

WRITTEN EXAMINATION FOR THE SPACE APPLICATIONS 2022

Name:

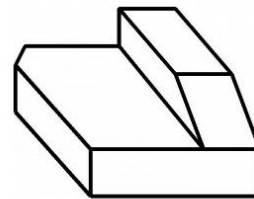
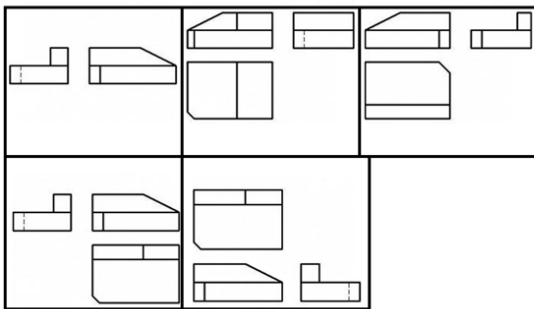
Total score:

Date: 16.6.2022

Test Questions:

- 1) Which sensor can be used to determine the position of a satellite with the greatest accuracy?
 - a) Rocket engine
 - b) Startracker
 - c) Solar panel
- 2) In recent years, satellite designers have been required to add the necessary fuel reserve. What is the reason for this?
 - a) So that the satellite can be moved if there is a change in mission plans.
 - b) A reserve in case of a small leak that would prevent the satellite from being placed in its exact position.
 - c) The fuel required to move the satellite into a "graveyard orbit" or Earth's atmosphere at the end of its life.
 - d) Satellites can outlive their lifetime, so they must have fuel for a mission extension.
- 3) In the box, there are red and green balls in a ratio of 3:2. If we take three of each colour, the ratio is 2:1. What will be the ratio if we add three pieces of each colour to the original quantity?
 - a) 5:3
 - b) 5:4
 - c) 5:2
 - d) 4:3

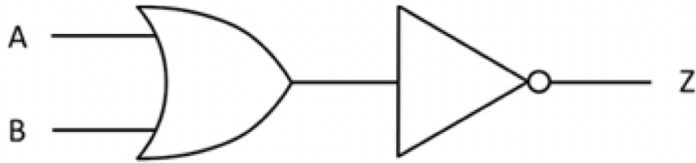
- 4) Select the proper projection:



- 5) What is the sum of all even integers from 21 to 50?
 - a) 540
 - b) 592
 - c) 600
 - d) 640

- 6) What are the two most common substances in the Earth's atmosphere?
- Oxygen and Hydrogen
 - Ozone and Methane
 - Nitrogen and Oxygen
 - Hydrogen and Carbon Dioxide

- 7) Which of these are binary digits?
- 0 and 1
 - 1 and 2
 - A and B

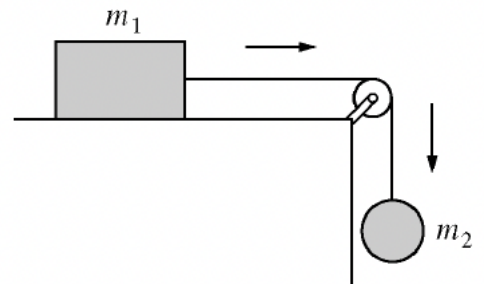


- 8) Which of the following is the correct Boolean expression for this gate?
- $(A \text{ OR } B)$
 - $\text{NOT}(A \text{ AND } B)$
 - $\text{NOT}(A \text{ OR } B)$
 - $A \text{ AND } B$

- 9) Mary, who is sixteen years old, is four times as old as her brother. How old will Mary be when she is twice as old as her brother?
- 20
 - 24
 - 25
 - 28

- 10) Which two letters come next? AZBYDWGT??
Answer:

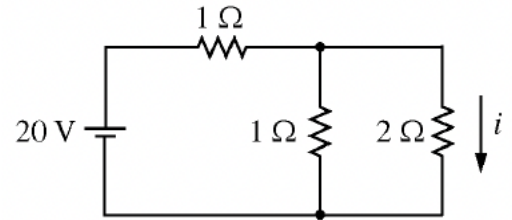
- 11) A block with mass m_1 that slides on a frictionless table is attached by a massless string over a massless, frictionless pulley to a hanging ball with mass m_2 , as shown in the figure. The tension in the string must be:
- equal to m_2g
 - greater than m_2g
 - less than m_2g



- 12) Name at least 3 areas, where are used satellite data:
-
 -
 -

13) For the circuit shown in the figure, what is the current i through the $2\ \Omega$ resistor?

- a) 2 A
- b) 4 A
- c) 5 A



14) What quantity is used to assess the power characteristics of a rocket engine?

- a) Horsepower
- b) Watts
- c) Specific impulse
- d) Mach

15) Identify at least 3 critical challenges for space travel:

- a)
- b)
- c)

16) What type of galaxy is our Milky Way?

- a) An elliptical galaxy
- b) A spiral galaxy
- c) An irregular galaxy

17) Light in one-year travels 9,460,000,000,000 km.

- a) True
- b) False

18) Kepler's laws of planetary motion replaced circular orbits with:

- a) Elliptical orbits
- b) Parabolic orbits
- c) Hyperbolic orbits

19) What is the first cosmic velocity?

- a) the speed required to eject a body from Earth into orbit
- b) the speed required to leave the Earth's gravitational field
- c) the speed required to leave the Solar System

20) There are many stars in the Universe. Which one is closest to planet Earth?

- a) Sirius
- b) Proxima Centauri
- c) Epsilon Eridani