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Subject Code

- Any -

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- Any -

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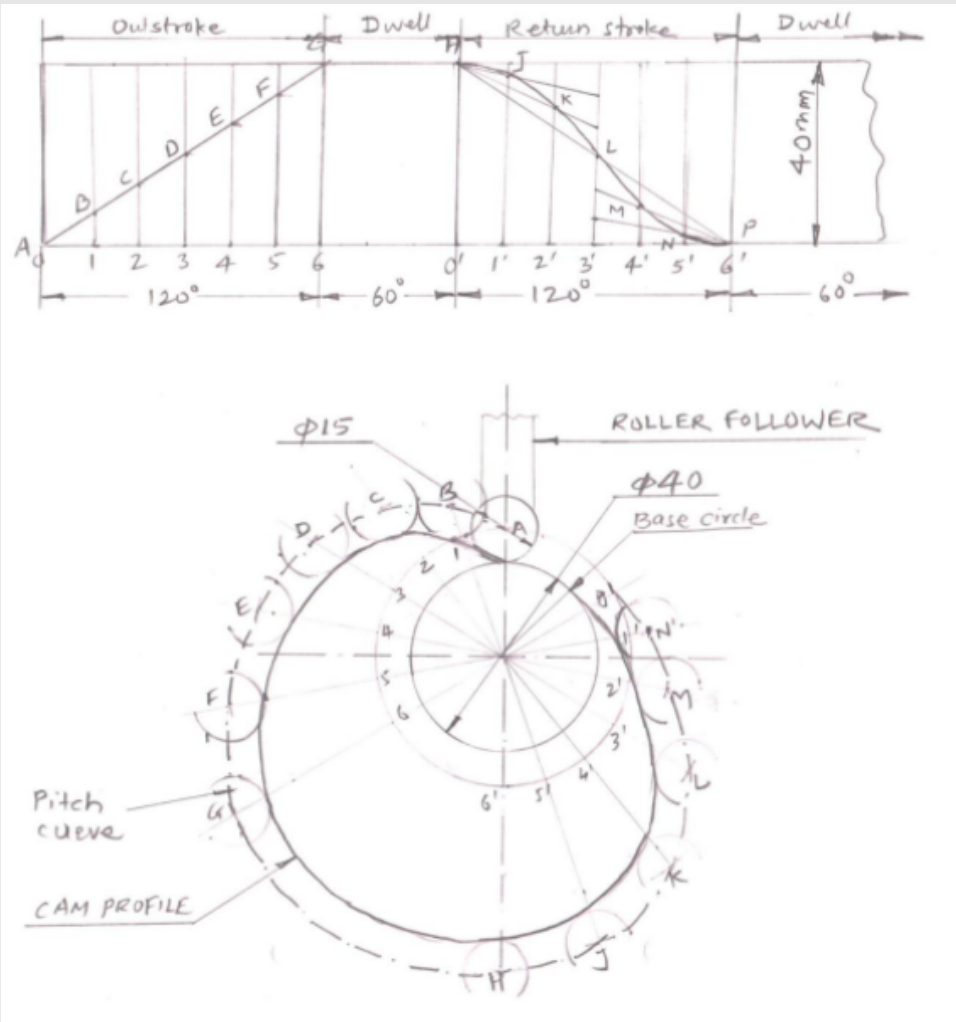
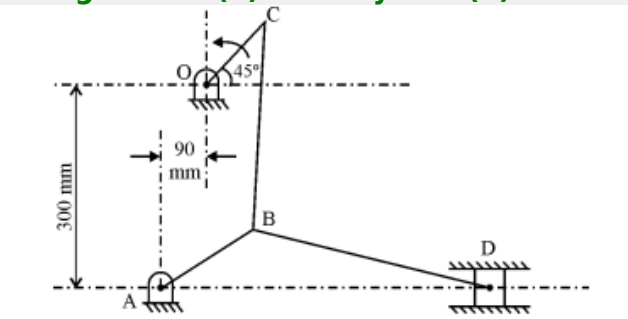
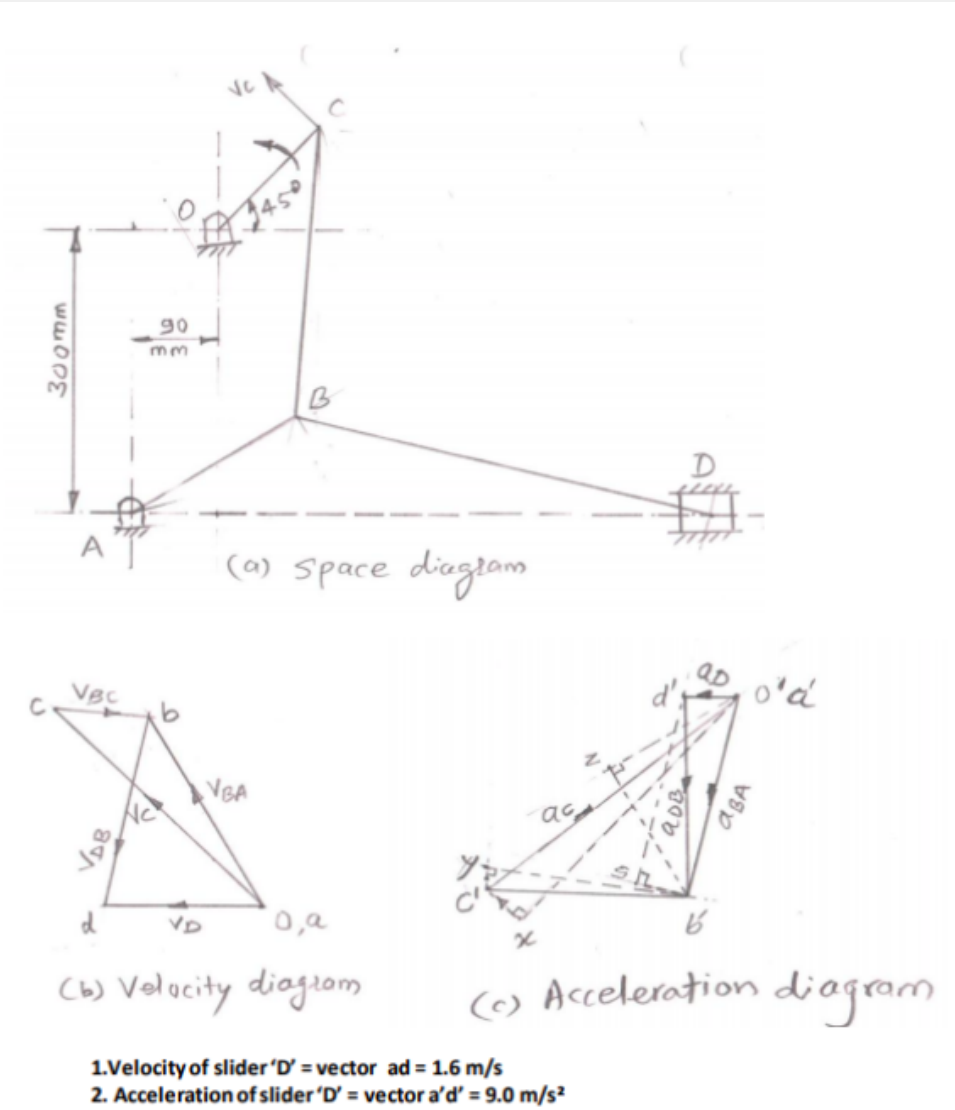
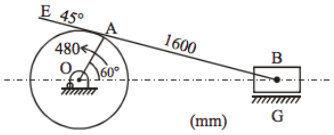
