

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

NOVEMBER EXAMINATION 2011

MACHINE MANUFACTURING NQF LEVEL 3

14 NOVEMBER 2011

This marking guideline consists of 7 pages.

SECTION A

QUESTION 1: MACHINE SAFETY

- 1.1 ➤ Fixed Guards ✓
 - ➤ Interlock Guards ✓
 - Automatic Guards
 - Distance Guards
 - ➤ Trip Guards. ✓ (5)
- 1.2 > Wearing of a tie/ scarf
 - Wearing of jewellery
 - Loose clothing
 - ➤ Long hair ✓ ✓ (any two) (2)
- 1.3 > No person should work alone
 - Never lean or sit on machine
 - Use all safety guards and safety equipment provide
 - Don't play fool when operating a machine
 - Never attempt to operate a machine unless trained
 - > Never leave a machine unattended in motion
 - Never reach across or into a machine
 - There must be only one operator on a machine at a time
 - Or any other relevant answer.
 - (any four) (4)
- 1.4 Risk = Probability Rating x Severity Rating
 = 1 x 1
 = 1 (Actual Score) (1)

or

- 1.5 > Position of First Aid equipment
 - Position of Fire Equipment so that the area be cleared
 - Easiest direction to emergency exit
 - A safe route through a workshop
 - Storage and packing area
 - Work area.

(any two) (2) [15]

QUESTION 2: CAD APPLICATIONS

- 2.1 > Initial expense of hardware can be high
 - Heavy computing power is required
 - Cad packages are expensive and take time to learn
 - Some programmes are expensive

 \checkmark

(any two)

(2)

(1)

- Trained operators needed.
- 2.2 2.2.1 Microsoft: No ✓
- 2.2.2 Caddie: Yes ✓ (1)
 - 2.2.3 Paintbrush: No ✓ (1)
 - 2.2.4 Turbocad: Yes ✓ (1)
 - 2.2.5 Inventor: Yes ✓ (1)
- 2.3 2.3.1 all actions are undone in case of a mistake. ✓ (1)
 - 2.3.2 to move an object from one part of the screen to another ✓ (1) location of the screen.
 - 2.3.3 an object made longer or smaller. ✓ (1)
 - 2.3.4 to delete or erase any object. ✓ (1)
 - 2.3.5 it allows objects to copied to another part of the screen. ✓ (1)

- 2.4 > The tapping size <u>drill is either too small or too big.</u>
 - \triangleright And if the tap and the tap wrench is not square in the hole $\sqrt{}$
 - ➤ Cutting fluid should be constantly used while tapping. √
 - > Tapping procedure not followed.

(3) **[15]**

TOTAL SECTION A: 30

SECTION B

QUESTION 3: ISO FITS AND LIMITS

- 3.1 It is obtained when the diameter of the hole is expanded by heat and the shaft (1) is forced in it and allowed to cool down.
- 3.2 3.2.1 It is when the hole (female) component is given the basic size and the variation needed is made on the shaft size to obtain a fit (2)
 - 3.2.2 The shaft is given the basic size and the variation needed is made on a ✓ hole to obtain the necessary fit. ✓ (2)
 - 3.1.3 The tolerance = $0.05 \checkmark$ (1)
- $3.3 \quad 3.3.1 \quad 125 \quad \checkmark$ (1)
 - 3.3.2 125.00 ✓ (1)
 - 3.3.3 125.02 ✓ (1)
 - $3.3.4 \quad 0.04 \checkmark$ (1)
- 3.4 3.4.1

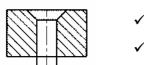
1,6/

3.4.2

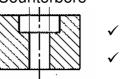
77777777

3.5

Counter sink



Counterbore



(4) **[15]**

QUESTION 4: CENTRE LATHE AND MILLING MACHINE

- 4.1 ➤ Keeps cutting tool and the work piece cool. ✓
 - ➤ Allows high cutting speed. ✓
 - ➤ Increases the life span of the cutting tool. ✓
 - ➤ Washes away chips and cuttings ✓
 - ➤ Imparts smooth finish ✓ (5)

4.2 Given: D= 20mm = 20/1000 = 0.02mN= $1.5 \text{ rev/s} = 1.5 \times 60 = 90 \text{ r/min} \checkmark$

$$V = \pi \times D \times \frac{N}{60} \qquad \checkmark$$

$$= \pi \times 0.02 \times \frac{90}{60} \qquad \checkmark$$

$$= 0.094 \ m/s$$

$$=5,65 m/\min \qquad \checkmark \tag{5}$$

4.3 4.3.1 E \checkmark (1)

4.4 ➤ Spark test ✓

- ➤ Fracture test ✓
- ➤ Sound test ✓
- ➤ Appearance/machine test ✓
 (4)

4.5 Soft ✓

(1) [**20**]

QUESTION 5: CENTRE LATHE AND MILLING MACHINE

- 5.1 > Keyway or Slots
 - ➤ Gears
 - Indexing
 - Drilling
 - Milling
 - ➤ Helical cutting
 (3)
 - Or any other relevant answer.
 (any three)
- 5.2 > Three Jaw Chuck
 - Four Jaw Chuck
 - > Turning Between Centres
- ▶ By a Mandrel
 ✓ ✓ ✓
 (any three)
- 5.3 5.3.1 Gear and Belt cover ✓ (1)
 - 5.3.2 Transparent chuck guard ✓ (1)
 - 5.3.3 Splash Guard ✓ (1)
 - 5.3.4 Emergency Switch ✓ (1)
 - 5.3.5 Foot operated brake ✓ (1)

5.4

Front clearance (2)

5.5	 Angular Indexing ✓ Simple Indexing ✓ Rapid Indexing ✓ Differential Indexing ✓ 	(4)
5.6	> Broken or Blunt cutting tool	
	Loose Vice or Dividing Head	
	Play between arbour and the spindle	
	Play between arbour support and arbour	
	➤ Play on the slides of machine table (any two)	(2)
5.7	One needs to familiarize him/herself with the <u>manufacture's manual</u> . ✓ <u>Oil levels</u> must be checked, as well as <u>oiling the slides</u> with hand operated ✓ ✓ pumps.	
	The conditions of <u>dial gauges</u> and spirit levels if applicable should be checked. ✓	(4)
5.8	$ \frac{40}{N} $ $ = \frac{40}{44} \qquad \checkmark $ $ = \frac{10}{11} \times \frac{3}{3} \qquad \checkmark $ $ = \frac{30}{33} \qquad \checkmark $	
	No (0) complete turns + 30 holes in a 33 hole circle	(5)
5.9	5.9.1 Chuck ✓	(1)
	5.9.2 Rake ✓	(1)
	5.9.3 Dividing head ✓	(1)
	5.9.4 Handle ✓	(1)
	5.9.5 Sector Arms (on Index Plate) ✓	(1)
	5.9.6 Dead Centre ✓	(1)
	5.9.7 Tail Stock (Foot Stock) ✓	(1) [35]

TOTAL SECTION B: 70 GRAND TOTAL: 100