higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

NOVEMBER EXAMINATION

FITTING AND TURNING
NQF LEVEL 2

21 NOVEMBER 2013

This marking guideline consists of 7 pages.

QUESTION 1

1.1 True
1.2 True
1.3 False
1.4 False
1.5 False
1.6 True
1.7 False
1.8 False
1.9 False
1.10 True

(10 × 1) **[10]**

2.1
- Straight grinding wheel
- Cylindrical grinding wheel
- Tapered grinding wheel
- Recessed grinding wheel
- Straight cup grinding wheel
- Flared cup grinding wheel
- Dish grinding wheel
- Saucer grinding wheel

(Any 3 × 1) (3)

2.2 To ensure that the grinding wheels have not been damaged. (1)

2.3 The wheel is not running true.
The pores of the wheel become clogged with filings (2 × 1) (2)

2.4 Push the drill bit slowly against the grinding wheel. At the same time, move it slightly away from the cutting edge to give it the lip clearance. Turn the drill bit around and repeat the process. (3)

2.5 Clearance angle is the angle between the cutting tool and the surface being cut. The rake angle is the angle between the cutting tool face and a line at right angles to the surface of the material that is being cut (4)

[13]

QUESTION 3

3.1 3.1.1 Countersinking is a method by which metal is removed at the top of a hole in order to let screws and rivets be flush with the surface of the material.

3.1.2 Counter-boring is the process by which you enlarge the upper part of a drilled hole to accommodate round or cap head screws. (4)

3.2 Tolerance is the amount by which a measurement is allowed to vary without affecting the function of the work piece. (2)

3.3 $S = \pi \times D \times N$

$= \pi \times (25 \times 10^{-3}) \times (1{,}5 \times 60)$

$= 7{,}07\ m/\min$ (3)

3.4
- Upper limit: 25,01 mm
- Lower limit: 24,98 mm (2 × 1) (2)

3.5
- Taper-shank bit – the shaft tapers, i.e., it narrows, at the end
- Straight-shank bit – the shaft is parallel, i.e., it has the same diameter along its length (2 × 1) (2)

[13]

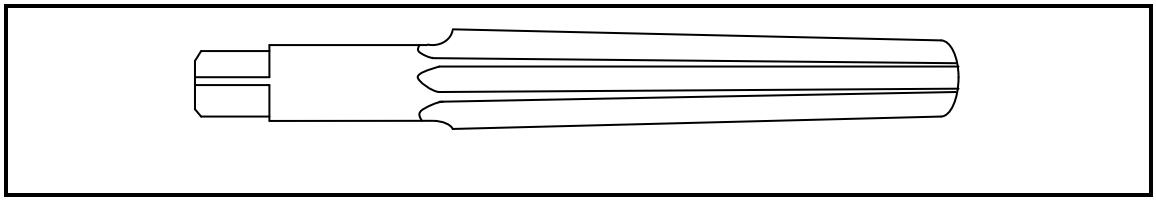
QUESTION 4

4.1
- V-thread
- Square thread
- Acme screw thread
- Buttress screw thread (Any 2 × 1) (2)

4.2 4.2.1 Internal thread is a helical groove that is cut in a round hole.

4.2.2 Root diameter is the dimension taken across the bottom, or root, of the screw thread. (2 × 1) (2)

4.3



(3)

4.4 A hand tap is used to cut internal threads whereas the die nut is used to cut external threads (2)

[9]

QUESTION 5

5.1 A key is used to connect a component to a shaft. (1)

5.2
- Rectangular key or parallel key
- Taper gibhead key
- Feather key
- Woodruff key (Any 2 × 1) (2)

5.3
- Thread-cutting screws
- Self-tapping screws
- Drive screws (Any 1 × 1) (1)

5.4 5.4.1 t = D/6 = 60/6 = 10 mm

5.4.2 w = D/4 = 60/4 = 15 mm

5.4.3 Depth of keyway = t/2 = 10/2 = 5 mm

(3 × 1) (3)