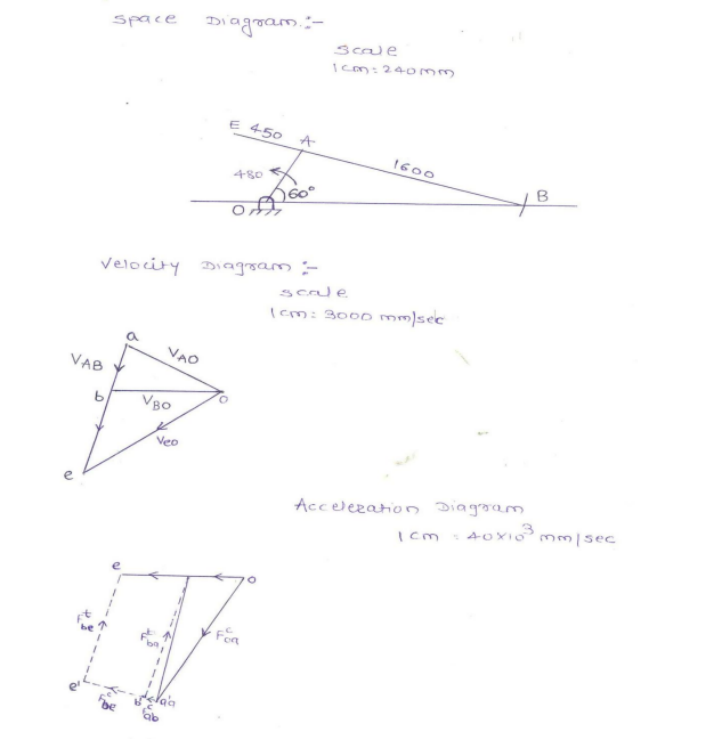
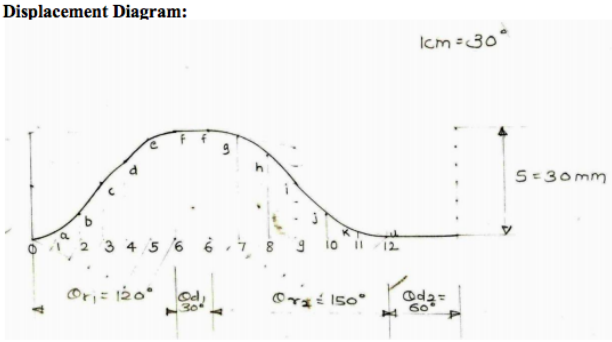
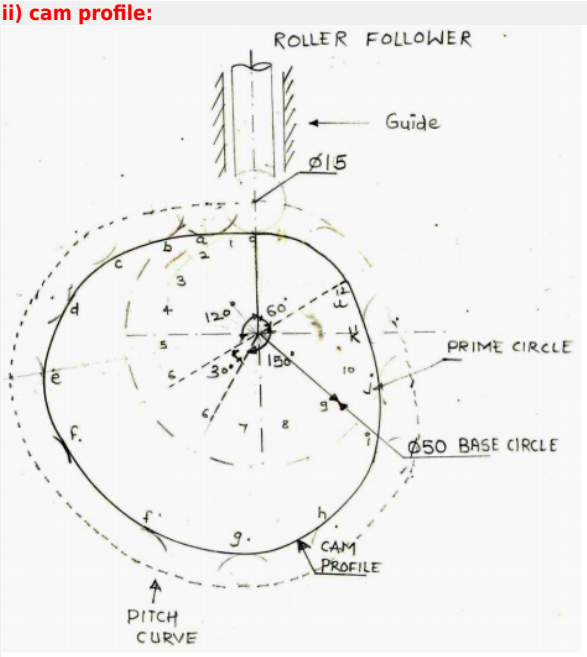
Examination: 2017 SUMMER

