External assessment 2024

Multiple choice question book

Engineering

General instruction

- Work in this book will not be marked.

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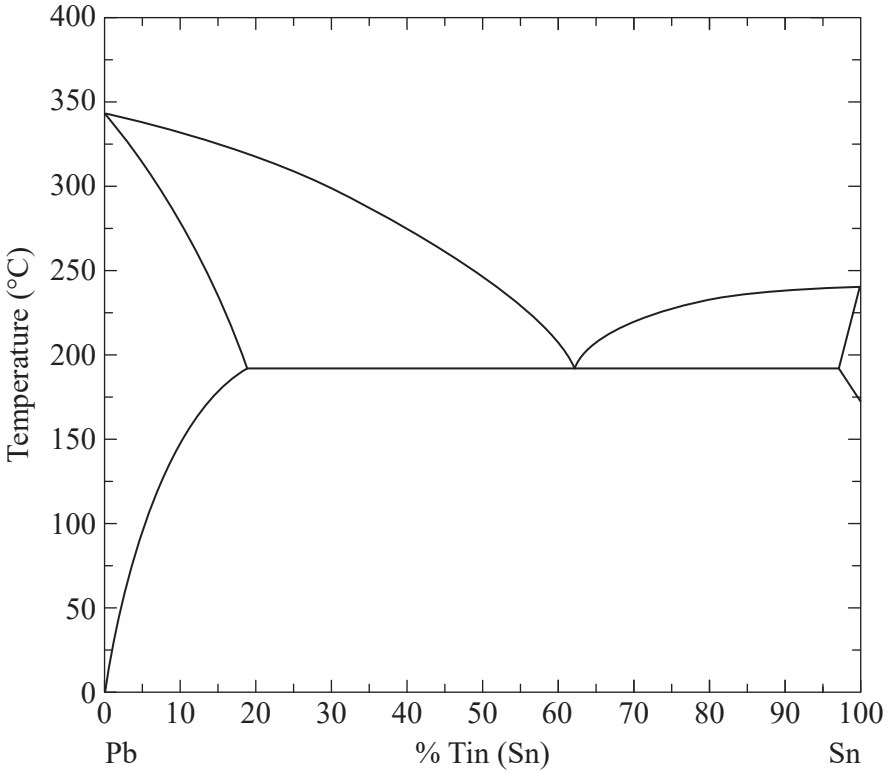
Section 1

Instruction

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

QUESTION 1

A lead–tin thermal-equilibrium phase diagram is shown.



What phase would be present in an alloy containing 35% Sn at a temperature of 225 °C?

(A) β

(B) L

(C) α + β

(D) α + L

QUESTION 2

Which material is most suitable for highly tempered punches and axles?

