

Code No: 56019

Set No. 1

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III B.Tech. II Sem., II Mid-Term Examinations, April – 2014

DESIGN OF MACHINE MEMBERS-II

Objective Exam

Name: \_\_\_\_\_ Hall Ticket No.

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Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

**I Choose the correct alternative:**

1. Which of the following gear is used to non-parallel and non-intersecting shafts [      ]  
a. Spur Gear                      b. Bevel Gear                      c. Herringbone Gear                      d. Worm Gear
2. Tooth interference in an external involute spur gear can be reduced by [      ]  
a. Decreasing centre distance      b. Decreasing module  
c. Decreasing pressure angle      d. Increasing number of gear teeth
3. In the formulation of Lewis equation for toothed gearing, it is assumed that the tangential load acts at [      ]  
a. Pitch point      b. Tip of the tooth      c. Root of the tooth      d. Flank of the tooth
4. In spur gears having involute teeth, the product of circular pitch and diametral pitch is [      ]  
a.  $\pi$                       b.  $1/\pi$                       c. 1                      d. Module
5. To ensure self-locking in a screw, it is essential that helix angle is [      ]  
a. Larger than the friction angle                      b. Smaller than the friction angle  
c. Equal to the friction angle                      d. Zero
6. In helical gears, the distance between similar faces of adjacent teeth along a helix on the pitch cylinders normal to the teeth is called [      ]  
a. Diametral pitch                      b. Axial pitch                      c. Normal pitch                      d. Module
7. The face angle of the bevel gear is equal to [      ]  
a. Pitch angle + dedendum angle                      b. Pitch angle - addendum angle  
c. Pitch angle + addendum angle                      d. Pitch angle - dedendum angle
8. The number of starts on the worm for a velocity ratio of 100:1 should be [      ]  
a. Single                      b. Double                      c. Triple                      d. Quadruple
9. The maximum efficiency of a square threaded screw is (angle of friction,  $\phi$ ) [      ]  
a.  $\eta = \frac{1 - \sin \phi}{1 + \sin \phi}$                       b.  $\eta = \frac{1 - \cos \phi}{1 + \cos \phi}$                       c.  $\eta = \frac{1 + \sin \phi}{1 - \sin \phi}$                       d.  $\eta = \frac{1 + \cos \phi}{1 - \cos \phi}$
10. The minimum number of teeth on the pinion in order to avoid interference for  $20^\circ$  stub system is [      ]  
a. 12                      b. 14                      c. 18                      d. 32

**Cont.....2**

**II Fill in the blanks**

11. The angle between the line of action and the perpendicular to the line of centers in spur gears is known as \_\_\_\_\_
12. The two spur gears that are in mesh have 19 and 37 teeth with a module of 5mm. The centre distance is \_\_\_\_\_
13. The tangential load acting on an involute tooth with pressure angle of  $25^0$  is 1000 N. The radial load on the tooth is \_\_\_\_\_
14. The number of teeth on a helical gear is 24. The formative number of teeth on the helical gear if the helix angle is  $45^0$  \_\_\_\_\_
15. For satisfactory design of helical gears, the limiting wear tooth load must be greater than \_\_\_\_\_ load on the tooth.
16. A multiple start screw thread is designated by  $T_r 40 \times 14(p7)$ . The number of starts in screw are \_\_\_\_\_
17. The type of the stress induced at the core or root diameter of the screw due to axial loads is \_\_\_\_\_
18. A 33 kW motor running at 1200 rpm drives a compressor at 780 rpm through a  $90^0$  bevel gear arrangement. The pitch angle for the pinion is \_\_\_\_\_
19. If “W” denotes the face width and L denotes the cone distance, then the bevel factor is \_\_\_\_\_
20. The diameter of a worm gear shaft is 50 mm. the direct compressive stress on the shaft due to an axial force of 2650 N is \_\_\_\_\_ MPa.

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Set No. 2

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Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

**I Choose the correct alternative:**

1. In spur gears having involute teeth, the product of circular pitch and diametral pitch is [      ]  
a.  $\pi$                       b.  $1/\pi$                       c. 1                      d. Module
2. To ensure self-locking in a screw, it is essential that helix angle is [      ]  
a. Larger than the friction angle                      b. Smaller than the friction angle  
c. Equal to the friction angle                      d. Zero
3. In helical gears, the distance between similar faces of adjacent teeth along a helix on the pitch cylinders normal to the teeth is called [      ]  
a. Diametral pitch                      b. Axial pitch                      c. Normal pitch                      d. Module
4. The face angle of the bevel gear is equal to [      ]  
a. Pitch angle + dedendum angle                      b. Pitch angle - addendum angle  
c. Pitch angle + addendum angle                      d. Pitch angle - dedendum angle
5. The number of starts on the worm for a velocity ratio of 100:1 should be [      ]  
a. Single                      b. Double                      c. Triple                      d. Quadruple
6. The maximum efficiency of a square threaded screw is (angle of friction,  $\phi$ ) [      ]  
a.  $\eta = \frac{1 - \sin \phi}{1 + \sin \phi}$                       b.  $\eta = \frac{1 - \cos \phi}{1 + \cos \phi}$                       c.  $\eta = \frac{1 + \sin \phi}{1 - \sin \phi}$                       d.  $\eta = \frac{1 + \cos \phi}{1 - \cos \phi}$
7. The minimum number of teeth on the pinion in order to avoid interference for  $20^\circ$  stub system is [      ]  
a. 12                      b. 14                      c. 18                      d. 32
8. Which of the following gear is used to non-parallel and non-intersecting shafts [      ]  
a. Spur Gear                      b. Bevel Gear                      c. Herringbone Gear                      d. Worm Gear
9. Tooth interference in an external involute spur gear can be reduced by [      ]  
a. Decreasing centre distance                      b. Decreasing module  
c. Decreasing pressure angle                      d. Increasing number of gear teeth
10. In the formulation of Lewis equation for toothed gearing, it is assumed that the tangential load acts at [      ]  
a. Pitch point                      b. Tip of the tooth                      c. Root of the tooth                      d. Flank of the tooth