Que.No	Question/Problem	marks	Link
Q 5 a)	Question: **A cam with 40 mm minimum diameter rotates in clockwise at uniform speed and has to give the following motion to a roller follower 15 mm diameter :** **(i) Follower to complete outward stroke of 40 mm during 120o of cam rotation with uniform velocity.** **(ii) Follower to dwell for 60o of cam rotation.** **(iii) Follower will return to its initial position during 120□ of cam rotation with uniform acceleration and retardation.** **(iv) Follower will dwell for remaining 60o of cam rotation.** **Draw the profile of cam, if the axis of follower passes through the axis of cam.** **Answer:**  	8	view

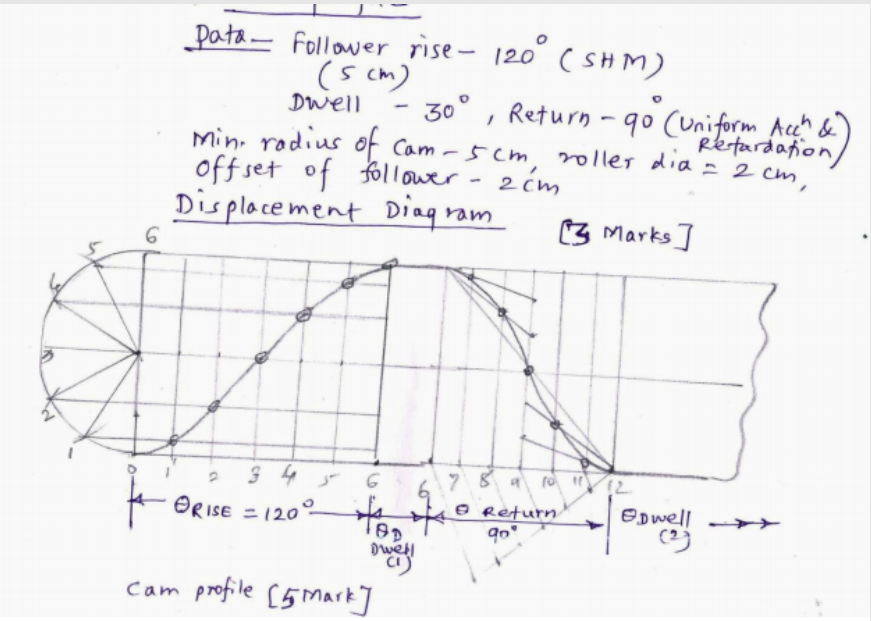
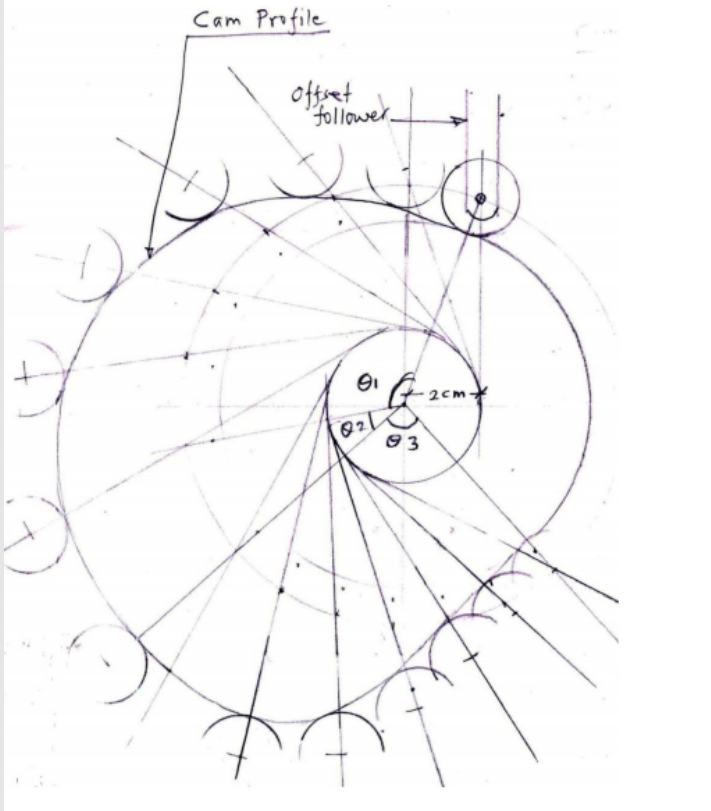
Que.No	Question/Problem	marks	Link
Q 5 b)	Question: **In the toggle mechanism as shown in Fig. (2), D is constrained to move on a horizontal path. The dimensions of various links are AB = 200 mm, BC = 300 mm, OC = 150 mm and BD = 450 mm. The crank OC is rotating in a counter clockwise direction at a speed of 180 rpm. Find, for given configuration (1) velocity and (2) acceleration of 'D'.**  Fig. 2 **Answer:**  	8	view

