



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.

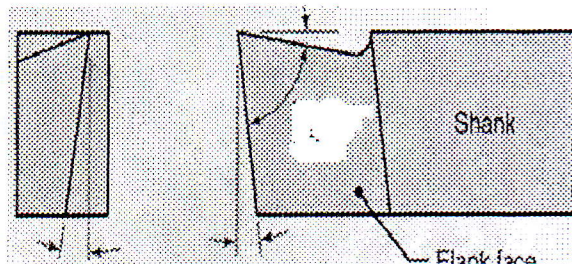
QUESTION 2:

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 / 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, 60-65100-120.....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).

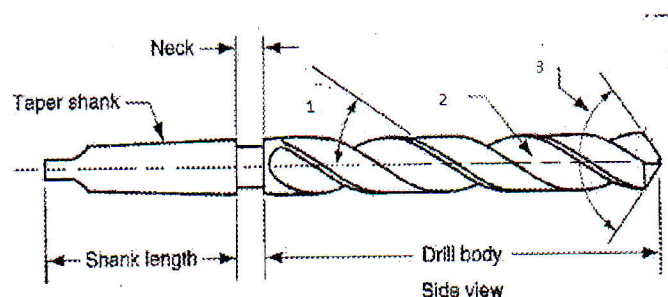
Second side (46,47,49,51,53,54,57,58,59,62,66).

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



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