



2nd Copernicus Olympiad
Physics and Astronomy Discipline, Category I,
Global Round Exam.

Name and Surname:

Country:

Date:

Grade:

Rules and Regulations:

- This exam has 25 multiple choice and classical type questions. Each question weighs 4 points. Maximum point student can get is 100. Four (4) incorrect answers will eliminate one correct answer.
- Time allocated for this exam is 90 minutes. You will start when proctor tells you to start and will stop when proctor tells you that time is over.
- Students are not allowed to use any kind of electronic device.
- This exam contains 8 pages. Before starting the exam please check and let your proctor know if any page is missing.
- Students can use both pen and pencil, but we recommend to use pencil, so it will be easier to clean when you make mistake.
- Each question has to have only one answer. Questions with more than one answer will be counted as incorrect.
- Students cannot consult the proctor as to the meaning of any question.
- Students must not give or receive assistance of any kind during the exam. Any cheating, any attempt to cheat, assisting others to cheat, or participating therein, or engaging in such improper conduct is a serious violation and will generally result in disqualifying.
- Students must sign each page of their exam paper. Candidates who fail to do so will have their exams disqualified.

End of rules and regulations. **Good luck!**

Q1: Magnet is also known as _____

- A. Lode stone
- B. Grey stone
- C. Black stone
- D. none of these

Q2: The force of friction can be reduced by the help of

- A. ball bearing
- B. lubricants
- C. cushion surfaces
- D. all of them

Q3: An elephant weighing 20,000 N stands on one foot of area 1000 cm². How much pressure would it exert on the ground?

- A. 200,000 N/m²
- B. 20,000 N/m²
- C. 2000 N/m²
- D. 200 N/m²

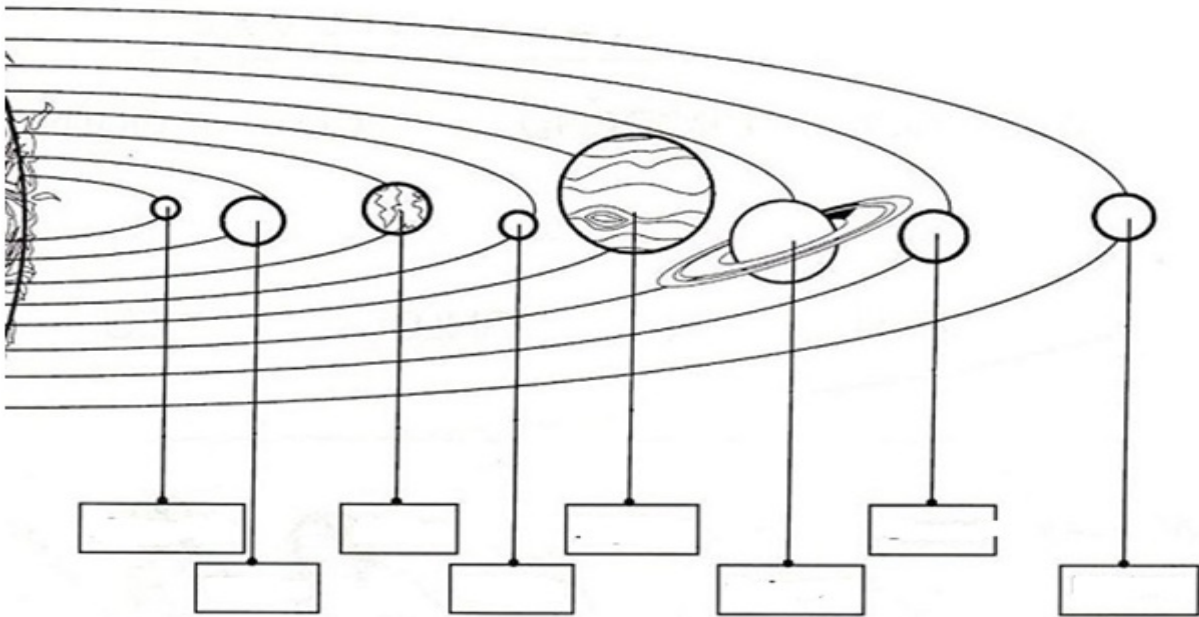
Q4: 1cm³ is equal to

- A. 1x10⁻⁹m³
- B. 1x10⁻⁶m³
- C. 1x10³m³
- D. 1x10⁶m³

Q5: Frequency of oscillation is:

- A. The number of oscillations per minute
- B. The number of oscillations per hour
- C. The number of oscillations per second
- D. The number of oscillations

Q6: Label the planets in the solar system.