5.5 The feather key is attached to the shaft by means of screws whereas the rectangular key fits in the keyway. (2)
[9]

QUESTION 6

6.1 Mandrels are used to hold work pieces accurately in position between centres on a lathe. (1)

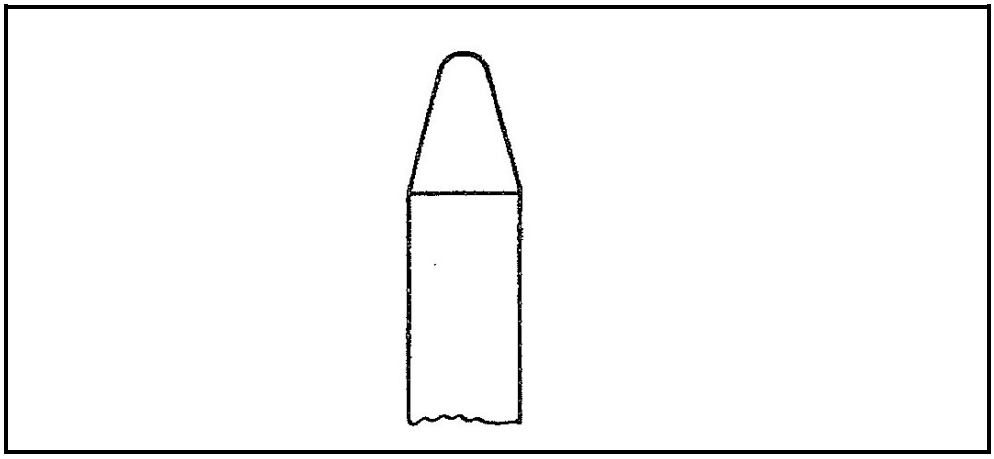
6.2
- Travelling steady
- Fixed steady (2 × 1) (2)

6.3
- Easy to set the work piece
- Internal and external jaws are available
- Work can be easily performed on the end face of the work piece
- A wide range of cylindrical and hexagonal work pieces can be held

(Any 3 × 1) (3)

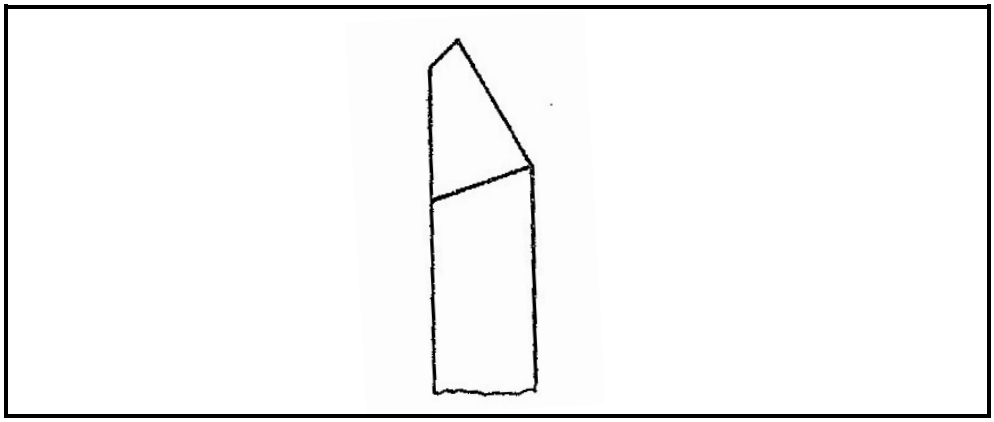
6.4
- Only round and hexagonal work pieces can be held.
- Accuracy decreases as the chuck becomes worn
- Centring accuracy is limited when the work is reversed in the chuck
- Run-out cannot be corrected (Any 3 × 1) (3)