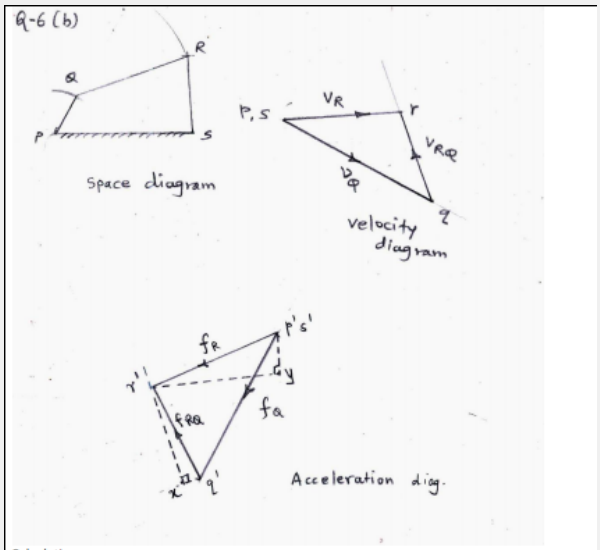
Examination: 2016 SUMMER

Que.No	Question/Problem	marks	Link
Q 5 a)	Question: (a) In a slider crank mechanism shown in figure 1.  **Fig. – 1** Calculate : (i) The acceleration of the slider at B (ii) The acceleration of point E. (iii) The acceleration of link AB. OA rotates at 20 rad/sec counter – clockwise. **Answer:**  **Calculations:** **i) Velocity of crank AO:** **V_{AO} = (r X ω) X (480 X 20)** V_{AO} = 9600mm/sec Velocity of connectingrod (AB) V_{AB} = l(ab) X Scale = 1.6 X3000 V_{AB} = 4800mm/sec Velocity of Slider : V_{BO} = l(bo) X Scale = 3.2 X3000 V_{BO} = 9600mm/sec Velocity of Extended link : V_{BE} = l(be) X Scale = 4.5 X3000 V_{BE} = 13500mm/sec Now, Calculations for acceleration Diagram: $f^c_{OA} = \frac{(\text{velocity of crank}^2)}{\text{length of crank}} = \frac{(9600)^2}{480} = 192X10^3$ mm/sec $f^c_{AB} = \frac{(\text{velocity of rod}^2)}{\text{length of rod}} = \frac{(4800)^2}{1600} = 14.4X10^3$ mm/sec $f^c_{BE} = \frac{(\text{velocity of Extended link}^2)}{\text{length of crank}} = \frac{(13500)^2}{2050} = 88.90X10^3$ mm/sec **To be find:** 1. **Acceleration of slider:** a_{bo} = l(bo)XScale = 1.6X40X10³ a_{bo} = 64X10³ mm/sec² 2. **The Acceleration of point E:** a_{oe} = l(oe)XScale = 3.4X40X10³ a_{oe} = 136X10³ mm/sec² 3. **Acceleration of link AB:** **a_{ab} = l(ab) X Scale = 4.3 X 40 X 10³** **a_{ab} = 172 X 10 mm/sec²**	8	view

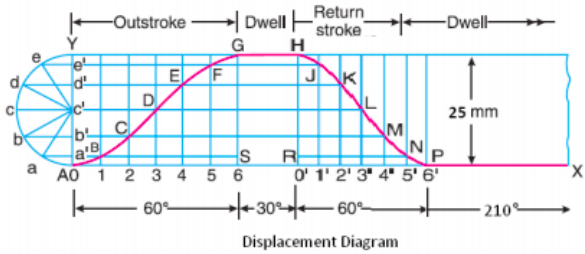
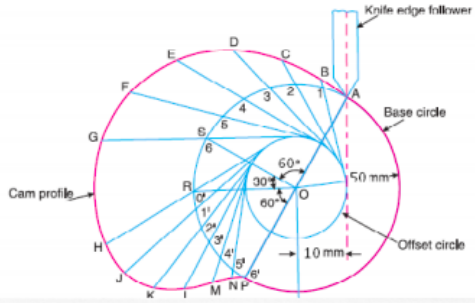
Que.No	Question/Problem	marks	Link
Q 5 b)	Question: **Draw the profile of cam operating a roller reciprocating follower with the following data :** **Minimum radius of cam = 25 mm** **lift = 30 mm** **Roller diameter = 15 mm** **The cam lifts the follower for 120°with SHM followed by a dwell period of 30°. Then the follower lowers down during 150° of the cam rotation with uniform acceleration and deceleration followed by a dwell period.** **Answer:** **i) Displacement Diagram:**  **ii) cam profile:**  	8	view