Q7: Calculate the volume of wood of mass 6000 kg if the density of wood is 0.8 gr/cm^3 .

- A. 7.5 cm^3
- B. 2.4 m^3
- C. 7.5 m^3
- D. 10.2 m^3

Q8: A bus travels 54 km in 90 minutes. The speed of the bus is

- A. 0.6 m/s
- B. 10 m/s
- C. 5.4 m/s
- D. 3.6 m/s

Q9: What is the effect caused by the tilt of Earth's axis?

- A. the changing season
- B. meteors and asteroids
- C. the alignment of the planets
- D. periods of daylight and darkness

Q10: Choose the alternative which resembles the mirror image of the given combination.

EFFECTIVE

(1) EVITCEFFE

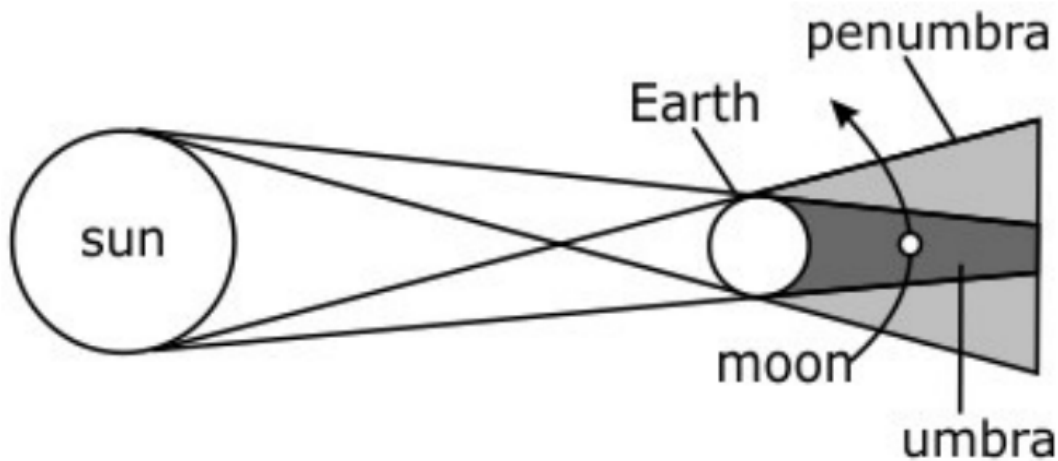
(2) EVITCEFFE

(3) EFFICEVTE

(4) EFFICEVTE

- A. 1
- B. 2
- C. 3
- D. 4

Q11: This diagram shows an alignment of the Sun, Earth, and the Moon.



Which event happens during this alignment?

Answer: _____

Q12: The process of transferring of heat without any contact between the source of heat and the heated object is called

- A. Conduction
- B. Convection
- C. Radiation
- D. Induction

Q13: Alex and Kate measured their body temperature. Alex found his to be 98.6°F and Kate recorded 37°C.

Which of the following statements is true?

- A. Alex has a higher body temperature than Kate.
- B. Alex has a lower body temperature than Kate.
- C. Both have normal body temperatures.
- D. Both are suffering from fever.

Q14: Which one among the followings denotes the smallest temperature?

- A. 1° on the Celsius scale
- B. 1° on the Kelvin scale
- C. 1° on the Fahrenheit scale
- D. 1° on the Reaumur scale

Q15: A beggar wrapped himself with a few layers of newspaper on a cold winter night. This helped him to keep himself warm because

- A. friction between the layers of newspaper produces heat.
- B. air trapped between the layers of newspaper is a bad conductor of heat.
- C. newspaper is a conductor of heat.
- D. newspaper is at a higher temperature than the temperature of the surrounding.

Q16: This table shows the average surface temperatures of four planets.

Planet	Average Low Temperature / High Temperature
1	-50°F / 20°F
2	38°F / 100°F
3	117°F / 195°F
4	130°F / 320°F

Which planet would most likely be able to support life similar to that found on Earth?