(A) mild carbon steel

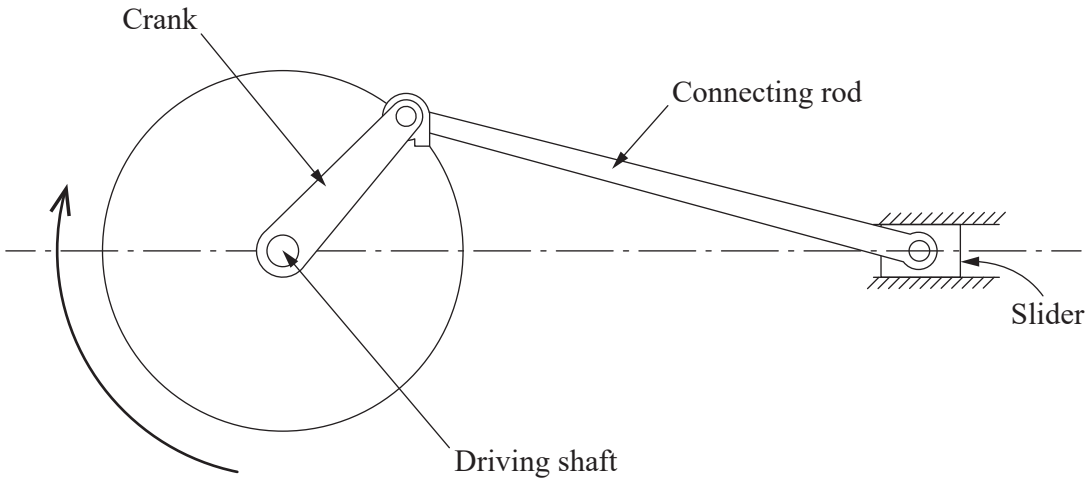
(B) medium carbon steel

(C) high carbon steel

(D) ultra-high carbon steel

QUESTION 3

The crank moves continually in the direction shown.



Identify the type of motion that best describes what is experienced by the slider.

(A) oscillatory

(B) reciprocal

(C) rotary

(D) linear

QUESTION 4

Which plastic is the most suitable for use as a medical screw?

(A) nylon

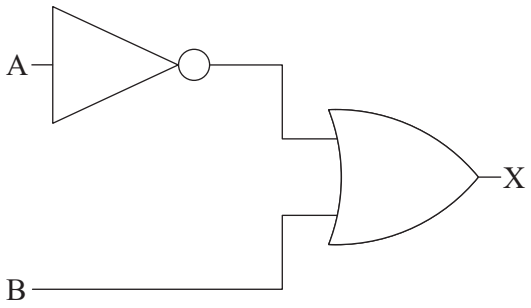
(B) polypropylene

(C) polylactic acid

(D) polyvinyl chloride

QUESTION 5

A logic gate circuit is shown.



Which truth table shows the correct output column for the logic gate circuit?

(A)

A	B	X
0	0	1
0	1	1
1	0	0
1	1	1

(B)

A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

(C)

A	B	X
0	0	0
0	1	1
1	0	0
1	1	0

(D)

A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

QUESTION 6

A cyclist exerts an effort force of 125 N on the pedal of a bicycle. The load force on the rear wheel is 500 N. The velocity ratio of the bicycle is 5.

What is the efficiency of the bicycle?

(A) 125%

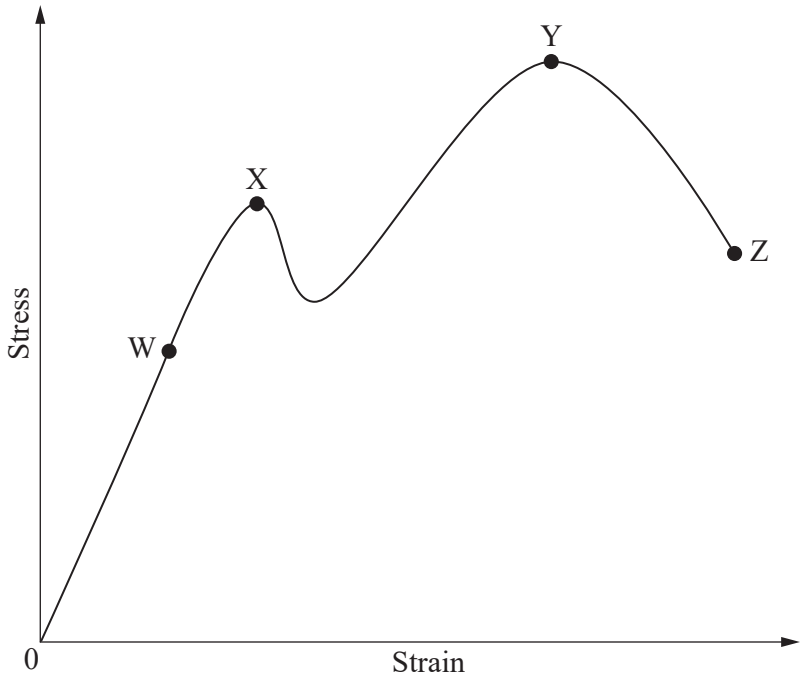
(B) 80%

(C) 8%

(D) 5%

QUESTION 7

A stress–strain diagram is shown.



