No. of Printed Pages : 3

BIME-031

B.Tech. – VIEP – MECHANICAL ENGINEERING

(BTMEVI)

Term-End Examination

00264

December, 2016

BIME-031 : KINEMATICS AND DYNAMICS OF MACHINES

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

1. Derive the formula to determine the length of an open belt drive and a cross belt drive. *14*

2. Describe, with the help of a neat sketch, the construction and working of a rope brake absorption dynamometer. *14*

3. Draw the profile of a cam operating a knife-edge follower when the axis of the follower is offset by 20 mm from the axis of the cam shaft with the following data : *14*

(a) Follower to move outwards through 40 mm during 60° of cam rotation

(b) Follower to dwell for the next 45°

(c) Follower to return to its original position during next 90°

(d) Follower to dwell for the rest of cam rotation

4. Explain the terms spin and precession. Derive the expression of gyroscopic couple. *14*

5. Derive an expression for the velocity of sliding between a pair of involute teeth. State the advantages and limitations of involute tooth profile gear. *14*

6. Two gears having 20 and 40 involute teeth respectively are in mesh. Pressure angle is 120° and the module of the gear teeth is 12 mm. The line of contact on each side of the pitch point is half the maximum possible length. Determine the height of the addendum for each gear wheel. *14*

7. What are the different types of followers ? With the help of neat sketches, explain the motion performed by each follower. *14*

8. Write short notes on the following : $4 \times 3\frac{1}{2} = 14$

(a) Laws of Friction

(b) Condition for Maximum Power Transmission in Belt Drives

(c) Interference and Undercutting in Involute Gear Teeth

(d) Sun and Planet Gears