- A. Planet 1
- B. Planet 2
- C. Planet 3
- D. Planet 4

Q17: The correct sequence of energy transfer that occurs when a bullet is shot upward and then started falling down at some point because of gravitational force is

- A. Gravitational potential energy → Chemical potential energy → Kinetic energy → Kinetic energy
- B. Kinetic energy → Chemical potential energy → Kinetic energy → Gravitational potential energy
- C. Chemical potential energy → Kinetic energy → Gravitational Potential energy → Kinetic energy
- D. Kinetic energy → Kinetic energy → Gravitational potential energy → Chemical potential energy

Q18: Find the altitude of a right prism for which the area of the lateral surface is 143 cm^2 and the perimeter of the base is 13 cm.

- A. 22 cm
- B. 15 cm
- C. 16 cm
- D. 11 cm

Q19: When a liquid thermally expands then

- A. the volume of liquid decreases
- B. the mass of liquid increases
- C. the mass of liquid decreases
- D. the density of liquid decreases

Q20: Select the variables that effect if any object will float or sink.

- A. The amount of air inside an object
- B. The surface area (shape) of the object
- C. The density of the object
- D. All of the above

Q21: The denser the liquid,

- A. the slower the speed of sound
- B. the faster the speed of sound
- C. more distance covered by the sound
- D. less distance covered by the sound

Q22: What are the only two planets in our solar system without moons?

Answer: _____

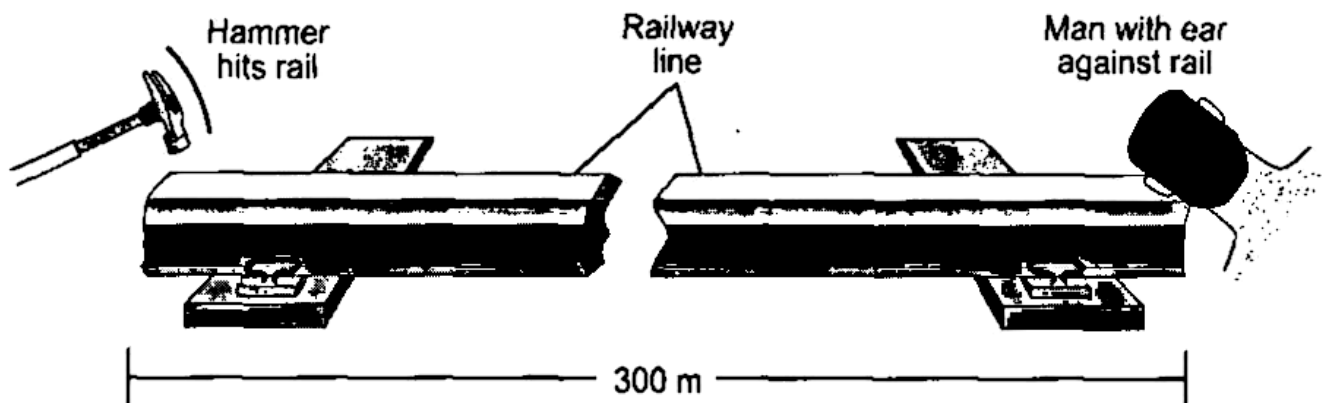
Q23: A bicycle has a speed of 6 m/s. What is the speed in km/h?

- A. 21.6 km/h
- B. 16.67 km/h
- C. 2.16 km/h
- D. 1.67 km/h

Q24: What type of star is the sun?

- A. neutron star
- B. red giant
- C. white dwarf
- D. yellow star

Q25: A disused railway line has a length of 300 m. A man puts his ear against one end of the rail and another man hits the other end with a metal hammer, as shown in figure.



Now answer the following questions:

(i) State an approximate value for the speed of sound in air.

Answer: _____

(ii) Sound travels at 5000 m/s in steel. Calculate the time in minutes it takes for the sound to travel along the rail.

Answer: _____

(iii) The man with his ear to the railway line actually hears two sounds from the hammer, separated by a short interval. Explain why he hears two sounds.

Answer: _____

(iv) Now raining has started and the man heard sound of thunderbolt 5 second after he saw flash of lightning. How far is he from the place where lightning occurs?
(take speed of sound as 330 m/s)

Answer: _____