6.5 6.5.1 Round Nose Tool



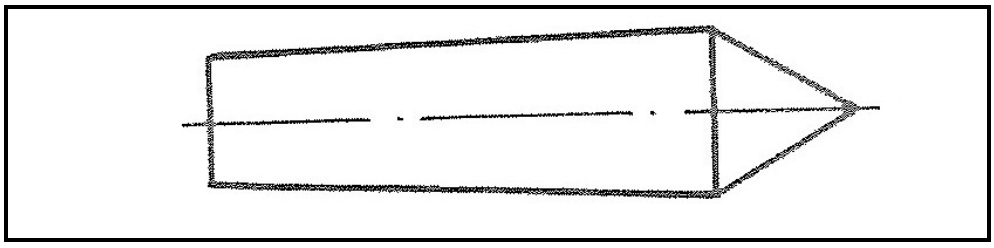
(2)

6.5.2 Finishing Tool



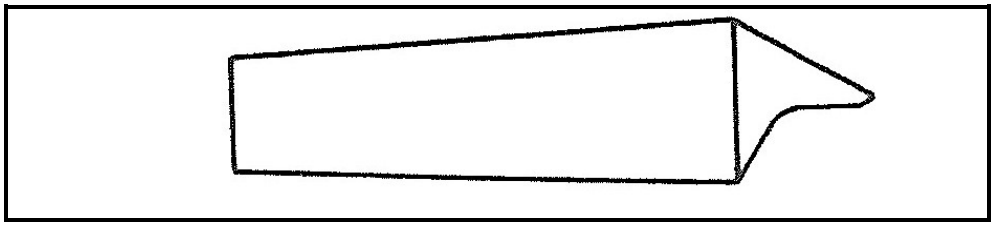
(2)

6.6 6.6.1 Solid Centre



(2)

6.6.2 Half Centre



(2)

6.7
- Vernier callipers – to check the length, diameter and depth of grooves
- Inside micrometers – check inside diameters of holes
- Outside micrometers – check outside diameters of shafts
- Engineers steel rule – to measure the length (4)

6.8 6.8.1 Pipe centre
6.8.2 Revolving centre or live centre
(2 × 1) (2)
[23]

QUESTION 7

7.1
- The vertical milling machine
- The plain horizontal milling machine
- The universal milling machine
- The Turret milling machine (Any 3 × 1) (3)

7.2
- Simple indexing
- Angular indexing (2)

7.3
- Dovetail cutter
- End mill cutter
- Corner rounding
- Slotting cutter
- Slot drill
- Single angle cutter
- Slitting saw
- Convex cutter
- Double angle cutter
- concave cutter
- Radius cutter
- Plain helical slab cutter
- Side and face cutter
- Nicked helical cutter
- T-slot cutter (Any 3 × 1) (3)

7.4 7.4.1 Provides the drive to the arbor and cutters
7.4.2 Trips the automatic feed at a pre-set position
7.4.3 Drives and holds the cutters in position (3)

7.5 7.5.1 $S = \pi \times D \times N$

$$N = \frac{S}{\pi \times D}$$

$$= \frac{15}{\pi \times 0{,}03}$$

$$= 159{,}15\ rev/\min$$ (3)

7.5.2 $F = f_t \times T \times N$

$= 0{,}05 \times 12 \times 159{,}15$

$= 95{,}49\ mm/\min$ (2)

7.6 $Indexting = \frac{40}{N}$

$= \frac{40}{7}$

$= 5\frac{5}{7}$

5 full turns of the crank and $\frac{5}{7} \times \frac{3}{3} = \frac{15}{21}$

5 full turns of the crank and 15 holes on a 21 hole plate (3)

7.7 In up-cut milling, the direction of rotation of the milling cutter is against the direction of feed of the work piece whereas in down-cut milling, the feed of the work piece is in the same direction as the rotation of the milling cutter. (4)

[23]

TOTAL: 100