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Subject Code

- Any - ▼

Question Type

- Any - ▼

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Question Number

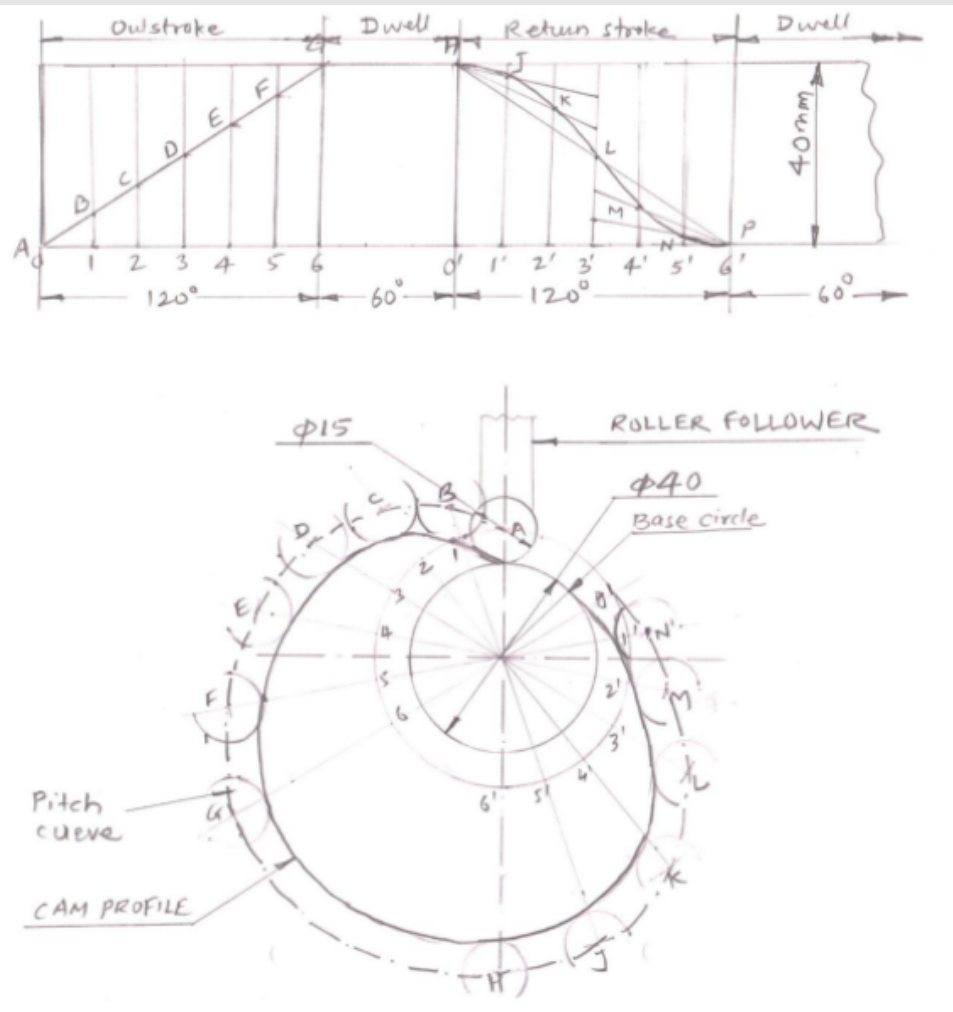
