External assessment 2023

Multiple choice question book

Engineering

General instruction

- Work in this book will not be marked.

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

Section 1

Instruction

- Respond to these questions in the question and response book.

QUESTION 1

A plastic beaker used to hold liquids in a laboratory is commonly manufactured using

(A) polyethylene.

(B) polypropylene.

(C) polylactic acid.

(D) polyvinyl chloride.

QUESTION 2

The force required to just stop an 80 kg box from sliding down a 20° incline is

(A) 97 N

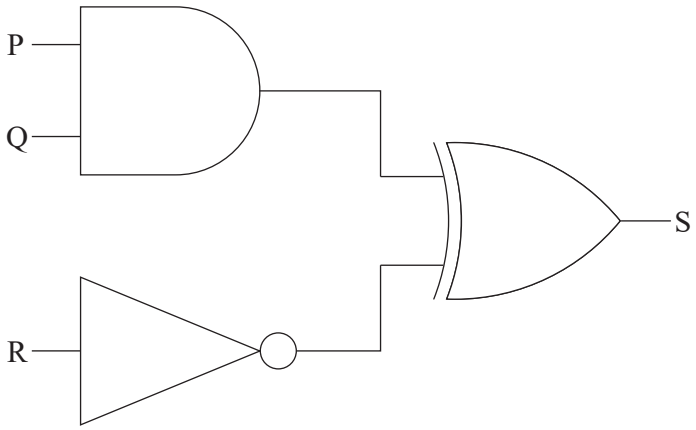
(B) 250 N

(C) 265 N

(D) 282 N

QUESTION 3

A logic circuit is shown.



Which truth table corresponds to the logic circuit?

(A)

P	Q	R	S
1	0	1	0
1	1	0	0
1	1	1	1

(B)

P	Q	R	S
1	0	1	1
1	1	0	1
1	1	1	0

(C)

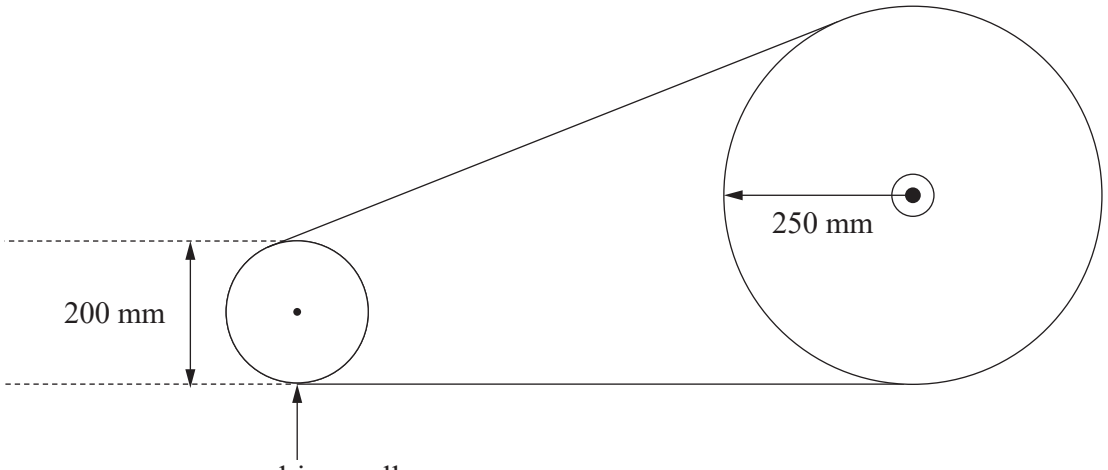
P	Q	R	S
1	0	1	0
1	1	0	1
1	1	1	0

(D)

P	Q	R	S
1	0	1	1
1	1	0	0
1	1	1	1

QUESTION 4

A simple pulley and belt driving system is shown.



Not to scale

The velocity ratio of the system is

(A) 0.40

(B) 0.80

(C) 1.25

(D) 2.50

QUESTION 5

A conveyor belt moves 1 tonne of material with an effort of 3.5 kN. What is the efficiency of the conveyor when the velocity ratio is 4?

(A) 29%

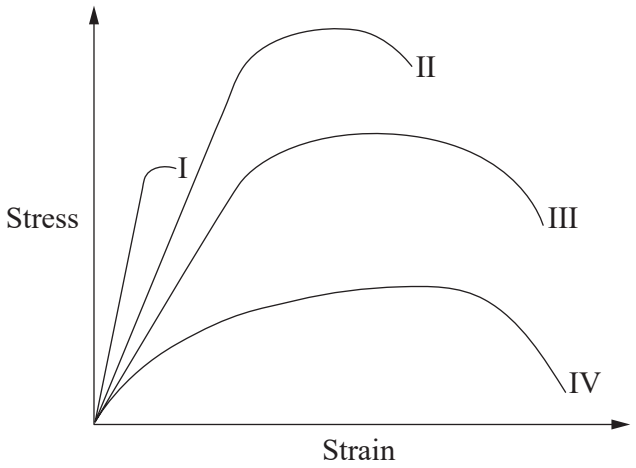
(B) 70%

(C) 80%

(D) 88%

QUESTION 6

The graph shows the stress–strain curves of four different materials.



Which material can best withstand deformation within its proportional limit?

(A) I

(B) II

(C) III

(D) IV

QUESTION 7

A 15 kg steel beam is dropped from a height of 4 m. The velocity of the steel beam just before it hits the ground is

(A) 2.83 m/s

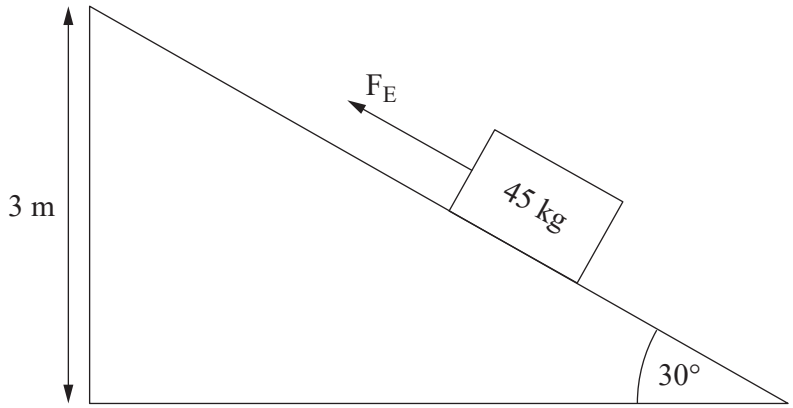
(B) 6.26 m/s

(C) 7.75 m/s

(D) 8.85 m/s

QUESTION 8

A 45 kg box is pulled up an incline as shown.



Not to scale

If the system is 80% efficient and the velocity ratio is 2, what force is required to move the box?

(A) 84 N

(B) 221 N

(C) 276 N

(D) 441 N

QUESTION 9

Steel containing 0.11% carbon is

(A) low carbon steel.

(B) mild carbon steel.

(C) medium carbon steel.

(D) high carbon steel.

QUESTION 10

A 40 kg object is pushed 3 m up a 25º incline at a uniform velocity.

If the frictional force opposing motion is 163 N and the weight force component acting down the incline is 165.66 N, the work done is

(A) 489 J

(B) 497 J

(C) 986 J

(D) 1066 J