Code No: **R1632241** **R16** SET - 1

III B. Tech II Semester Regular/Supplementary Examinations, August-2021
MACHINE TOOLS AND METROLOGY
(Automobile Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **FOUR** Questions from **Part-B**

*****

PART –A **(14 Marks)**

1. a) What are the functions of chip breaker in metal cutting? [2M]
   b) State the operations which can be performed on a lathe? [3M]
   c) Name some operations which are performed on shaper and planer? [3M]
   d) How grinding wheels are specified? [2M]
   e) How least count on Bevel Protractor can be measured? [2M]
   f) Distinguish between mechanical and electrical comparators. [2M]

PART –B **(56 Marks)**

2. a) The following data were obtained while orthogonal cutting of M.S rod of 120 mm diameter with 10^0 rake angle tool, cutting speed 25 m/min, feed 0.20 mm/rev, length of chip is 150 mm, cutting force 1500 N, feed force 650 N. Calculate: (i) Shear plane angle (ii) Chip thickness, (iii) Chip velocity. (Missing data may be suitably assumed). [7M]
   b) Explain the types of chips produced in a metal cutting. [7M]

3. a) Briefly explain with neat sketches the types of work holding devices that are commonly employed in lathes. Specify limitations of them. [8M]
   b) Differentiate Capstan and Turret Lathes. [6M]

4. a) Calculate the time required to machine a Cast Iron surface 250 mm long and 150 mm wide on a shaper with cutting to return ratio of 3:2. Use a cutting speed of 21 m/min, a feed of 2 mm/stroke and clearance of 25 mm. The available ram strokes on the shaper are: 28, 40, 60 and 90 stroke/min. Also, determine material removal rate assuming depth of cut as 4 mm. [7M]
   b) Differentiate between drilling and boring machines. [7M]

5. a) Explain various operations carried out on milling machine. [7M]
   b) Discuss the center less grinding with the help of a neat sketch. [7M]

6. a) Explain difference between interchangeable manufacturing and selective assembly. [7M]
   b) Describe with the aid of sketches how internal and external diameters can be measured using a rule and caliper? [7M]

7. a) Describe the principle and operation of Taylor Hobson Talysurf roughness measurement instrument. [7M]
   b) Explain with a neat sketch the construction and working principle of optical projector. [7M]

*****