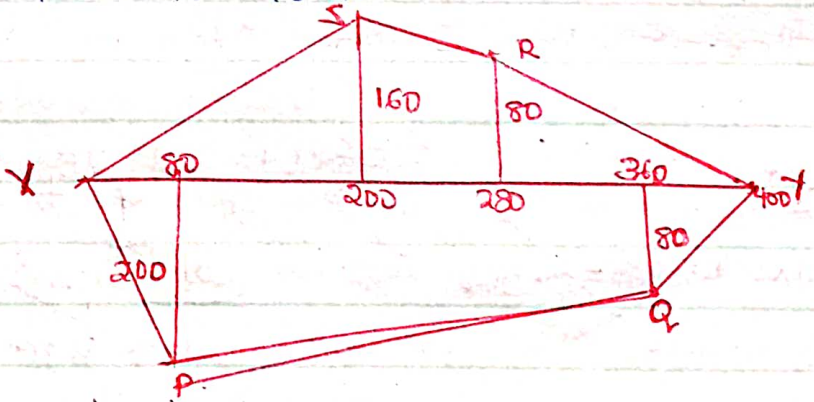
iii) Triangle A'B'C' (3mks)

b) Triangle A"B"C" is the image of triangle A'B'C' under a negative quarter turn, with the center of rotation as Origin (0, 0). On the same grid draw triangle A"B"C" (4mks)

18 The following measurements were obtained while measuring a coffee field. The measurements were entered in a field book as follows.

	Y	
	360	80 to Q
To R 80	280	
To S 160	200	
	80	200 to P
	X	

a) Taking the baseline XY = 400 m Draw the map of the coffee field using a scale of 1 cm represents 40 m. (5mks)



b) Calculate the area of the coffee field (5mks

XP = $\frac{1}{2} \times 80 \times 100 = 4000$ ✓

PQ = $\frac{1}{2} \times (80+200) 280 = 39200$ ✓

PY = $\frac{1}{2} \times 40 \times 80 = 1600$ ✓

YR = $\frac{1}{2} \times 80 \times 120 = 4800$ ✓

RS = $\frac{1}{2} \times 80 \times (80+160 = 9600$ ✓

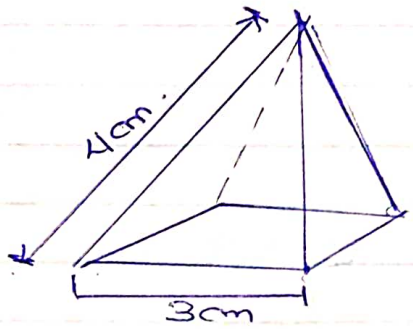
SX = $\frac{1}{2} \times 200 \times 160 = 16000$ ✓

75200 ✓

10000 ✓

= 7.52 ha ✓

19. The figure below represents a right pyramid on a square base of side 3cm. The slant edge of the pyramid is 4 cm.



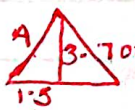
7K

a) Draw the net of the pyramid (2mks)

Ans below

b) Calculate the Surface Area of the pyramid (4mks)

Ans



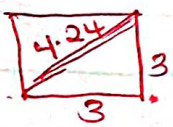
$\frac{1}{2} \times 3 \times 3.708 = 5.562$

$5.562 \times 4 = 22.25$

$3 \times 3 = 9 + 9$

31.25 cm^2

c) Calculate the volume of the pyramid to 2 decimal places (4mks)



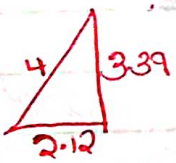
$3^2 + 3^2 = 18$

$\sqrt{18} = 4.24$

$\frac{4.24}{2} = 2.12$

$4^2 - 2.12^2 = 11.5056$

$\sqrt{11.505} = 3.39$



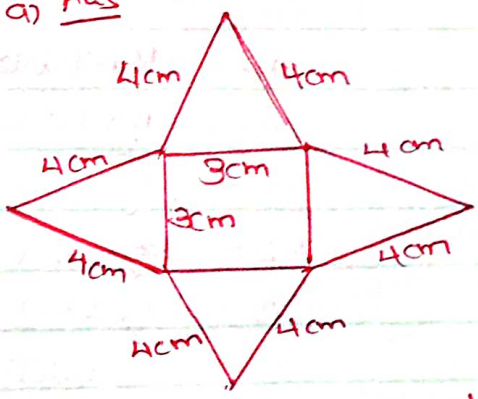
Volume $= \frac{1}{3} bA\,4$

$\frac{1}{3} \times 3 \times 3 \times 3.39$

$= 10.17 \text{ cm}^3$

a) Ans

Net



Drawing net — 1mks

measurements — 1mks