



## Answer all the following Questions

### Part I (45mark)

#### QUESTION 1

1. **Sketch** Methods of turning taper
2. Calculate tailstock offset required to turn a 1:20 taper  $L_t = 70$  mm long on a Workpiece  $L_c = 400$  mm long. The small diameter of tapered section is  $d = 30$  mm.

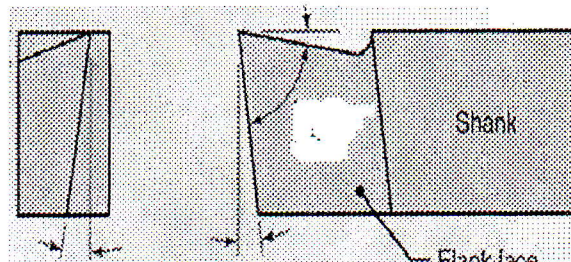
#### QUESTION 2:

1. Calculate machining time MRR, Power, Torque, and cutting force for turning steel workpiece with initial 100 mm length and 40 mm diameter to 36 final diameter ( $V = 80$  m/min,  $f = 0.35$  mm/rev. and, Maximum depth of cut 0.5 mm  $\Delta = 10$   $c = 4$   $WS / \text{mm}^3$ )
2. State the name of the different lathe tool angle (Figure 1)

#### QUESTION 3

1. **List** tool wear zones and tool wear mechanisms
2. A tool life of 70 minute is obtained at speed of 20 m/min and 10 minutes at 50 m/min. **Determine** the following:
  - Tool life equation
  - Cutting speed for 4 minute tool life

Figure 1



#### QUESTION 4:

1. **Sketch** Cutting thread arrangement on lathe
2. Estimate the changing gears (Compound) for threading  $M30 \times 1.5$  ( $PL = 6$  tpi) if the changing gears are 20-25-30----35-40-45-50-50, 60-65 .....100-120.....and 127)

## PartII (45mark)

### QUESTION1:

#### 1-List and sketch

- Three of commonly used types for both drilling and milling processes and discuss the application of each.
- Differences between up and down milling.
- Boring process and machine types

#### 2- Name the different twist drill tool angles (Figure2).

#### 3-Sketch to show different mechanisms satisfies quick return motion in planer machines.

#### 4- How can grinding wheel be identified, and according to this identification explain the following grinding wheel alphanumeric system A36K8S.

### QUESTION 2:

#### 1-Determine:

The hole circle to be used and the indexing movement required to index 30 divisions using a Cincinnati universal dividing head.

**N.B.**The circle divided as follows

First side (24,25,28,30,34,37,38,39,41,41.43).

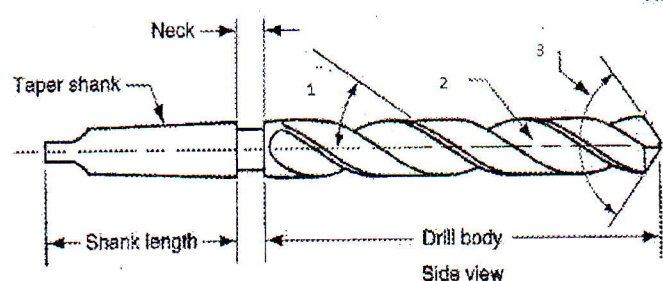
Second side (46,47,49,51,53,54,57,58,59,62,66).

#### 2-illustrate by sketches the tool form of broach with terms and sketch some shapes which can be produced by this operation and motion when is this process recommended.

#### 3-Comment with the help of sketch (if it is necessary):

- Permissible cutting speeds in milling four times higher than those for turning.
- Most of internal holes are done by pull broaches.
- Grinding wheel cutting speed should be known printed before the use of it.
- Hydraulic shapers, planers and slotters becoming increasingly popular.
- Information must be known before selecting of the broach tool and broaching machine.
- Goose-neck cutting tool recommended in finishing operations.

Figure 2



*With Best Wish:* Prof.Dr.Adel M.Abdelmaboud

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