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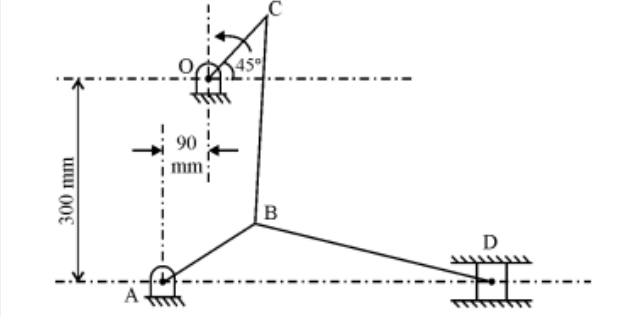
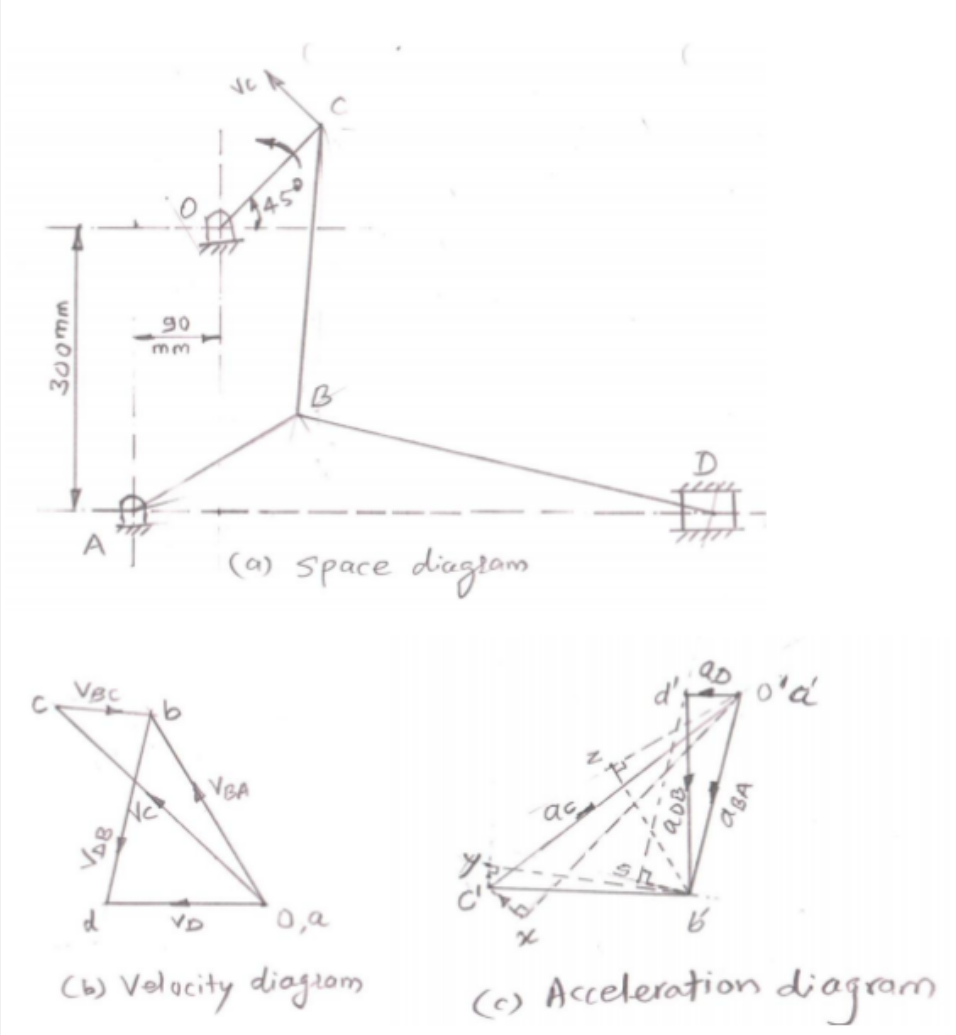
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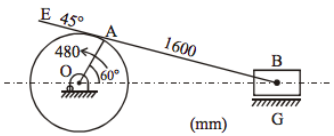
