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BME-056

DIPLOMA IN MECHANICAL ENGINEERING (DME) / ADVANCED LEVEL CERTIFICATE COURSE IN MECHANICAL ENGINEERING (DMEVI / ACMEVI)

Term-End Examination

00333 **June, 2018**

BME-056 : THEORY OF MACHINES

Time : 2 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. Use of scientific calculator is allowed. Assume missing data suitably.*

1. Explain any ***two*** of the following : *2×7=14*

(a) Brief about types of cams and followers

(b) Differentiate lower pairs and higher pairs

(c) Classification of governors

(d) Kennedy's Theorem

2. Explain inversions of double slider crank mechanism. *14*

3. Describe Whitworth's return motion mechanism with diagram. *14*

4. In a Hartnell governor, the extreme radii of rotation of the balls are 40 mm and 60 mm and the corresponding speeds are 210 rpm and 230 rpm. The mass of each ball is 3 kg. The lengths of the balls and the sleeve arms are equal. Determine the initial compression and the constant of the central spring. *14*

5. Two spur gears have a velocity ratio of 1/3. The driver gear has 72 teeth of 8 mm module and rotates at 300 rpm. Calculate the number of teeth and the speed of the driver. What will be the pitch line velocities ? *14*

6. In a thrust bearing, the external and the internal diameters of the contacting surfaces are 320 mm and 200 mm respectively. The total axial load is 80 kN and the intensity of pressure is 350 kN/m^2. The shaft rotates at 400 rpm. Taking the coefficient of friction as 0·06, calculate the power lost in overcoming the friction. Also find the number of collars required for the bearing. *14*

7. Four masses A, B, C and D carried by a rotating shaft at radii 80 mm, 100 mm, 160 mm and 120 mm respectively are completely balanced. Masses B, C and D are 8 kg, 4 kg and 3 kg respectively. Determine the mass A and the relative angular positions of the four masses if the planes are spaced 500 mm apart. *14*

8. Answer any ***two*** of the following : *2×7=14*

(a) Derive expression for 'path of contact' of a spur gear.

(b) Write in brief about Pantograph.

(c) What is the interference in gears ? How do we avoid it ? Explain.