Identify the key feature represented by point X on the diagram.

(A) yield stress

(B) plastic limit

(C) proportional limit

(D) ultimate tensile strength

QUESTION 8

A fibreglass swimming pool has a potential energy of 98 kJ when raised 20 m from the ground by a crane.

The mass of the swimming pool is

(A) 500 kg.

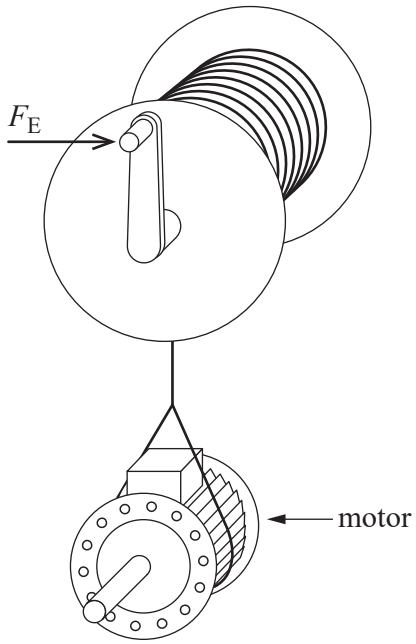
(B) 4900 kg.

(C) 10 000 kg.

(D) 48 020 kg.

QUESTION 9

A drum winch is used to vertically raise a 50 kg motor as shown. It has a velocity ratio of 3 and is 90% efficient.



What is the minimum effort force required to raise the motor using the drum winch?

(A) 18.52 N

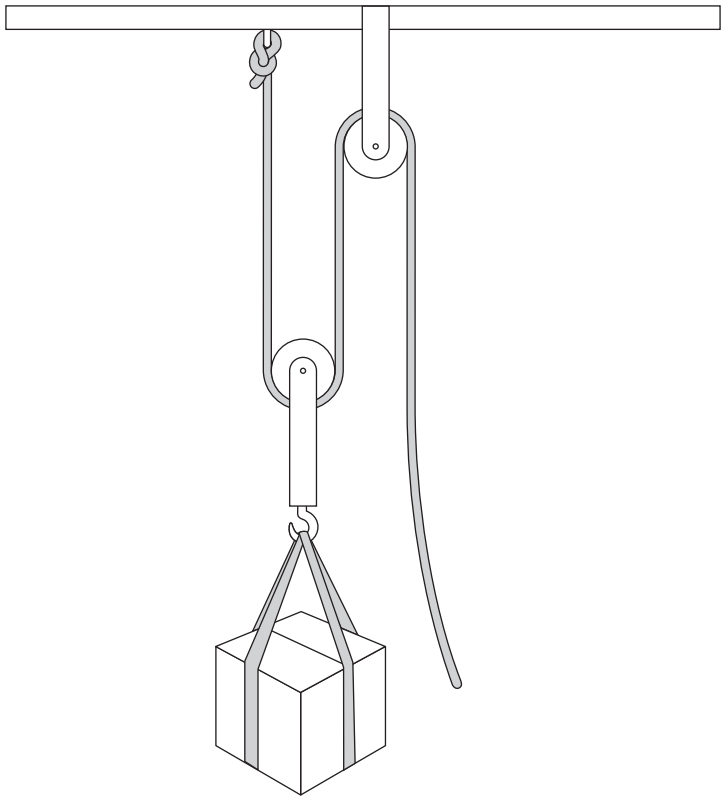
(B) 163.33 N

(C) 181.48 N

(D) 1323.00 N

QUESTION 10

A 15 N force is required to raise a box a distance of 12 m using the simple pulley system shown. Assume the friction in the rope is negligible.



What is the work done to raise the box 12 m?

(A) 3 J

(B) 90 J

(C) 180 J

(D) 360 J

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