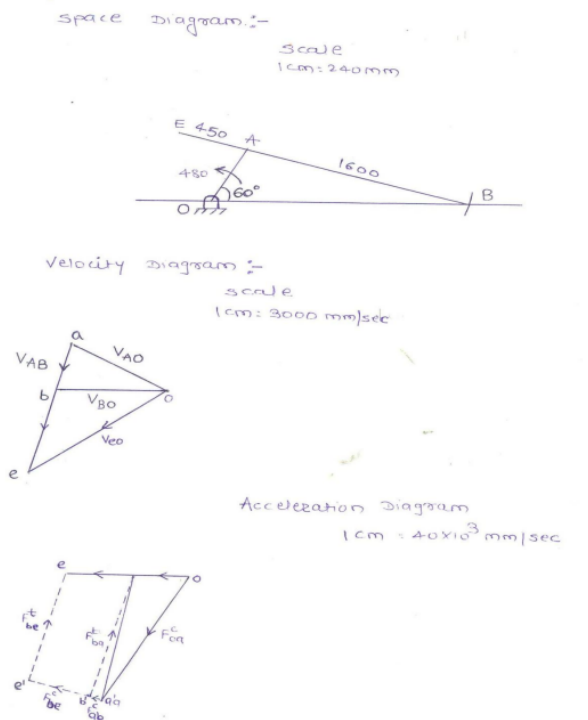
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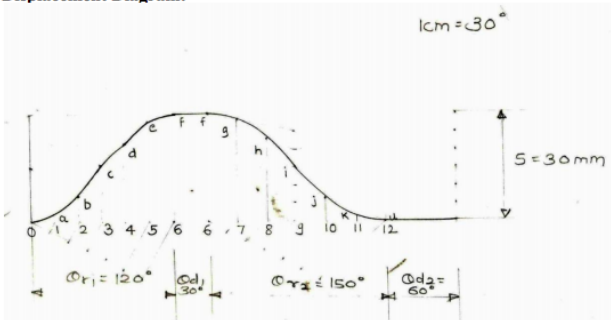
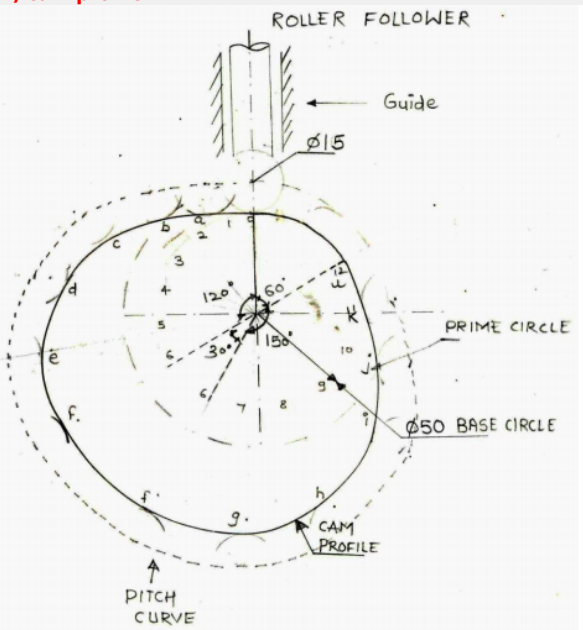
Examination: [2017 SUMMER](#)

