FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI
SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY
DEPARTMENT OF AGRICULTURAL ENGINEERING
2015/2016 HARMATTAN SEMESTER EXAMINATIONS

COURSE: ENG 103 - ENGINEERING DRAWING 1. TIME: 3 HOURS. DATE: *09/05/2016*

INSTRUCTIONS: (i) Answer question 1 and any other three questions (ii) Write your name (in full) and registration number with ink (iii) Submit the following assignments in your manual to your respective lecturers on/before 16/05/2016 [pg 6 nos 2 & 4; pg 17 no 1; pg 20 no 1 & 4; pg 24 no (iii)]

1(a) Construct triangle ABC such that BC = 75cm, $\angle ABC = 33\frac{1}{4}^{\circ}$ and $\angle BCA = 67\frac{1}{2}^{\circ}$. Construct the circumscribing circle of the triangle. Measure the diameter of the circumscribe circle. (b) Construct a scale of chords showing 5° divisions mid with its aid, set off angles 15°, 35°, 75°, and 115°

2(a) Two posts A and B are 2m apart. A boy plays a ball (P) around these posts such that the sum of the distance of the ball from A and B is always equal to 2.5m. Trace the locus of P using any method. [Use a scale of 1:2].

(b) A stone thrown up in the air reaches a **maximum height** of 8 m and covers a range of 6 m. Construct the path traced out by the stone assuming it to be parabolic, using the circumscribing rectangle method.

3 Construct a hexagon of side 40 mm, then construct six circles outside the hexagon, each touching one side of the hexagon externally and two other circles.

4(a) Divide a line of 100 mm in the ratio of 2:3:4:5

(b) Two circles of diameters 60 mm and 30 mm, have center distance of 105 mm. Construct circles and a straight line parallel to, and at distance of 90 mm to their center line.

5 In Figure 1, the cranks AO and BQ revolve in opposite directions at the same speed, and are joined by the rods AC and BCP. Plot the locus of P for one revolution of the cranks, if AO and BQ are 25 mm. AC=125mm, CP = 20mm and OQ = 75mm.

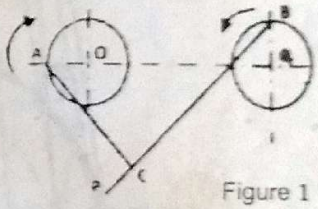


Figure 1

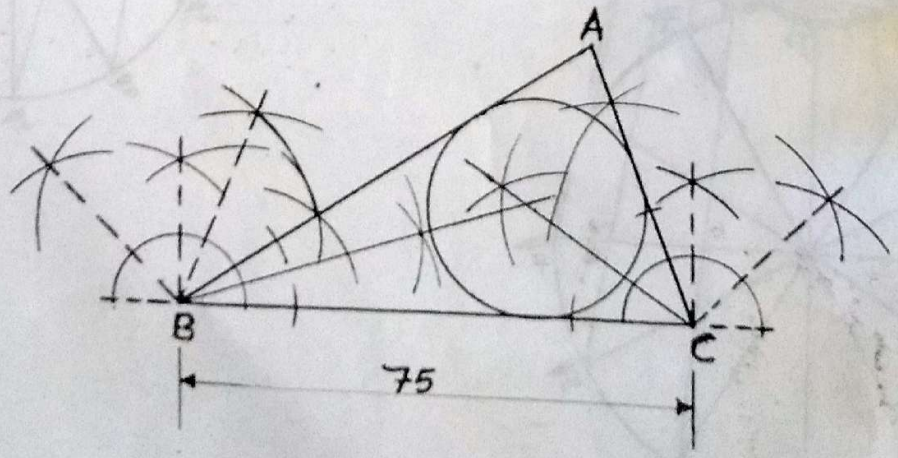
SOLUTION TO 2015/2016

Q1A

i) To get angle $67\frac{1}{2}^{\circ}$; Construct angle 135°, then bisect it to get $67\frac{1}{2}^{\circ}$

