Code.No: RR310304 | RR | SET-1

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
KINEMATICS OF MACHINES
(COMMON TO ME, MEP, MCT)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1.a) List the different types of mechanisms with examples.
b) Explain with examples the different types of constrained motions.
c) Derive the ratio of time taken on cutting and return strokes of a quick return motion on mechanism of crank and slotted lever type. [6+5+5]

2.a) Derive the necessary condition to prove that the mechanisms trace mathematically and explain any one straight line mechanism.
b) Does the Scoh Russel mechanism and modified Scott Russel mechanism. Satisfy the condition of Straight line mechanisms. If no to which mechanism theory belongs. Explain the working of both. [8+8]

3. The crank AB of a quick return motion mechanism is fixed at centre A and rotates about A. At a fixed centre D the end B operates a slider which is reciprocating in a slotted link and 50m above A vertically. The 100 mm long crank AB rotates in anti clockwise direction at a speed of 120 rpm when the crank AB has turned through an angle 50^0. Find the angular acceleration of a slotted link. [16]

4.a) How is the velocity and acceleration of a link in a single slider crank chain found using Klein's construction method.
b) Explain three centre in line theorem. Explain how the instantaneous centres are located on a single slider crank mechanism. [8+8]

5.a) Determine the maximum and minimum speeds of the driven shaft where the two shafts are connected by a Hooke's joint. The driving shafts revolve uniformly at 600 rpm and if the total permissible variation in speed of the driven shaft should not exceed ±5% of the mean speed, find the permissible angle between the centre lines of the shafts.
b) Explain how Ackerman's steering gear mechanism is different from Davis steering gear mechanism. [8+8]

6. Find the maximum velocity and acceleration of value during raising and lowering of the SHM through 50mm in $\frac{1}{6}^{th}$ of a revolution, keep fully raised through $\frac{1}{6}^{th}$ revolution and to lower it with uniform acceleration and retardation through $\frac{1}{4}^{th}$ revolution and the value remains closed for remaining revolution. The roller diameter is 20mm and minimum radius of cam is 30mm with diameter of the cam shaft 30 mm the cam rotates at 300 rpm. [16]

7.a) For a constant velocity ratio state and prove the law of gearing.
b) How are the parallel shafts connected with gear. Explain different gears. [8+8]

8. In an epicyclic gear train wheel A is keyed on the driving shaft, wheel B gears with A also with a fixed annular wheel C. Wheels B and D are fixed to the common spindle which is carried by an arm which can rotate about the axis of the wheel A and the wheel D gears with an annular wheel A and the wheel D gears with an annular wheel E which is keyed to the driven shaft. If E has 30 teeth, B has 36 and D has 20 teeth with same pitch find the velocity ratio of driving & drives shafts. [16]

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Code.No: RR310304 | RR | SET-2

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
KINEMATICS OF MACHINES
(COMMON TO ME, MEP, MCT)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1. The crank AB of a quick return motion mechanism is fixed at centre A and rotates about A. At a fixed centre D the end B operates a slider which is reciprocating in a slotted link and 50m above A vertically. The 100 mm long crank AB rotates in anti clockwise direction at a speed of 120 rpm when the crank AB has turned through an angle 50^0. Find the angular acceleration of a slotted link. [16]

2.a) How is the velocity and acceleration of a link in a single slider crank chain found using Klein's construction method.
b) Explain three centre in line theorem. Explain how the instantaneous centres are located on a single slider crank mechanism. [8+8]

3.a) Determine the maximum and minimum speeds of the driven shaft where the two shafts are connected by a Hooke's joint. The driving shafts revolve uniformly at 600 rpm and if the total permissible variation in speed of the driven shaft should not exceed ±5% of the mean speed, find the permissible angle between the centre lines of the shafts.
b) Explain how Ackerman's steering gear mechanism is different from Davis steering gear mechanism. [8+8]

4. Find the maximum velocity and acceleration of value during raising and lowering of the SHM through 50mm in $\frac{1}{6}^{th}$ of a revolution, keep fully raised through $\frac{1}{6}^{th}$ revolution and to lower it with uniform acceleration and retardation through $\frac{1}{4}^{th}$ revolution and the value remains closed for remaining revolution. The roller diameter is 20mm and minimum radius of cam is 30mm with diameter of the cam shaft 30 mm the cam rotates at 300 rpm. [16]

5.a) For a constant velocity ratio state and prove the law of gearing.
b) How are the parallel shafts connected with gear. Explain different gears. [8+8]

6. In an epicyclic gear train wheel A is keyed on the driving shaft, wheel B gears with A also with a fixed annular wheel C. Wheels B and D are fixed to the common spindle which is carried by an arm which can rotate about the axis of the wheel A and the wheel D gears with an annular wheel A and the wheel D gears with an annular wheel E which is keyed to the driven shaft. If E has 30 teeth, B has 36 and D has 20 teeth with same pitch find the velocity ratio of driving & drives shafts. [16]

7.a) List the different types of mechanisms with examples.
b) Explain with examples the different types of constrained motions.
c) Derive the ratio of time taken on cutting and return strokes of a quick return motion on mechanism of crank and slotted lever type. [6+5+5]

8.a) Derive the necessary condition to prove that the mechanisms trace mathematically and explain any one straight line mechanism.

b) Does the Scoh Russel mechanism and modified Scott Russel mechanism. Satisfy the condition of Straight line mechanisms. If no to which mechanism theory belongs. Explain the working of both. [8+8]

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Code.No: RR310304 | RR | SET-3