Que.No	Question/Problem	marks	Link
Q 5 a )	<p><b>Question:</b>  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 120° of cam rotation with uniform velocity.  (ii) Follower to dwell for 60° 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 60° of cam rotation.  Draw the profile of cam, if the axis of follower passes through the axis of cam.</p> <p><b>Answer:</b></p> 	8	<a href="#">view</a>

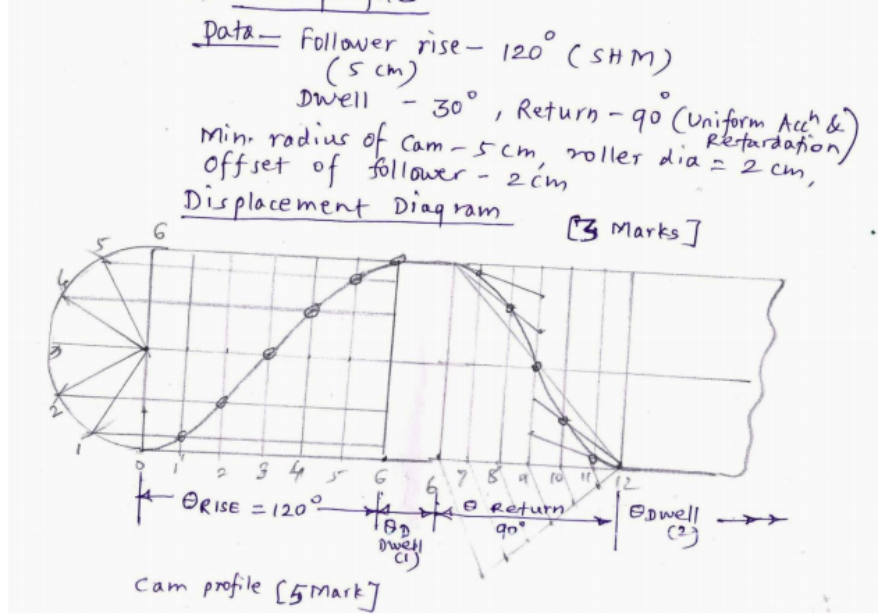
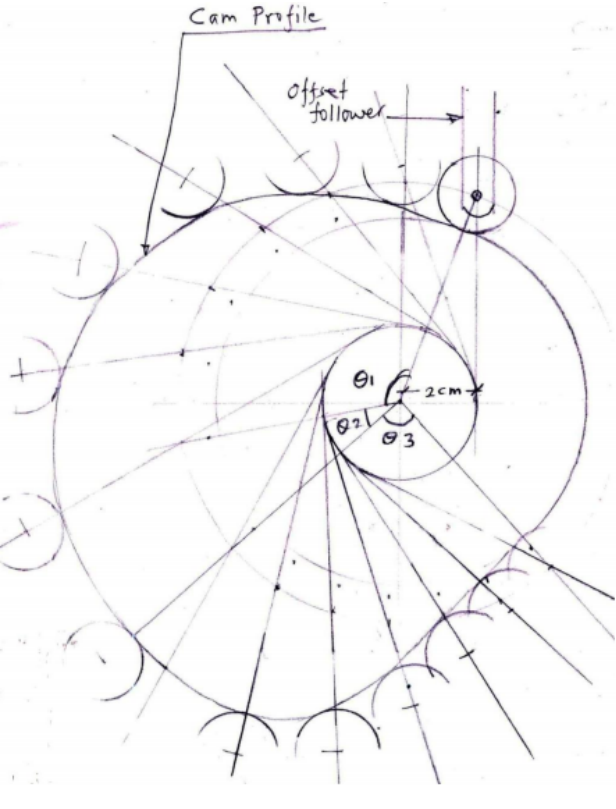
Que.No	Question/Problem	marks	Link
Q 5 b )	<p><b>Question:</b>            In the toggle mechanism as shown in Fig. (2), D is constrained to move on a horizontal path. The dimensions of various links are <math>AB = 200</math> mm, <math>BC = 300</math> mm, <math>OC = 150</math> mm and <math>BD = 450</math> mm. The crank <math>OC</math> is rotating in a counter clockwise direction at a speed of 180 rpm. Find, for given configuration (1) velocity and (2) acceleration of 'D'.</p>  <p style="text-align: center;"><b>Fig. 2</b></p> <p><b>Answer:</b></p>  <p style="text-align: center;">(a) Space diagram</p> <p style="text-align: center;">(b) Velocity diagram</p> <p style="text-align: center;">(c) Acceleration diagram</p> <p>1. Velocity of slider 'D' = vector <math>ad = 1.6</math> m/s            2. Acceleration of slider 'D' = vector <math>a'd' = 9.0</math> m/s<sup>2</sup></p>	8	<a href="#">view</a>

Examination: [2016 SUMMER](#)

