DIPLOMA VIEP MECHANICAL ENGINEERING (DMEVI)

Term-End Examination

December, 2013

BIME-022 : POWER TRANSMITTING ELEMENTS

Time : 2 hours *Maximum Marks : 70*

Note : *(i)* *Question **No.1** is **compulsory**.*

(ii) *Attempt **any four** out of **seven** question.*

(iii) *Each question carry **equal** marks.*

(iv) *Assume suitable data if **required**.*

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1. (a) Which type of gears are used for shaft axes having an offset ? **7x2=14**

(i) Mitre gears

(ii) Spiral bevel gears

(iii) Hypoid gears

(iv) Zero gears

(b) Strain energy stored in a body of volume V subjected to uniform stress S is :

(i) $\frac{SE}{V}$ (ii) $\frac{SE^2}{V}$

(iii) $\frac{SV^2}{E}$ (iv) $\frac{S^2V}{2E}$

(c) Large speed reduction (greater than 20) in one stage of a gear train are possible through :

(i) Spur gearing
(ii) Worm gearing
(iii) Bevel gearing
(iv) Helical gearing

(d) The working surface above the pitch surface of the gear tooth is termed as :

(i) Addendum (ii) Dedendum
(iii) Flank (iv) Face

(e) The lead angle of a worm is 22.5°. Its helix angle will be :

(i) 22.5° (ii) 45°
(iii) 67.5° (iv) 80°

(f) In the assembly design of shaft pulley and key, the nearest member is :

(i) Pulley (ii) Key
(iii) Shaft (iv) None

(g) When a belt drive transmitting max power ?

(i) Effective tension = centrifugal tension

(ii) Effective tension $= \frac{1}{2}$ of centrifugal

(iii) None
(iv) Both (i) and (ii)

2. (a) Explain concept of Power Transmission and various types of mechanical drives. 7

(b) Derive speed ratio in respect to drive. 7

3. (a) Explain causes of failure in shafts and axles and stresses in shafts. 7

(b) Methods of manufacturing of shafts. 7

4. (a) A solid shaft is subjected to a bending moment of 3.46 kNm and torsional moment of 11.5 kNm. The shaft is made of C-45 steel, and factor of safety is 6. Determine the diameter of shaft. 7

(b) Explain different material used in Belt. 7

5. (a) Design of Belt section in detail analysis. 7

(b) Explain Fibrous ropes used in Hoisting Tackle. 7

6. (a) Explain construction of chain. 7

(b) Derive relation for multi mesh Gears in detail. 7

7. (a) What are design consideration of helical spur gears ? 7

(b) Derive forces on worm and worm wheel. 7

8. (a) Explain difference between Shaft, Hub and Key. 7

(b) Design a herring bore drive for a 2.25 kW steam turbine running at 3000 rev/min to a speed reducer that should run at 2500 rev/min. 7