Examination: 2016 WINTER

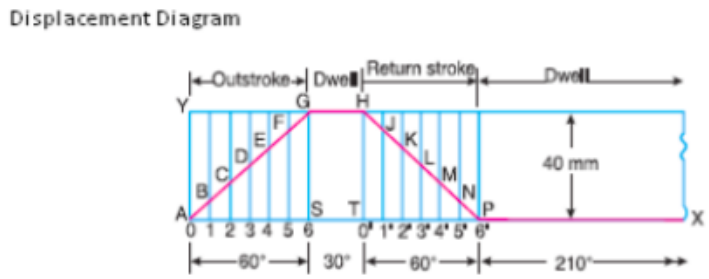
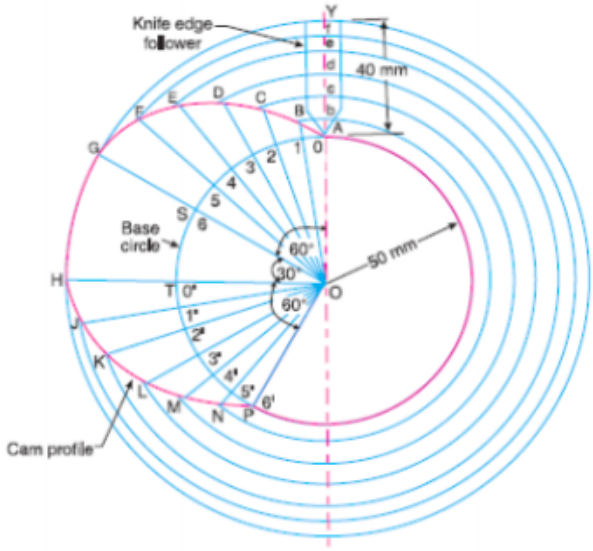
Que.No	Question/Problem	marks	Link
Q 5 b)	Question: **Draw profile of cam to raise the valve with S.H.M. through 5cm in 120° of revolution, keep it fully raised through 30° and lower it with equal uniform acceleration and retardation through 90° of rotation. The valve remain closed during the rest of rotation. The diameter of the roller is 2 cm and the minimum radius of the cam is 5cm. The axis of the valve rod is offset 2cm from the axis of the shaft. Assume the cam rotating in clockwise direction.** **Answer:**  Displacement diagram .....3 Marks Cam profile .....5 Marks  	8	view

Que.No	Question/Problem	marks	Link
Q 6 b)	Question: **PQRS is a four bar chain with link PS fixed. The lengths of links are PQ = 62.5mm, QR = 175mm, RS = 112.5mm and PS = 200mm, The crank PQ rotates at 10 rad/sec clockwise. Draw velocity and acceleration diagram, when angle QPS = 60° and Q and R lie on the same side of PS. Find the angular velocity and angular acceleration of links QR and RS.** **Answer:**  Calculations- V_{QP} = ω_{QP} X PQ =10 X 0.0625 = 0.625 m/s From Velocity diagram, By measurement, V_{RQ} =0.333 m/s,; ω_{QR} = V_{RQ} /RQ =0.333/0.175 =1.9 rad/s (Anti clockwise)...1M By measurement, V_{RS} =0.426 m/s,; ω_{RS} = V_{RS} /SR =0.426/0.1125 =3.78 rad/s (clockwise).....1M Find out radial acceleration of each link by using formula -V^2/length of link Fr_{QP} =6.25 m/s^2 ; fr_{RQ} = 0.634 m/s^2 ; fr_{RS} = 1.613 m/s^2 From acceleration diagram, measure all tangential components (ft) Angular acceleration of link QR , α_{QR} = ft RQ /QR =4.1/0.175= 23.43 rad/s^2 (Anti clockwise)...1M Angular acceleration of link RS , α_{RS}= ft RS /SR =5.3/0.1125= 47.1 rad/s^2 (Anti clockwise) ...1M	8	view

Examination: 2015 SUMMER

Que.No	Question/Problem	marks	Link
Q 5 b)	Question: **Construct a cam profile with knife edge follower having an offset of 10 mm for the following data :** **Outstroke = 60° with SHM** **Dwell = 30°** **Return = 60° with uniform velocity and remaining is dwell period.** **Minimum radius of cam = 50 mm** **Lift of follower = 25 mm** **Consider the rotation of cam in clockwise direction.** **Answer:**  Displacement Diagram **Note: In solution cam profile angles are not taken by measurement. In actual drawing in answer books it should be drawn by measurements only)**  	8	view

Examination: 2015 WINTER

Que.No	Question/Problem	marks	Link
Q 5 b)	Question: **A cam is to give the following motion to a knife edged follower :** **(i) Outstroke during 60° of cam rotation.** **(ii) Dwell for the next 30° of cam rotation.** **(iii) Return stroke during next 60° of cam rotation.** **iv) Dwell for the remaining 210° of cam rotation.** **The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return stroke. Draw the profile of the cam when the axis of the follower passes through the axis of the camshaft.** **Answer:**   	8	view