B.E. Eighth Semester (Mechanical Engineering) (CGS)

10891 : Elective-III : Machine Tool Design : 8 ME 02

P. Pages : 2 | AU - 2984

Time : Three Hours | Max. Marks : 80

Notes :
1. Separate answer book must be used for each section.
2. Answer **three** question from Section A and **three** question from Section B.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Diagrams and chemical equations should be given wherever necessary.
6. Illustrate your answer necessary with the help of neat sketches.
7. Use of D.A. Lows "Pocket Book for Mechanical Engineers" is permitted.
8. Discuss the reaction, mechanism wherever necessary.
9. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) What are types of structure diagram with neat sketches. **2**

   b) Explain with suitable example, how the optimum Ray diagram is selected. **5**

   c) Explain with neat sketches the devices for intermittent motion. **7**

OR

2. Design the feed box of Lathe machine for the feed range 0.05 – 4.0 mm/rev. Given $\phi = 1.41$. Assume a suitable kinematic train between the spindle and the input shaft of the feed box and between the output- shaft of the feed Box and the rack attached to the underside of the Lathe bed. **14**

3. a) How stiffness of the structure can be improved? Explain the stiffness arrangement that provides significant improvement in bending and torsional stiffness of the box type structure. **7**

   b) Deseribe stepped and stepless regulation of speed. Explain any method of stepless regulation. **6**

OR

4. a) How structures are grouped together and write the various requirements of structure. **7**

   b) Draw any two types of commonly used bed sections and state their applications. **6**

5. a) Explain closed loop machining system with a block diagram. Also state its features. **6**

   b) Derive Kudinov's Dynamic cutting force expression for the time constant of chip formation. **7**

OR

6. a) Explain stability analysis. Also explain single degree of freedom system for static cutting process characteristics. 6

b) Explain procedure for assessing dynamic stability of equivalent olathe system. 7

SECTION – B

7. a) Explain with neat sketch Vander pol model of oscillations. 7

b) Explain the following terms. 7

i) Stick slip phenomenon.

ii) Shock mounts.

iii) Gooseneck Tool.

OR

8. a) Explain with neat sketch the effect of vibration on machine tools. 7

b) Explain with neat sketches the disturbances in the drives which causes vibrations. 7

9. a) Solve the expression to determine the average and maximum pressure for oblique cutting. 7

b) Explain with neat sketch, working of Hydrostatic Pad Bearing. 6

OR

10. a) What are various materials are used to manufacture the slideways. 6

b) Distinguish between various profiles of slideways with neat sketches. 7

11. a) What is sliding Bearing and explain the various types of sliding bearings with Hurray diagram. 6

b) Explain the method of preloading for Taper Roller Bearing. 7

OR

12. a) Discuss the following with reference to spindle of machine tools. 7

i) Function.

ii) Requirement.

iii) Material.

b) Derive an expression for deflection of spindle axis due to compliance of spindle supports. 6

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