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Sample assessment 2020

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Multiple choice question book

# Engineering



Queensland  
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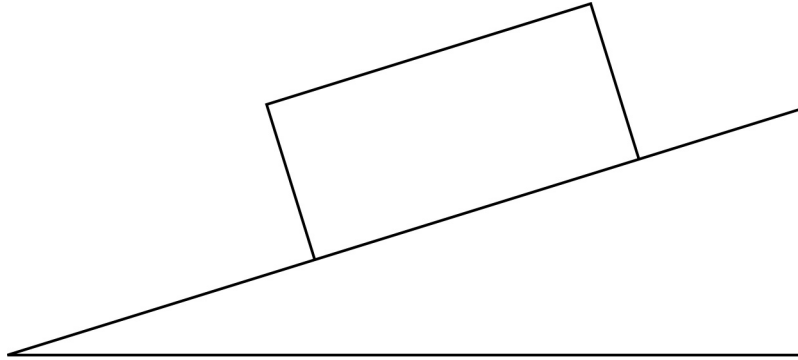
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## Section 1

### Instructions

- Answer all questions in the question and response book.
  - This book will not be marked.
- 

### QUESTION 1



The block in the figure above is raised on an inclined plane to an angle of  $20^\circ$ . The coefficient of static friction is 0.25. The statement that best describes the action of the block is that it will

- (A) not move.
- (B) slide at a constant rate down the incline.
- (C) slide at a decelerating rate down the incline.
- (D) slide at an accelerating rate down the incline.

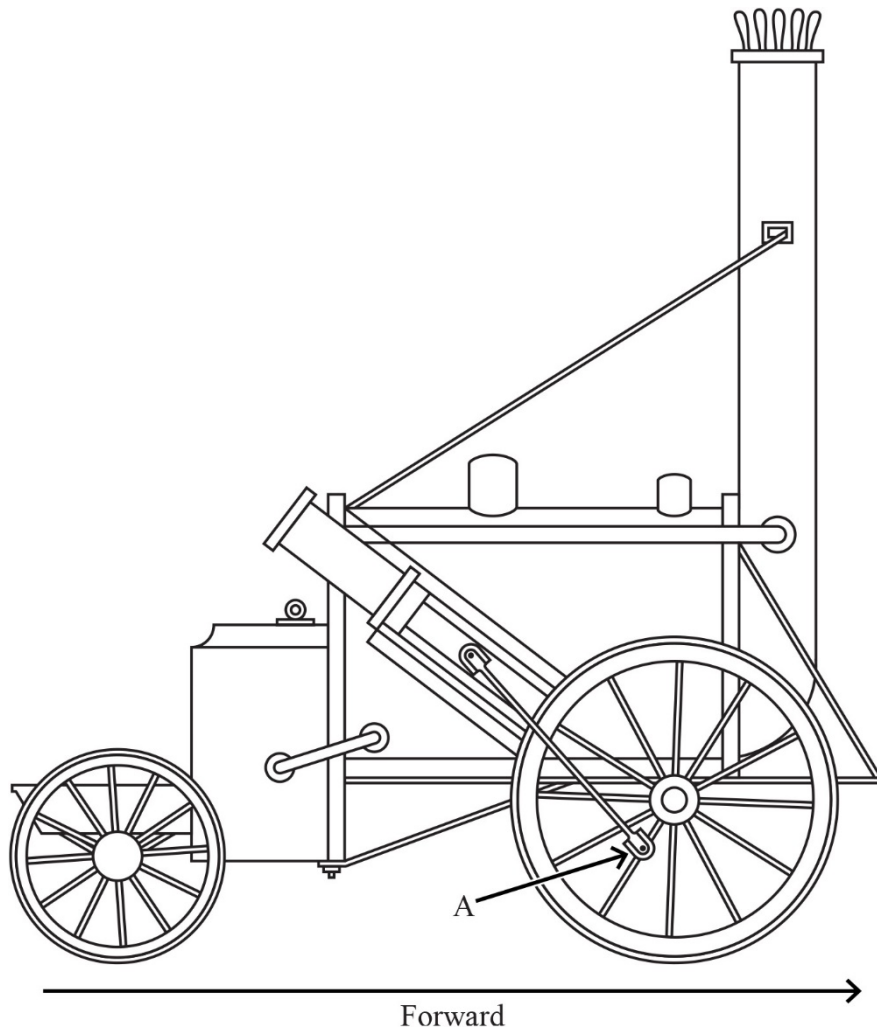
### QUESTION 2

Pearlite is composed of alternating layers of

- (A) ferrite and austenite.
- (B) ferrite and cementite.
- (C) gamma iron and carbon.
- (D) cementite and gamma iron.

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## QUESTION 3



When the vintage machine in the figure above is moving forward, the motion of rod connection A is best described as

- (A) reciprocal and linear.
- (B) rotary and reciprocal.
- (C) rotary and oscillating.
- (D) reciprocal and oscillating.

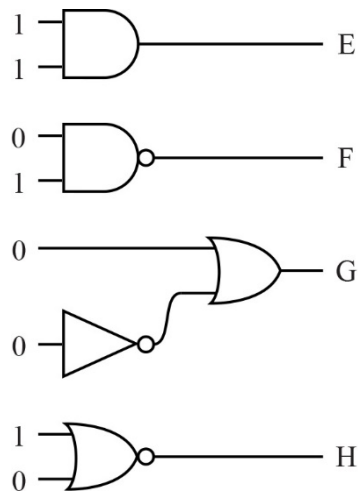
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## QUESTION 4

Plastic gears would most likely be manufactured from

- (A) nylon.
- (B) polylactic acid.
- (C) polyvinyl chloride.
- (D) acrylonitrile butadiene styrene.

