higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

APPLIED ENGINEERING TECHNOLOGY
NQF LEVEL 4

(6021024)

15 November 2024
09:00–12:00

This question paper consists of 6 pages.

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QUESTION 1

1.1.1 D
1.1.2 C
1.1.3 C
1.1.4 D
1.1.5 B
1.1.6 C
1.1.7 C
1.1.8 B
1.1.9 D
1.1.10 C (10 × 1) (10)

1.2
- Axial misalignment✓
- Radial misalignment✓
- Angular misalignment✓ (3)

1.3
- Higher initial costs. ✓
- Cannot handle larger loads. ✓
- Noisy after long use. ✓
- Cannot be repaired. ✓ (4 × 1) (4)

1.4 To control the direction of oil flow. ✓✓ (2)

1.5 $m = 20\ kg$
$\mu = 0{,}08$

$NR = W = mg$
$NR = 20 \times 9.81$✓
$= 162.2N$✓
$F_\mu = \mu \times NR$✓
$= 0.08 \times 196.2$✓
$F_\mu = 15.696N$✓ (5)

1.6.1 $\mu_{kinetic} = 0{,}47$✓

$W = mg$
$= 40 \times 9{,}81$
$= 392{,}4N$✓
$F\mu_{Kinetic} = \mu \times NR$✓
$= 0.47 \times 392{,}4$✓
$= 184{,}428N$✓ (5)

1.6.2 $u_{static} = 0{,}61$✓
$W = mg$
$= 40 \times 9{,}81$
$= 392{,}4N$
$F\mu_{Static} = \mu \times NR$✓
$= 0.61 \times 392{,}4$
$= 239{,}364N$✓ (5)

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1.7 Reciprocating pumps or Rotary Pumps. (1)
[35]

QUESTION 2

2.1 UDL = mg
= $200 \times 9{,}81$✓
= 1962 N✓
UDL = 1962×8✓
= $15{,}696$ kN✓

Reaction at ***B*** takes moments at ***C***

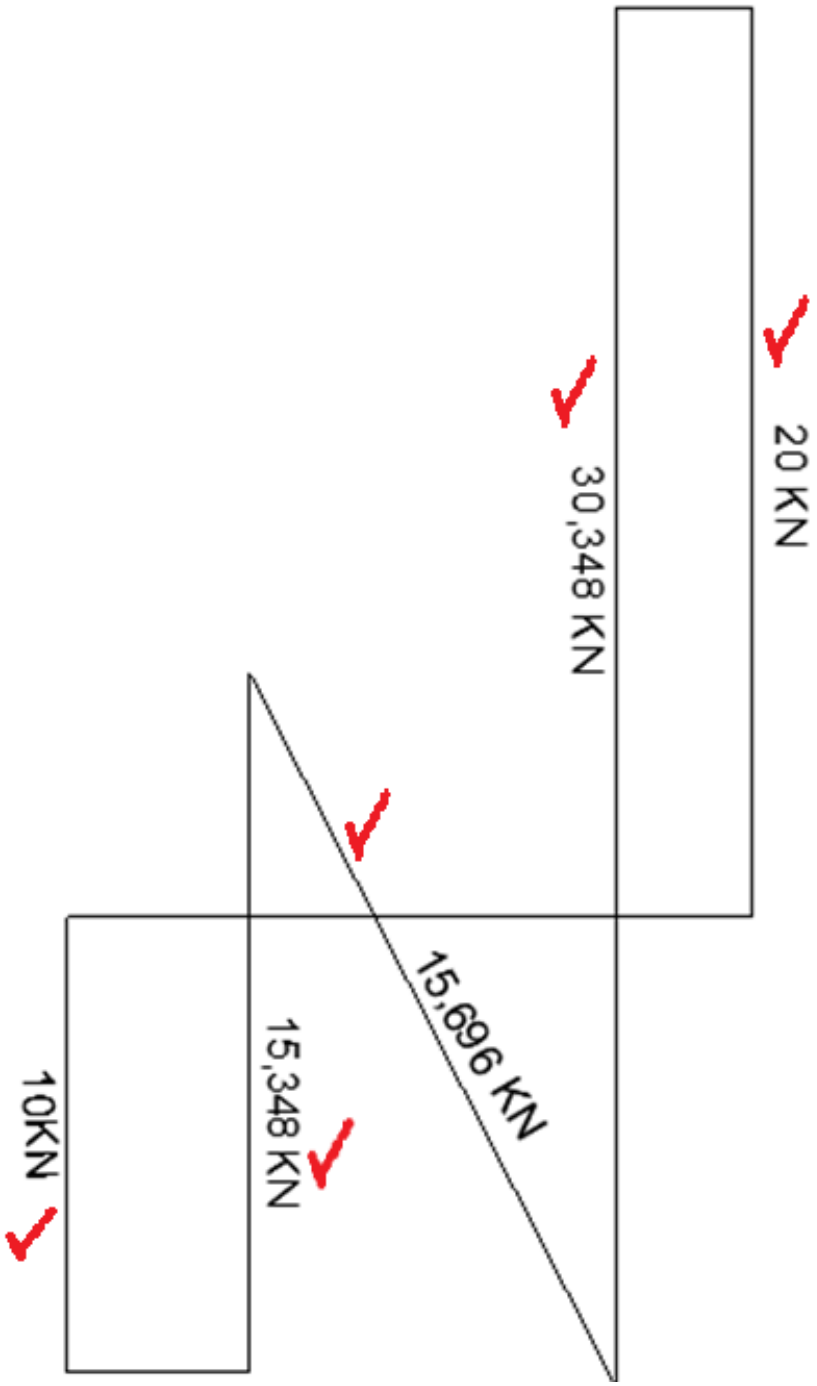
$(B \times 8) + (20 \times 3)$✓=$(15{,}696 \times 4)$✓ $+ (10 \times 12)$✓
B= $15{,}348$ kN✓