**Cont.....2**

**II Fill in the blanks**

11. The number of teeth on a helical gear is 24. The formative number of teeth on the helical gear if the helix angle is  $45^\circ$  \_\_\_\_\_
12. For satisfactory design of helical gears, the limiting wear tooth load must be greater than \_\_\_\_\_ load on the tooth.
13. A multiple start screw thread is designated by  $T_r 40 \times 14(p7)$ . The number of starts in screw are \_\_\_\_\_
14. The type of the stress induced at the core or root diameter of the screw due to axial loads is \_\_\_\_\_
15. A 33 kW motor running at 1200 rpm drives a compressor at 780 rpm through a  $90^\circ$  bevel gear arrangement. The pitch angle for the pinion is \_\_\_\_\_
16. If “W” denotes the face width and L denotes the cone distance, then the bevel factor is \_\_\_\_\_
17. The diameter of a worm gear shaft is 50 mm. the direct compressive stress on the shaft due to an axial force of 2650 N is \_\_\_\_\_ MPa.
18. The angle between the line of action and the perpendicular to the line of centers in spur gears is known as \_\_\_\_\_
19. The two spur gears that are in mesh have 19 and 37 teeth with a module of 5mm. The centre distance is \_\_\_\_\_
20. The tangential load acting on an involute tooth with pressure angle of  $25^\circ$  is 1000 N. The radial load on the tooth is \_\_\_\_\_

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Set No. 3

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Objective Exam

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Answer All Questions. All Questions Carry Equal Marks. Time: 20 Min. Marks: 10.

**I Choose the correct alternative:**

1. In helical gears, the distance between similar faces of adjacent teeth along a helix on the pitch cylinders normal to the teeth is called [      ]  
a. Diametral pitch    b. Axial pitch                      c. Normal pitch                      d. Module
2. The face angle of the bevel gear is equal to [      ]  
a. Pitch angle + dedendum angle    b. Pitch angle - addendum angle  
c. Pitch angle + addendum angle    d. Pitch angle - dedendum angle
3. The number of starts on the worm for a velocity ratio of 100:1 should be [      ]  
a. Single                      b. Double                      c. Triple                      d. Quadruple
4. The maximum efficiency of a square threaded screw is (angle of friction,  $\phi$ ) [      ]  
a.  $\eta = \frac{1 - \sin \phi}{1 + \sin \phi}$     b.  $\eta = \frac{1 - \cos \phi}{1 + \cos \phi}$     c.  $\eta = \frac{1 + \sin \phi}{1 - \sin \phi}$     d.  $\eta = \frac{1 + \cos \phi}{1 - \cos \phi}$
5. The minimum number of teeth on the pinion in order to avoid interference for 20° stub system is [      ]  
a. 12                      b. 14                      c. 18                      d. 32
6. Which of the following gear is used to non-parallel and non-intersecting shafts [      ]  
a. Spur Gear                      b. Bevel Gear                      c. Herringbone Gear                      d. Worm Gear
7. Tooth interference in an external involute spur gear can be reduced by [      ]  
a. Decreasing centre distance                      b. Decreasing module  
c. Decreasing pressure angle                      d. Increasing number of gear teeth
8. In the formulation of Lewis equation for toothed gearing, it is assumed that the tangential load acts at [      ]  
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10. To ensure self-locking in a screw, it is essential that helix angle is [      ]  
a. Larger than the friction angle                      b. Smaller than the friction angle  
c. Equal to the friction angle                      d. Zero

**Cont.....2**

**II Fill in the blanks**

11. A multiple start screw thread is designated by  $T_r 40 \times 14(p7)$ . The number of starts in screw are \_\_\_\_\_
12. The type of the stress induced at the core or root diameter of the screw due to axial loads is \_\_\_\_\_
13. A 33 kW motor running at 1200 rpm drives a compressor at 780 rpm through a  $90^\circ$  bevel gear arrangement. The pitch angle for the pinion is \_\_\_\_\_
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18. The tangential load acting on an involute tooth with pressure angle of  $25^\circ$  is 1000 N. The radial load on the tooth is \_\_\_\_\_
19. The number of teeth on a helical gear is 24. The formative number of teeth on the helical gear if the helix angle is  $45^\circ$  \_\_\_\_\_
20. For satisfactory design of helical gears, the limiting wear tooth load must be greater than \_\_\_\_\_ load on the tooth.

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**I Choose the correct alternative:**

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a. Single                      b. Double                      c. Triple                      d. Quadruple
2. The maximum efficiency of a square threaded screw is (angle of friction,  $\phi$ ) [      ]  
a.  $\eta = \frac{1 - \sin \phi}{1 + \sin \phi}$       b.  $\eta = \frac{1 - \cos \phi}{1 + \cos \phi}$       c.  $\eta = \frac{1 + \sin \phi}{1 - \sin \phi}$       d.  $\eta = \frac{1 + \cos \phi}{1 - \cos \phi}$
3. The minimum number of teeth on the pinion in order to avoid interference for 20° stub system is [      ]  
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4. Which of the following gear is used to non-parallel and non-intersecting shafts [      ]  
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a. Pitch angle + dedendum angle                      b. Pitch angle - addendum angle  
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Cont.....2

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11. A 33 kW motor running at 1200 rpm drives a compressor at 780 rpm through a  $90^\circ$  bevel gear arrangement. The pitch angle for the pinion is \_\_\_\_\_
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