Que.No	Question/Problem	marks	Link
Q 5 a )	<p><b>Question:</b></p> <p>(a) In a slider crank mechanism shown in figure 1.</p>  <p style="text-align: center;">(mm)</p> <p style="text-align: center;"><b>Fig. - 1</b></p> <p>Calculate :</p> <ol style="list-style-type: none"> <li>The acceleration of the slider at B</li> <li>The acceleration of point E.</li> <li>The acceleration of link AB. OA rotates at 20 rad/sec counter – clockwise.</li> </ol> <p><b>Answer:</b></p>  <p><b>Calculations:</b></p> <p><b>i) Velocity of crank AO:</b>  <math>V_{AO} = (r \times \omega) \times (480 \times 20)</math>  <math>V_{AO} = 9600 \text{ mm/sec}</math></p> <p>Velocity of connectingrod (AB)  <math>V_{AB} = l(ab) \times \text{Scale} = 1.6 \times 3000</math>  <math>V_{AB} = 4800 \text{ mm/sec}</math></p> <p>Velocity of Slider :  <math>V_{BO} = l(bo) \times \text{Scale} = 3.2 \times 3000</math>  <math>V_{BO} = 9600 \text{ mm/sec}</math></p> <p>Velocity of Extended link :  <math>V_{BE} = l(be) \times \text{Scale} = 4.5 \times 3000</math>  <math>V_{BE} = 13500 \text{ mm/sec}</math></p> <p>Now,</p> <p>Calculations for acceleration Diagram:</p> $f_{OA}^c = \frac{(\text{velocity of crank}^2)}{\text{length of crank}} = \frac{(9600)^2}{480} = 192 \times 10^3 \text{ mm/sec}^2$ $f_{AB}^c = \frac{(\text{velocity of rod}^2)}{\text{length of rod}} = \frac{(4800)^2}{1600} = 14.4 \times 10^3 \text{ mm/sec}^2$ $f_{BE}^c = \frac{(\text{velocity of Extended link}^2)}{\text{length of crank}} = \frac{(13500)^2}{2050} = 88.90 \times 10^3 \text{ mm/sec}^2$ <p><b>To be find:</b></p> <ol style="list-style-type: none"> <li><b>Acceleration of slider:</b>  <math>a_{bo} = l(bo) \times \text{Scale} = 1.6 \times 40 \times 10^3</math>  <math>a_{bo} = 64 \times 10^3 \text{ mm/sec}^2</math></li> <li><b>The Acceleration of point E:</b>  <math>a_{oe} = l(oe) \times \text{Scale} = 3.4 \times 40 \times 10^3</math>  <math>a_{oe} = 136 \times 10^3 \text{ mm/sec}^2</math></li> <li><b>Acceleration of link AB:</b>  <math>a_{ab} = l(ab) \times \text{Scale} = 4.3 \times 40 \times 10^3</math>  <math>a_{ab} = 172 \times 10 \text{ mm/sec}^2</math></li> </ol>	8	<a href="#">view</a>

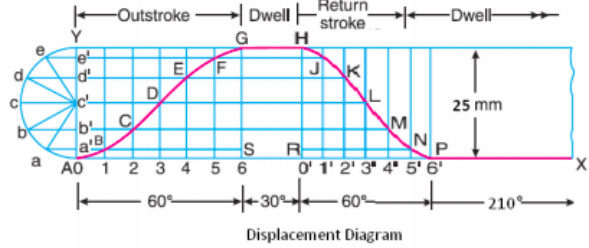
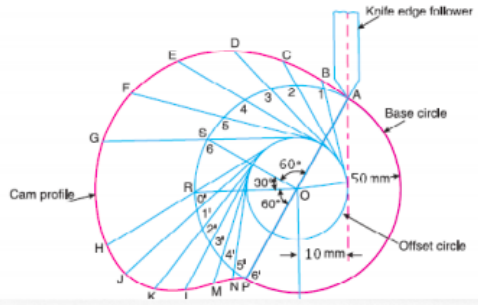
Que.No	Question/Problem	marks	Link
	<p><b>Question:</b>  <b>Draw the profile of cam operating a roller reciprocating follower with the following data :</b>  <b>Minimum radius of cam = 25 mm</b>  <b>lift = 30 mm</b>  <b>Roller diameter = 15 mm</b>  <b>The cam lifts the follower for 120° with SHM followed 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.</b>  <b>Answer:</b></p> <p>i) <b>Displacement Diagram:</b></p>  <p>ii) <b>cam profile:</b></p> 	8	<a href="#">view</a>

