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**

30 NOVEMBER 2015

This marking guideline consists of 5 pages.

QUESTION 1: GRINDING AND SHARPENING

1.1   A place for everything and everything in its place. Also refers to the general and routine work done to maintain cleanliness and tightness around the workplace.   (2)

1.2
- Limits the time spent searching for tools etc
- Space is saved
- Injuries are prevented
- Fire hazards are reduced
- Improves the working environment and workers' morale
- It increases production
- Accidents are kept to a minimum   (5 x 1)   (5)

1.3
- Hardening
- Tempering
- Annealing
- Normalising
- Case hardening   (3 x 1)   (3)

1.4   1.4.1   To correct an 'out-of-round' wheel

          1.4.2   To restore the wheel's sharpness   (2 x 2)   (4)

1.5
- Loading of the wheel
- Glazing of the wheel
- Wheel not running concentrically to the spindle   (3)

1.6
- Carbon steel
- High speed steel
- Tungsten carbide   (3)

[20]

QUESTION 2: DRILLING MACHINES

2.1
- Wear goggles/safety glasses
- Never try to stop the drill spindle by hand
- Never leave the machine unattended
- Clamp the workpiece securely
- Remove the chuck key before starting the machine
- Do not make any adjustments/repairs while the machine is running   (5)

2.2   A – Taper shank
        B – Body length
        C – Point
        D – Overall length
        E – Helix or rake angle   (5)

2.3   D = 20 mm = 20/1 000 = 0,02 m
        N = 90 rpm
        S =? m/min
        S = π × D × N
          = π × 0,02 × 90√√
          = <u>5,655 m/min</u>√   (3)

2.4   • U–clamp
        • Straight clamp
        • Finger clamp
        • Offset clamp
        • G or C clamp   (5)

2.5   • Extends the life span of the drill
        • Prevents metal from building up on the cutting edges
        • Does not form gummy deposits
        • Non-flammable   (Any 2 x 1)   (2)
                                                                                        [20]

QUESTION 3: HAND THREADING AND REAMING

3.1   3.1.1   Internal thread is one which is cut on the inside surface of a hole
                                                                                  eg. a nut

        3.1.2   Crest is the top part of the thread

        3.1.3   Root lies at the bottom of the thread; the base where two adjacent
                  flanks meet

        3.1.4   Pitch is the distance from one point of a thread to a corresponding
                  point on the adjacent thread
                                                                  (4 x 2)   (4)

3.2   Tap drill size = major diameter – pitch
                       = 10 – 1,5√
                       = <u>8,5 mm</u>√   (2)
                                                                                  [10]

QUESTION 4: KEYS AND FASTENERS

4.1
- Rectangular/parallel
- Feather
- Taper gib-head
- Woodruff (4)

4.2 $h = D/6$
        $= 36/6\sqrt{}$
        $= \underline{6\ mm}\sqrt{}$

     $w = D/4$
        $= 36/4\sqrt{}$
        $= \underline{9\ mm}\sqrt{}$ (4)

4.3
- Side milling cutter
- Slot drill (2)
[10]

QUESTION 5: CENTRE LATHE

5.1   1 – Headstock
        2 – Carriage
        3 – Tailstock
        4 – Tool post
        5 – Compound slide
        6 – Cross slide
        7 – Apron
        8 – Feed shaft
        9 – Lead screw (9)

5.2

ADVANTAGES	DISADVANTAGES
- Ease of work setting. - A wide range of cylindrical and hexagonal workpieces can be held. - Work can be readily performed on the end face. - Work can be bored. (Any 2 x 1)	- Accuracy decreases as chuck becomes worn. - Centring accuracy is limited when work is reversed. - Run-out' cannot be corrected. - Only round and hexagonal components can be held. (Any 2 x 1)

(4)

5.3   Supports a workpiece (1)

5.4
- Workpieces are easily mounted and removed
- External turning will be true to internal diameter
- Setting up is simple, quick and true
- Can be adapted to suit a large variety of workpieces   (Any 3 x 1)   (3)

5.5 D = 50 mm = 50/1 000 = 0,05

           N = 900 rpm

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

             $= \pi \times 0,05 \times 900 \checkmark\checkmark$

             = <u>141,372 m/min</u>$\checkmark$ (3)

                                                                    [20]

QUESTION 6: MILLING MACHINE

6.1   • Machining dovetails, grooves and splines

        • Making spur, bevel and spiral gears

        • Performing drilling, boring and profile cutting operations

        • For making flat surfaces, squaring

        • For mass production of workpieces   (5)

6.2   • Wear goggles/safety glasses

        • Clamp your workpiece securely

        • Never leave the machine unattended

        • Make sure the cutting tool is secured

        • Do not make any adjustments while the machine is running   (3 x 1)   (3)

6.3   • Plain horizontal

        • Universal

        • Vertical

        • Turret-type   (4)

6.4 $S = \pi \times D \times N$

           $N = S/ \pi \times D$

             $= 24/ \pi \times 0,025 \checkmark\checkmark$

             = <u>305,577 r/min</u>$\checkmark$

           $f = f_t \times T \times N$

            $= 0,051 \times 4 \times 305,577 \checkmark\checkmark$

            = <u>62,334 mm/min</u>$\checkmark$ (3 x 2)   (6)

6.5   • Solid

        • Split   (2 x 1)   (2)

                                                                    [20]

                                                       TOTAL: **100**