## QUESTION 5

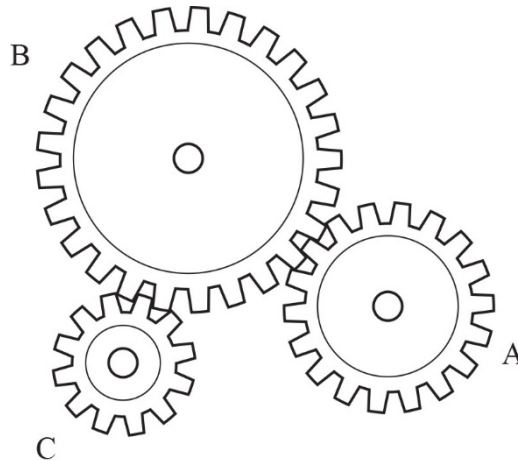


The outputs for the logic circuit in the figure above are

- |     |   |   |     |   |   |
|-----|---|---|-----|---|---|
| (A) | E | 1 | (C) | E | 1 |
|     | F | 1 |     | F | 0 |
|     | G | 1 |     | G | 1 |
|     | H | 0 |     | H | 0 |
|     |   |   |     |   |   |
| (B) | E | 1 | (D) | E | 1 |
|     | F | 1 |     | F | 1 |
|     | G | 1 |     | G | 0 |
|     | H | 1 |     | H | 0 |

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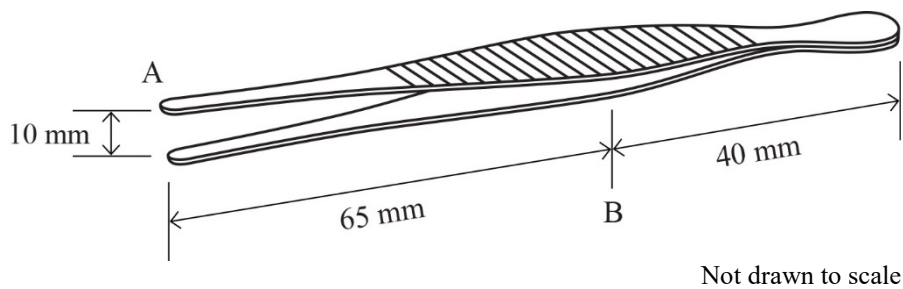
## QUESTION 6



The gear train in the figure above is driven by gear C. Gear B is an idler gear. The velocity ratio of gear A to gear C is

- (A) 9:1
- (B) 3:2
- (C) 1:2
- (D) 2:3

## QUESTION 7



The tweezers shown in the figure above are squeezed together 6 mm at B using a force of 10 N. The output force of the closed jaws at A is

- (A) 2.4 N
- (B) 3.8 N
- (C) 6.3 N
- (D) 6.5 N

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## QUESTION 8

A 1000 kg carriage is moving unimpeded by wind or friction down a roller-coaster at an angle of  $45^\circ$ . The acceleration of the carriage on the roller-coaster is

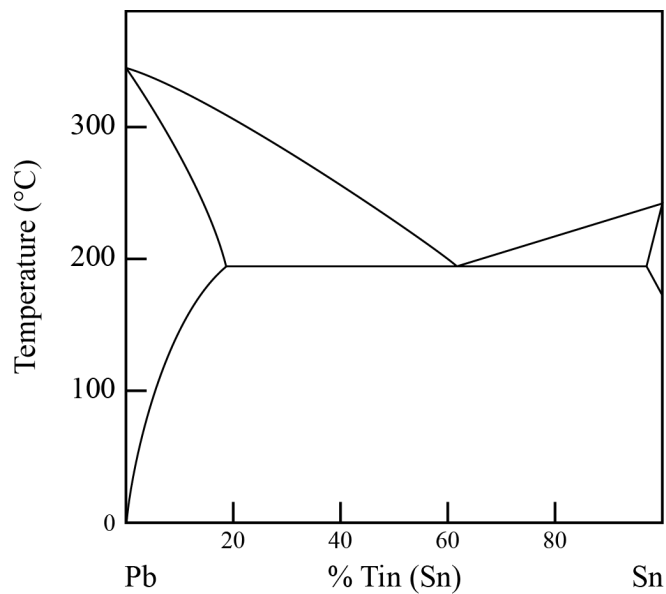
- (A)  $2.87 \text{ m/s}^2$
- (B)  $6.93 \text{ m/s}^2$
- (C)  $7.07 \text{ m/s}^2$
- (D)  $9.80 \text{ m/s}^2$

## QUESTION 9

Structural steel plates and sections used for fabricating machine frameworks have a carbon content of

- (A) 0.07% to 0.15%
- (B) 0.16% to 0.30%
- (C) 0.31% to 0.60%
- (D) 0.61% to 1.25%

## QUESTION 10



The eutectic composition of lead and tin shown in the lead–tin thermal equilibrium phase diagram above is

- (A) 62% tin and 38% lead.
- (B) 62% lead and 38% tin.
- (C) 82% tin and 18% lead.
- (D) 82% lead and 18% tin.

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## References

### Question 3

'Stephenson's Rocket Drawing' (from *The Mechanics Magazine* 1829),  
[https://en.wikipedia.org/wiki/File:Stephenson%27s\\_Rocket\\_drawing.jpg](https://en.wikipedia.org/wiki/File:Stephenson%27s_Rocket_drawing.jpg), public domain.

### Question 7

Pearson Scott Foresman, 'Tweezers', [https://commons.wikimedia.org/wiki/File:Tweezers\\_\(PSF\).png](https://commons.wikimedia.org/wiki/File:Tweezers_(PSF).png), public domain.



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