Examination: [2016 WINTER](#)

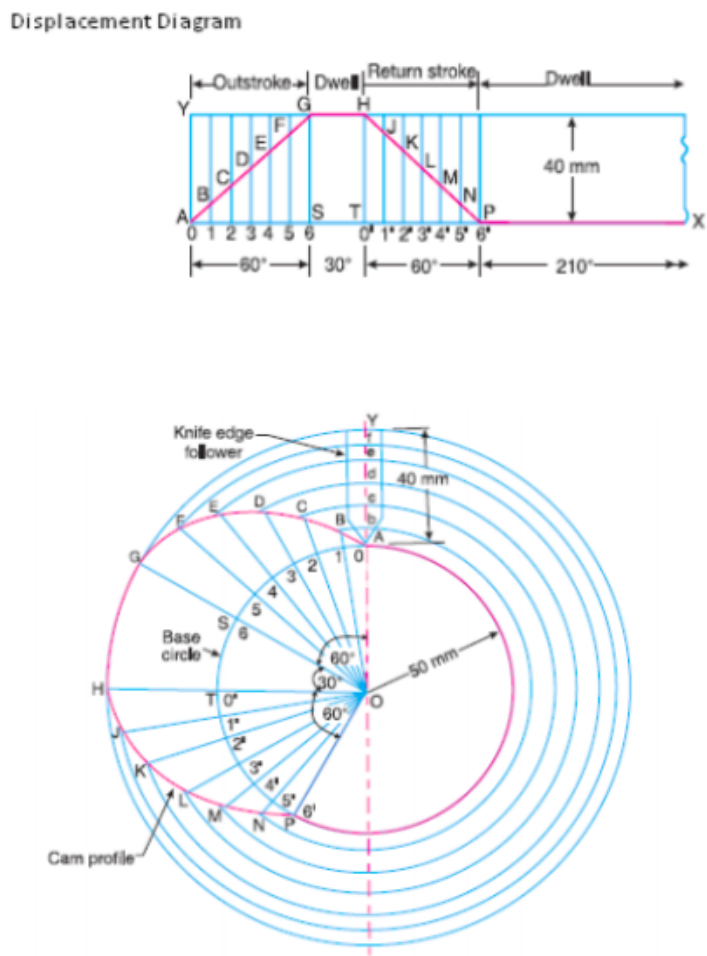
Que.No	Question/Problem	marks	Link
	<p><b>Question:</b>            Draw profile of cam to raise the valve with S.H.M. through 5cm in <math>120^\circ</math> of revolution, keep it fully raised through <math>30^\circ</math> and lower it with equal uniform acceleration and retardation through <math>90^\circ</math> 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.</p> <p><b>Answer:</b></p>  <p>Data— Follower rise— <math>120^\circ</math> (S.H.M.) (5 cm)            Dwell — <math>30^\circ</math>, Return — <math>90^\circ</math> (Uniform Acc<sup>n</sup> &amp; Retardation)            Min. radius of Cam — 5 cm, roller dia = 2 cm,            Offset of follower — 2 cm</p> <p>Displacement Diagram [3 Marks]</p> <p>Cam profile [5 Mark]</p>		
Q 5 b )	<p>Displacement diagram .....3 Marks</p> <p>Cam profile .....5 Marks</p>  <p>Cam Profile</p> <p>offset follower</p> <p>2 cm</p> <p><math>\theta_1</math>  <math>\theta_2</math>  <math>\theta_3</math></p>	8	<a href="#">view</a>