ii) To get angle $33\frac{1}{4}^{\circ}$; Bisect angle $67\frac{1}{2}^{\circ}$

Diameter of inscribe circle = Ø32



Q1B

QUESTION NO 1B SAME AS 2013/2014: Q1B

Q2A

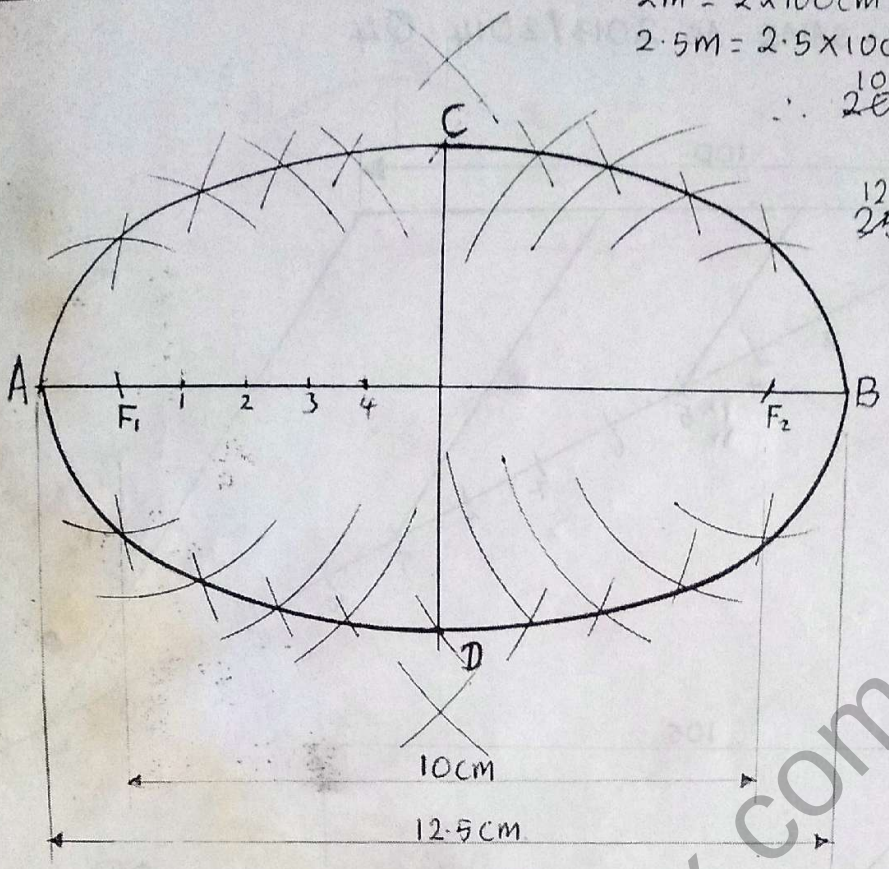
Scale given : 1:20

$2m = 2 \times 100cm = 200cm$

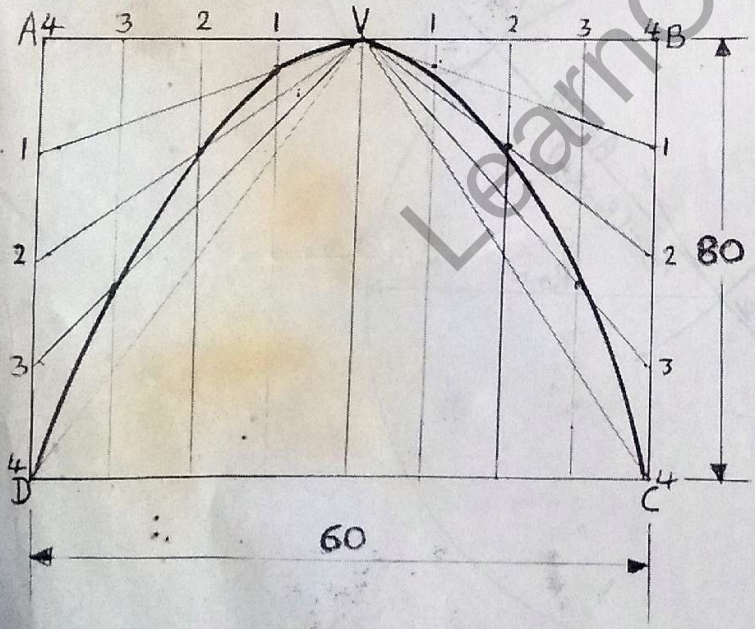
$2.5m = 2.5 \times 100cm = 250cm$

$\therefore 200cm \times \frac{1}{20} = 10cm$

$250cm \times \frac{1}{20} = 12.5cm$



Q2B



Using scale 1:20 as given in Q2A

$8m = 8 \times 100cm = 800cm$

$= 800cm \times \frac{1}{20} = 40cm$

$6m = 6 \times 100cm = 600cm$

$= 600cm \times \frac{1}{20} = 30cm$

Now we have RISE as 40cm and SPAN as 30cm. But it is big considering our drawing space. So we say:

Let 1cm = 2mm

$\therefore$ If $1cm = 2mm \Rightarrow \frac{40cm \times 2mm}{1cm} = 80mm$

$40cm = xmm$

If $1cm = 2mm \Rightarrow \frac{30cm \times 2mm}{1cm} = 60mm$

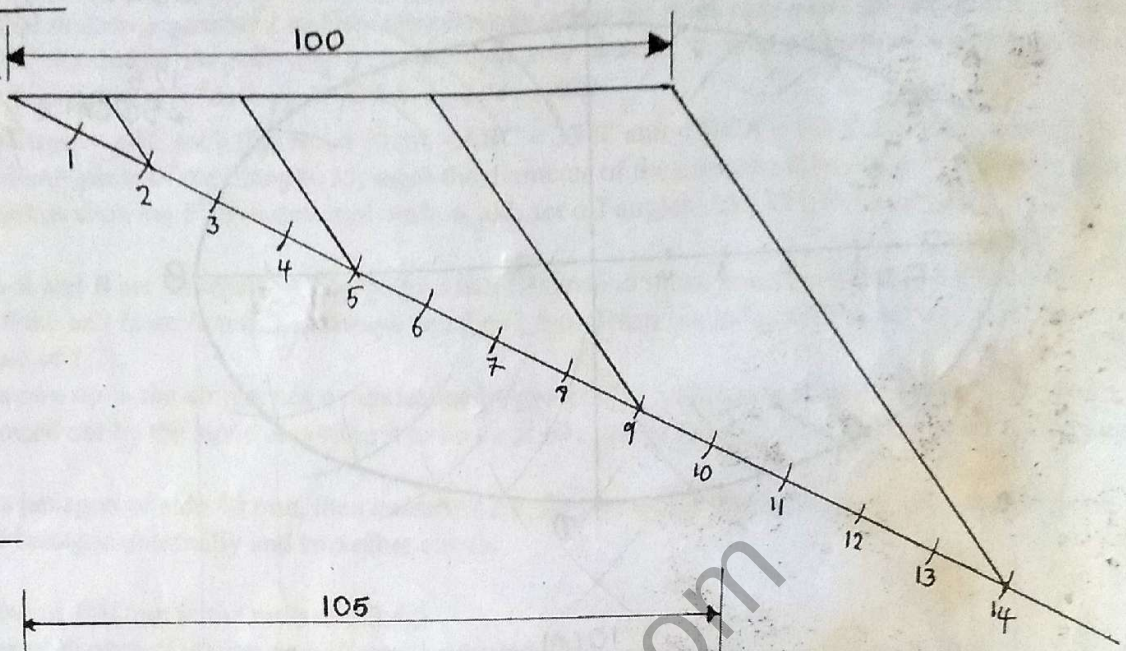
$30cm = xmm$

So our RISE = 80 and SPAN = 60

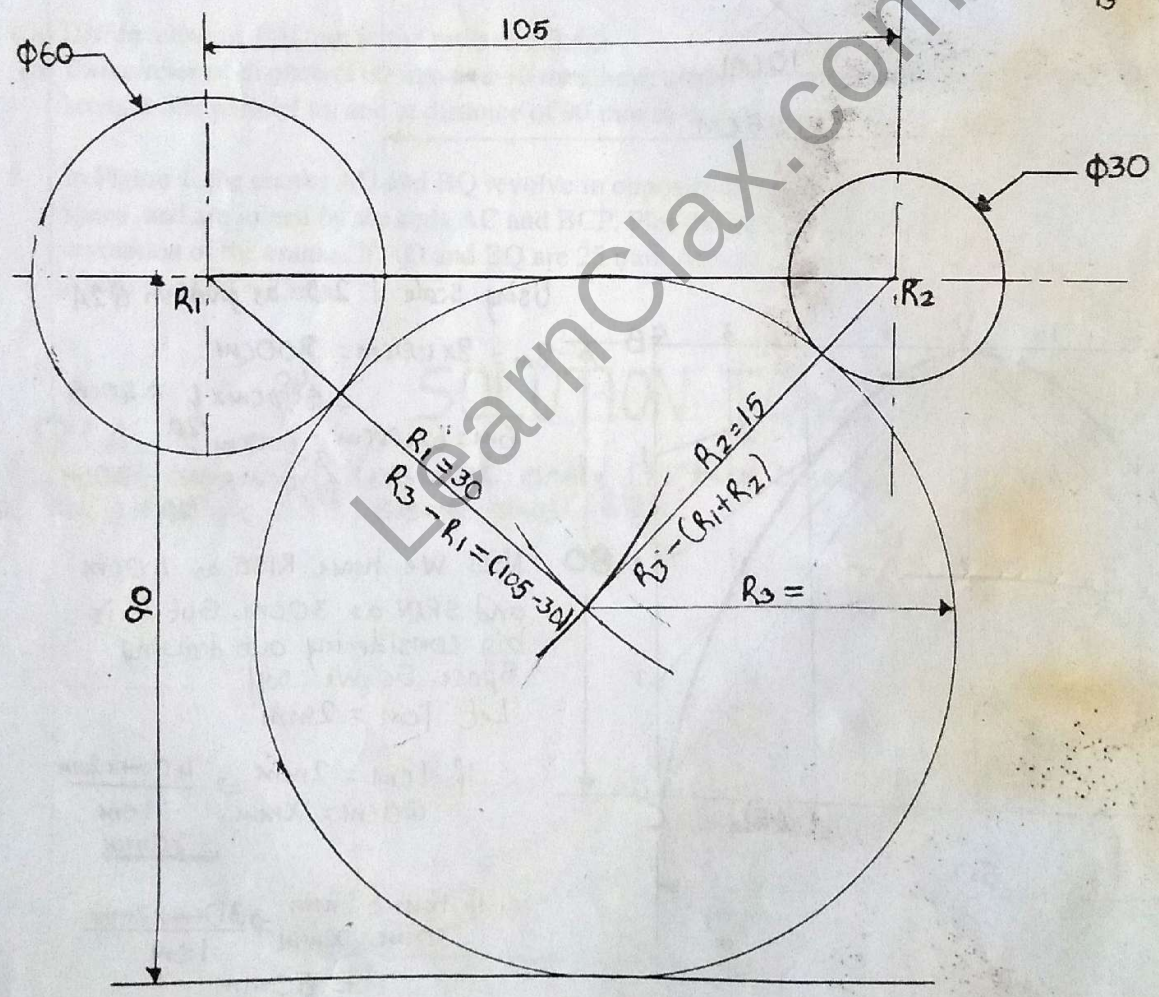
Q3

QUESTION NO 3 : SAME AS 2013/2014 Q4

Q4 A



Q4 B



Q5