higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

RIGGING THEORY N2

25 November 2024

This marking guideline consists of 6 pages.

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QUESTION 1

1.1 A. Double-legged chain sling.
B. Thimble-eye machine-swaged.
C. Single-legged chain sling. (3)

1.2
- Easier to handle.
- Lighter in weight.
- Greater resistance to shock loading.
- Longer life.
- Greater resistance to bacterial attacks. (5)

1.3
- The endless haulage.
- The main and tail haulage.
- The direct haulage. (3)

1.4 1.4.1 Long splice is used to join two ropes which are required to pass through a block. (2)

1.4.2 Short splice is simpler✓ but as this splice increases the size of the rope,✓ it cannot be used in the same way as a long splice.✓ (3)

1.5
- Increase wearing surface.
- Greater strength.
- Greater endurance.
- Less wear. (Any relevant answer) (4)

[20]

QUESTION 2

2.1
- Tensile stress.✓
- Compressive stress.✓
- Shear stress.✓ (3)

2.2
- Block with swivel hook.✓
- Block with shackles.✓
- Wooden sheave blocks.✓
- Strapsheave block.✓ (Any other relevant answer) (4)

2.3 A. Tirfor winch.✓
B. Safety harness.✓
C. Chain block.✓ (3)

2.4
- Check that it is in a good condition.✓
- Check the chain links for cracks, wear, corrosion and kinks.✓
- Check that the chain is not slipping in the wheel.✓
- Check the hooks for cracks, dents, stretched and wear.✓
- Check that the latches are not damaged.✓ (Any other relevant answer) (5)

[15]

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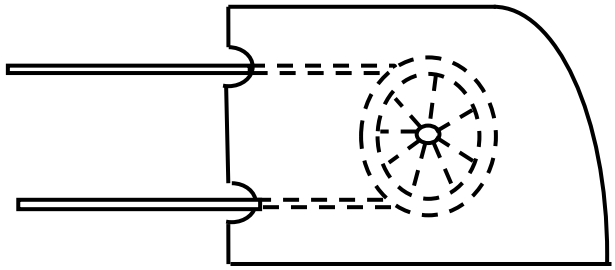
QUESTION 3

3.1 Snatch block are single blocks in which part of the shell is hinged to allow a rope to be inserted in the swallow from one side.✓✓ (2)

3.2 Mushroom rollers are used in over-rope haulage applications.✓ They are usually in pairs or groups to keep the rope in its true direction with minimal deflection.✓ They also guide the rope not to jump off the sheaves and pulleys.✓ (3)

3.3
- Check for wear.✓
- Check for cracks.✓
- Check for corrosion.
- Check for chips and bends. (Any TWO or any relevant answer) (2)

3.4



✓✓✓

(3)
[10]

QUESTION 4

4.1 A. Grip pulley.✓
B. V-groove pulley.✓
C. Flat-belt pulley.✓ (3)

4.2
- Permanent drum winders for vertical shafts and inclined shafts.✓
- Friction koepe winders.✓
- Drum winders for sinking shafts.✓
- Platform winders for sinking shafts.✓ (4)

4.3



✓✓ (2)

4.4 4.4.1 Platforms ropes are used to suspend the sinking platform and to act as a guide for the kibble cross-heads✓ during the greater part of the kibble wind.✓
The ropes that are used in construction are the six-strand triangular winding ropes and the triangular no-spin ropes.✓ (3)

4.4.2 The platform has four seperate ropes and its own drum.✓ In the case of each rope being used, only two parts✓ of the ropes are used and the other ropes assist in case of an any breakage in the rope.✓ (3)
[15]

QUESTION 5

5.1 A. Hook✓
B. Beam clamp✓
C. Beam✓
D. Shackle✓ (4)

5.2
- Lower the load until there is no tension.✓
- Open the beam clamp by pressing so that the clamp will swivel at the pins. Release the latch on the hook and remove the shackle that is mounted on the clamp.✓
- Remove all the attachments such as slings, shackles where necessary.✓
- Store away on a rack so that the clamp does not get damaged.✓ (4)

5.3 No.✓ The clamp is made to pick up only beams and it cannot open wide enough for the plates. It has a claw-type arm that fits only on a beam.✓ (2)
[10]

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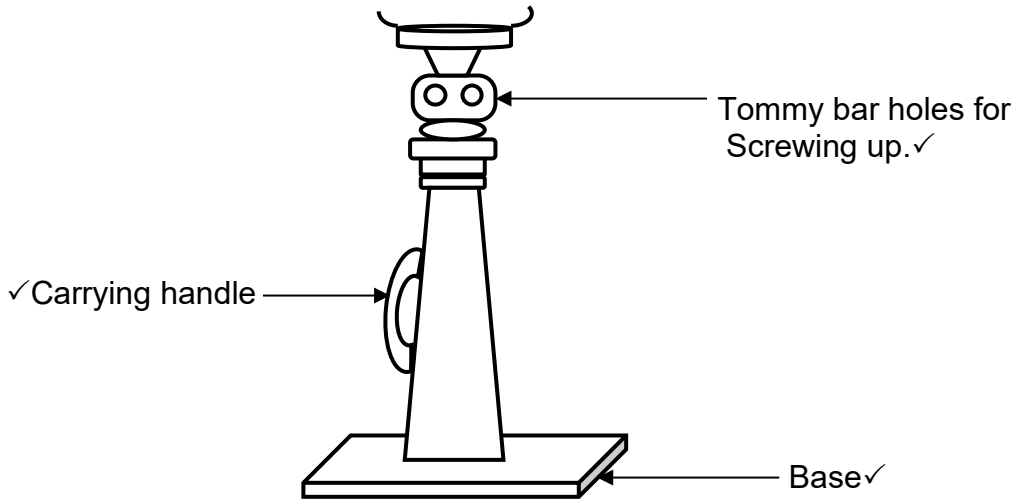
QUESTION 6

6.1 6.1.1 A✓ (1)

6.1.2 When the load is lifted in this direction there is very little tension on the eye bolt and will avoid it to bend.✓✓ (2)

6.2



(TWO marks for sketch and THREE marks for labelling) (5)

6.3
- Baulk of timber trees.✓
- Sea anchor holdfast.✓
- Baulk and picket.✓
- Double stake. (Any THREE or any relevant answer) (3)

6.4 Tripod anchors consist of three spars or legs.✓ They are lashed together and crossed near their heads with the heels splayed out to form a tripod.✓ The heels are placed on a shoe made out of timber.✓ The tripod can only be used for a straight lift. After a tripod is assembled, no rigging is required to support it.✓ (4)

6.5
- Locomotive crane.✓
- Automotive crane.✓
- Crawler crane.✓
- Three-wheel industrial truck crane.✓
- Tower crane.✓
- Loader crane. (Any FIVE or any relevant answer) (5)

[20]

QUESTION 7

7.1 $B^2 = 40^2 + 25^2$✓

$= 2225$ mm

$B = \sqrt{2225\ mm}$✓

$= 47.17$ mm✓ (3)

7.2 $F = m \times g$

$= 300 \times 9.81$✓

$= 2943$ Nm✓

$WD = F \times S$

$= 2943 \times 20$✓

$= 58860$ J or 58,860 KJ.✓ (4)

7.3 $Y = \frac{460}{2}$

$= 230$ mm ✓

$X = \frac{760}{2}$

$= 380$ mm✓

CENTRE OF GRAVITY = (380 : 230)✓ (3)
[10]

TOTAL 100

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