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
KINEMATICS OF MACHINES
(COMMON TO ME, MEP, MCT)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1.a) Determine the maximum and minimum speeds of the driven shaft where the two shafts are connected by a Hooke's joint. The driving shafts revolve uniformly at 600 rpm and if the total permissible variation in speed of the driven shaft should not exceed ±5% of the mean speed, find the permissible angle between the centre lines of the shafts.

b) Explain how Ackerman's steering gear mechanism is different from Davis steering gear mechanism. [8+8]

2. Find the maximum velocity and acceleration of value during raising and lowering of the SHM through 50mm in $\frac{1}{6}^{th}$ of a revolution, keep fully raised through $\frac{1}{6}^{th}$ revolution and to lower it with uniform acceleration and retardation through $\frac{1}{4}^{th}$ revolution and the value remains closed for remaining revolution. The roller diameter is 20mm and minimum radius of cam is 30mm with diameter of the cam shaft 30 mm the cam rotates at 300 rpm. [16]

3.a) For a constant velocity ratio state and prove the law of gearing.

b) How are the parallel shafts connected with gear. Explain different gears. [8+8]

4. In an epicyclic gear train wheel A is keyed on the driving shaft, wheel B gears with A also with a fixed annular wheel C. Wheels B and D are fixed to the common spindle which is carried by an arm which can rotate about the axis of the wheel A and the wheel D gears with an annular wheel A and the wheel D gears with an annular wheel E which is keyed to the driven shaft. If E has 30 teeth, B has 36 and D has 20 teeth with same pitch find the velocity ratio of driving & drives shafts. [16]

5.a) List the different types of mechanisms with examples.

b) Explain with examples the different types of constrained motions.

c) Derive the ratio of time taken on cutting and return strokes of a quick return motion on mechanism of crank and slotted lever type. [6+5+5]

6.a) Derive the necessary condition to prove that the mechanisms trace mathematically and explain any one straight line mechanism.

b) Does the Scoh Russel mechanism and modified Scott Russel mechanism. Satisfy the condition of Straight line mechanisms. If no to which mechanism theory belongs. Explain the working of both. [8+8]

7. The crank AB of a quick return motion mechanism is fixed at centre A and rotates about A. At a fixed centre D the end B operates a slider which is reciprocating in a slotted link and 50m above A vertically. The 100 mm long crank AB rotates in anti clockwise direction at a speed of 120 rpm when the crank AB has turned through an angle 50^0. Find the angular acceleration of a slotted link. [16]

8.a) How is the velocity and acceleration of a link in a single slider crank chain found using Klein's construction method.

b) Explain three centre in line theorem. Explain how the instantaneous centres are located on a single slider crank mechanism. [8+8]

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Code.No: RR310304 | RR | SET-4

III B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010
KINEMATICS OF MACHINES
(COMMON TO ME, MEP, MCT)

Time: 3hours **Max.Marks:80**

Answer any FIVE questions
All questions carry equal marks

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1.a) For a constant velocity ratio state and prove the law of gearing.
b) How are the parallel shafts connected with gear. Explain different gears. [8+8]

2. In an epicyclic gear train wheel A is keyed on the driving shaft, wheel B gears with A also with a fixed annular wheel C. Wheels B and D are fixed to the common spindle which is carried by an arm which can rotate about the axis of the wheel A and the wheel D gears with an annular wheel A and the wheel D gears with an annular wheel E which is keyed to the driven shaft. If E has 30 teeth, B has 36 and D has 20 teeth with same pitch find the velocity ratio of driving & drives shafts. [16]

3.a) List the different types of mechanisms with examples.
b) Explain with examples the different types of constrained motions.
c) Derive the ratio of time taken on cutting and return strokes of a quick return motion on mechanism of crank and slotted lever type. [6+5+5]

4.a) Derive the necessary condition to prove that the mechanisms trace mathematically and explain any one straight line mechanism.
b) Does the Scoh Russel mechanism and modified Scott Russel mechanism. Satisfy the condition of Straight line mechanisms. If no to which mechanism theory belongs. Explain the working of both. [8+8]

5. The crank AB of a quick return motion mechanism is fixed at centre A and rotates about A. At a fixed centre D the end B operates a slider which is reciprocating in a slotted link and 50m above A vertically. The 100 mm long crank AB rotates in anti clockwise direction at a speed of 120 rpm when the crank AB has turned through an angle 50^0. Find the angular acceleration of a slotted link. [16]

6.a) How is the velocity and acceleration of a link in a single slider crank chain found using Klein's construction method.
b) Explain three centre in line theorem. Explain how the instantaneous centres are located on a single slider crank mechanism. [8+8]

7.a) Determine the maximum and minimum speeds of the driven shaft where the two shafts are connected by a Hooke's joint. The driving shafts revolve uniformly at 600 rpm and if the total permissible variation in speed of the driven shaft should not exceed ±5% of the mean speed, find the permissible angle between the centre lines of the shafts.
b) Explain how Ackerman's steering gear mechanism is different from Davis steering gear mechanism. [8+8]

8. Find the maximum velocity and acceleration of value during raising and lowering of the SHM through 50mm in $\frac{1}{6}^{th}$ of a revolution, keep fully raised through $\frac{1}{6}^{th}$ revolution and to lower it with uniform acceleration and retardation through $\frac{1}{4}^{th}$ revolution and the value remains closed for remaining revolution. The roller diameter is 20mm and minimum radius of cam is 30mm with diameter of the cam shaft 30 mm the cam rotates at 300 rpm.

[16]

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