BIME-022

DIPLOMA – VIEP – MECHANICAL ENGINEERING (DMEVI)

Term-End Examination

00815   **December, 2014**

BIME-022 : POWER TRANSMITTING ELEMENTS

Time : 2 hours   *Maximum Marks : 70*

*Note : **All** questions are **compulsory**. Use of calculator is permitted.*

1. Choose the correct answer from the given four alternatives.   *7 ×2=14*

    (a) A machine is said to be self-locking if efficiency of the machine is

        (i)   more than 50%

        (ii) equal to 50%

        (iii) less than 50%

        (iv) equal to 100%

(b)   If T_1 and T_2 are the tensions on the tight side and slack side of a belt and θ is the angle of contact, then the ratio of tension is given by

(i) $\dfrac{T_1}{T_2} = \mu\theta$

(ii) $\dfrac{T_1}{T_2} = e^{\mu\theta}$

(iii) $\dfrac{T_1}{T_2} = e^{\frac{1}{\mu\theta}}$

(iv) $\dfrac{T_1}{T_2} = \mu e^{\theta}$

where μ = coefficient of friction between the belt and pulley.

(c)   Crowning of pulley is done

(i)   to avoid the slipping of the belt.

(ii)   to make them more sturdy.

(iii)   to enable the pulley to be rigidly fixed to the shaft.

(iv)   to make the pulley look more pleasant in appearance.

(d) Two intersecting and coplanar shafts are connected by gears. This type of gear is called

    (i) helical gear

    (ii) spur gear

    (iii) bevel gear

    (iv) spiral gear

(e) Diametral pitch is defined as the ratio of

    (i) number of teeth to pitch circle diameter

    (ii) pitch circle diameter to number of teeth

    (iii) circumference of the pitch circle to number of teeth

    (iv) None of the above

(f) The module (m) is defined as equal to the ratio of

    (i) number of teeth to pitch circle diameter

    (ii) pitch circle diameter to number of teeth

    (iii) circumference of the pitch circle to number of teeth

    (iv) None of the above

(g) The product of the module and diametral pitch is equal to

    (i) 2π

    (ii) π

    (iii) $\dfrac{\pi}{2}$

    (iv) $1 \cdot 0$

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

  (a) A shaft running at 200 rpm is to drive a parallel shaft at 300 rpm. The pulley on the driving shaft is 60 cm diameter. Calculate the diameter of the pulley on the driven shaft :

    (i) Neglecting belt thickness

    (ii) Taking belt thickness into account, which is 5 mm thick.

  (b) Derive an expression for the length of belt on open belt drive.

  (c) Show the construction of roller chain by a neat sketch and state its advantages over belt and gear drives.

3. Answer any ***two*** of the following : $2 \times 7 = 14$

   (a) What are the important types or classification of gears ?

   (b) Explain the following terms :

   (i) Module

   (ii) Pressure angle

   (iii) Addendum

   (c) What are the different forms of a tooth ? Explain in brief.

4. Answer any ***two*** of the following : $2 \times 7 = 14$

   (a) Determine the number of teeth and speed of the driver if the driven gear has 80 teeth of 8 mm module and rotates at 360 rpm. The two spur gears have a velocity ratio of $\frac{1}{4}$. Also calculate the pitch line velocities.

   (b) What do you mean by 'interference' between two mating gears ? How is it prevented ?

   (c) A pulley of 1 m diameter, is driven by a belt at 200 rpm. If the tensions on the tight and slack sides are 900 N and 300 N respectively, find the power transmitted. Neglect slip.

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5. Answer the following : $2 \times 7 = 14$

   (a) Explain the cause of noise, vibration or wear of wheel teeth.

   (b) Two spur gears, having 20 and 60 teeth, are meshing with each other. If the module be 5, find the pitch circle diameters of the two gears. Also calculate the circular and diametral pitches of these gears.

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