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**Federal University of Technology Minna**  
**Dept. of Industrial & Technology Education**  
**First Semester Examination 2019/2020**

**Course Title:** Machine Tool Process II

**Course Code:** ITE 571

**Time Allowed:** 2 hours 30 mins.

**Instructions:** Attempt only Four Questions. Good grammatical Expressions and clear neat sketches will be rewarded.

**Question 1**

1a. Differentiate between the following methods of taper turning

i Compound Slide Method ii. Setting over the Tail stock iii. Taper turning with attachment

1b. Identify and discuss comprehensively factors that determine cutting speed selection for a particular job on the lathe.

**Question 2**

2a. A cylindrical job of 160mm diameter is to be turned at a cutting speed of 65m /min, the feed is 10min/rev. If the length of the job is 122mm. Calculate the following i. Spindle Speed.

ii. Revolutions required iii. Time taken

2b. Calculate the time, the cutting speed and revolutions required to drill a hole through a plate of 50mm thick using a 12mm diameter drill. The spindle speed is 398rev/min.

2c. Write Short notes on the following

i. Cutting Speed ii Depth of Cut iii Spindle Speed iv Cutting fluid

**Question 3**

3a. With the aid of a good diagrammatic sketch show the principle of a dividing head, label your diagram and critically explain how motions are obtain to cut gears.

3b. Given a Brown and Sharpe head with the following hole circles 15,16, 17, 18 and 20, 21 23, 27, 29,31, 33 holes 37, 39, 41, 43, 47, and holes. Calculate for indexing the following

a. 17 b 25 c 36 d. 52 e. 86

3c. Calculate the indexing for the following angle gears on a Cincinnati and Parkinson head with the following hole circles 25,28,30,34,37,38,39,41,42,43,46,47,49,51,53,54,57,58,59,62 and 66 holes. Therefore calculate a.  $38^\circ$  b.  $49^\circ 30'$  c.  $61^\circ 20'$  d.  $8^\circ 15'$  e.  $24^\circ 36'$ .

**Question 4**

4a. Identify and write notes on the following work holding methods on the milling machine

i. Rotary Milling table ii Mounting between centers iii Dividing head iv Using Special fixtures v Machine vice

4b. Explain the following with detail notes

a. Up cutting and down cutting milling b. Gang and straddle milling c. Arbors and Arbor Support brackets. d. Over arm and Colum e. Milling cutters and collars

**Question 5**

5a. With the aid of sketch show mounted grinding wheel label your sketch and briefly explain the procedure of wheel mounting.

5b Write notes on the followings

i. Abrasives ii Bonds iii Wheel classification iv loading and glazing v. Truing and dressing

5c. Identify and discuss briefly factors that guide wheel selection.

**Question 6**

6a Justify the need (importance and advantages) of automatic machining; Numerical and Computer Numerical Control (NC & CNC).

6b List and briefly discuss three sequences of how Numerical Control work

6c. Write short notes on i Vertical Spindle NC & CNC ii Horizontal Spindle NC & CNC