Reaction at ***C*** takes moments at ***B***

$(15{,}696 \times 4) + (20 \times 11)$✓ = (10×4)✓ $+ (C \times 8)$✓
C = $30{,}348$ kN✓ (12)

2.2 $Upwards = Downwards$
$15{,}348 + 30{,}348 = 10 + 15{,}696 + 20$✓ (2)
$45{,}696 = 45{,}696$✓

2.3 (5)



2.4 $BM_A = -10 \times 0 = 0$
$BM_B = -10 \times 4 = -40N.m$
$BM_C = -10 \times 12 + 15{,}348 \times 8 - 15{,}696 \times 4 = -60N.m$
$BM_D = -10 \times 15 + 15{,}348 \times 11 - 15{,}696 \times 7 + 30{,}348 \times 3 = 0$ (4)
[23]

QUESTION 3

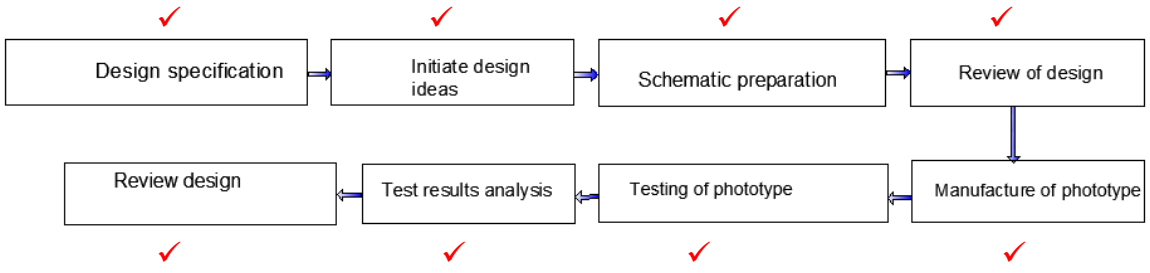
3.1
3.1.1 G
3.1.2 F
3.1.3 A
3.1.4 H
3.1.5 I
3.1.6 J
3.1.7 K
3.1.8 L
3.1.9 C
3.1.10 B

(10 × 1) (10)

3.2 $A = \frac{\pi d^2}{4}$
$= \frac{\pi \times 0{,}15^2}{4}$ ✓
$= 0{,}018m^2$ ✓
$F = P \times A$
$= 5500 \times 0.018$ ✓
$= 99N$ ✓ (4)

3.3 Salt spray test ✓ (1)

3.4



(8+ 2 marks for steps being in correct order) (10)
[25]

QUESTION 4

4.1
- Water runs into the drum and fills it to an exact amount depending on the programme chosen.
- The drum rotates back and forth(agitating).
- The dirty water is removed from the drum.
- Clean water enters the drum to rinse the clothes.
- The rising water is removed from the drum.
- The drum spins very fast for the drying cycle.

(Any 4 × 1) (4)

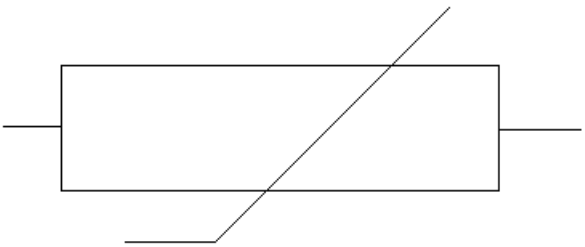
4.2 Light✓- dependent✓ resistor✓ (3)

4.3 Uses a light source and a sensor to detect ✓and set off an alarm when smoke is present. ✓ (2)

4.4.1 Engineer✓ (1)

4.4.2
- Check all gauges and record all readings at every stage of operation.✓
- Test all alarms and safety switches.✓
- Check the time that each operation takes to complete.✓
- Check all voltages at each point.✓
- Check and record power usage.✓
- Perform and record all calibration as these will be needed in future.✓ (6)

4.5



✓

(1)

[17]

TOTAL: 100

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