Que.No	Question/Problem	marks	Link
Q 6 b )	<p><b>Question:</b>  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.</p> <p><b>Answer:</b></p> <p>Calculations-</p> <p><math>V_{QP} = \omega_{QP} \times PQ = 10 \times 0.0625 = 0.625 \text{ m/s}</math></p> <p>From Velocity diagram,</p> <p>By measurement, <math>V_{RQ} = 0.333 \text{ m/s}</math>; <math>\omega_{QR} = V_{RQ}/RQ = 0.333/0.175 = 1.9 \text{ rad/s}</math> (Anti clockwise)....1M</p> <p>By measurement, <math>V_{RS} = 0.426 \text{ m/s}</math>; <math>\omega_{RS} = V_{RS}/RS = 0.426/0.1125 = 3.78 \text{ rad/s}</math> (clockwise).....1M</p> <p>Find out radial acceleration of each link by using formula <math>-V^2/\text{length of link}</math></p> <p><math>f_{QP} = 6.25 \text{ m/s}^2</math>; <math>f_{RQ} = 0.634 \text{ m/s}^2</math>; <math>f_{RS} = 1.613 \text{ m/s}^2</math></p> <p>From acceleration diagram, measure all tangential components (ft)</p> <p>Angular acceleration of link QR, <math>\alpha_{QR} = f_{tRQ}/RQ = 4.1/0.175 = 23.43 \text{ rad/s}^2</math> (Anti clockwise)....1M</p> <p>Angular acceleration of link RS, <math>\alpha_{RS} = f_{tRS}/RS = 5.3/0.1125 = 47.1 \text{ rad/s}^2</math> (Anti clockwise) ...1M</p>	8	<a href="#">view</a>

Examination: [2015 SUMMER](#)

Que.No	Question/Problem	marks	Link
Q 5 b )	<p><b>Question:</b>  Construct a cam profile with knife edge follower having an offset of 10 mm for the following data :  Outstroke = <math>60^\circ</math> with SHM  Dwell = <math>30^\circ</math>  Return = <math>60^\circ</math> 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.</p> <p><b>Answer:</b></p>  <p>The displacement diagram shows the cam's motion over 210 degrees. The outstroke (0-60°) follows a simple harmonic motion (SHM) curve, the dwell (60-90°) is a horizontal line at 25 mm lift, the return stroke (90-150°) is a straight line back to 0 mm, and the final dwell (150-210°) is another horizontal line at 0 mm. The cam profile is constructed using a base circle of 50 mm radius and an offset circle of 10 mm. Points on the cam profile are labeled A through P, corresponding to the displacement diagram.</p> <p><b>Note:</b> In solution cam profile angles are not taken by measurement. In actual drawing in answer books it should be drawn by measurements only)</p>  <p>The cam profile construction shows the base circle (50 mm), the offset circle (10 mm), and the cam profile (solid line). The knife edge follower is shown at its various positions. The cam rotates clockwise. The cam profile is constructed by drawing arcs from the base circle and offset circle, and then connecting them to form the cam profile.</p>	8	<a href="#">view</a>

Examination: [2015 WINTER](#)

Que.No	Question/Problem	marks	Link
Q 5 b )	<p><b>Question:</b>  A cam is to give the following motion to a knife edged follower :  (i) Outstroke during <math>60^\circ</math> of cam rotation.  (ii) Dwell for the next <math>30^\circ</math> of cam rotation.  (iii) Return stroke during next <math>60^\circ</math> of cam rotation.  iv) Dwell for the remaining <math>210^\circ</math> 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.</p> <p><b>Answer:</b></p>  <p>The diagram shows the displacement diagram and the resulting cam profile. The displacement diagram is a graph of follower displacement (Y-X) versus cam rotation angle. It consists of four segments: an outstroke of <math>60^\circ</math> (A to G), a dwell of <math>30^\circ</math> (G to H), a return stroke of <math>60^\circ</math> (H to P), and a dwell of <math>210^\circ</math> (P to X). The outstroke and return stroke are linear, indicating uniform velocity. The cam profile is a circular cam with a base circle of 50 mm radius. The knife edge follower is a vertical line passing through the camshaft axis. The cam profile is drawn by the radial line method, using the displacement diagram to determine the follower's position at various cam angles.</p>	8	<a href="#">view</a>