

# Science Olympiad Foundation Uganda

Uganda National Junior Science Olympiad - Grandfinal

Exam ID: 127

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Direction for Questions: 1 to 5**

The human cerebrum is divided into right and left cerebral hemispheres.

The outer 2-4mm of the cerebral hemispheres is known as the cerebral cortex. It consists of grey matter.

The left side of the cerebral cortex receives information from and controls movement of the right side of the body and vice-versa. A thick band of axons known as corpus callosum enables the right and left cerebral cortices to communicate. The left cerebral hemisphere is concerned with recognition of faces.

In a particular patient the corpus callosum was surgically removed as a treatment of last resort for the most extreme form of epilepsy in which fits occurred as often as 30 minutes. The patient appeared normal after recovery but exhibited a 'split-brain' effect.

Answer the following questions using options (Yes/No).

**Question: 1 of 27**

QID: 468

Marks: 1

The patient is blindfolded and given a comb in the left hand. Then the blindfolded person is asked to locate the comb in a mixture of objects (mirror, ball, pen, etc) with his left hand. Will he succeed?

Please mark (✓) for the correct answer.

A. Yes

B. No

**Question: 2 of 27**

QID: 469

Marks: 1

If the doctor asks the blindfolded patient to say what the object was, would he be able to answer?

Please mark (✓) for the correct answer.

A. Yes

B. No

**Question: 3 of 27**

QID: 470

Marks: 1

The doctor asks the blindfolded patient to find the comb in the mixture of objects with his right hand. Would he be successful?

Please mark (✓) for the correct answer.

A. Yes

B. No

**Question: 4 of 27**

QID: 471

Marks: 1

When the blindfolded patient is given the comb in right hand and asked to say what the object is, will he be able to answer?

Please mark (✓) for the correct answer.

A. Yes

B. No

**Question: 5 of 27**

QID: 472

Marks: 1

If the patient is shown a photograph of a familiar face first in the left field of vision and then in the right field, would he be able to put a name to the face, in either field?

Please mark (✓) for the correct answer.

A. Yes

B. No

**Question: 6 of 27**

QID: 251

Marks: 1

Why can liquids not be compressed easily?

Please mark (✓) for the correct answer.

- A. The particles are in a random arrangement
- B. The particles are closely packed
- C. The particles are free to move over each other

**Question: 7 of 27**

QID: 250

Marks: 1

Which theory describes the arrangement and movement of particles in solids, liquids and gases?

Please mark (✓) for the correct answer.

- A. Theory of relativity
- B. Kinetic theory
- C. Atomic theory

**Question: 8 of 27**

QID: 249

Marks: 1

Sound travels through a gas under which of the following condition?

Please mark (✓) for the correct answer.

- A. Isothermal condition
- B. Non-isothermal condition
- C. Adiabatic condition
- D. Transverse condition

**Question: 9 of 27**

QID: 248

Marks: 1

When a pebble is dropped into a pond of still water, what happens?

Please mark (✓) for the correct answer.

- A. Particles move
- B. Waves move
- C. The pebble moves
- D. Water moves

**Question: 10 of 27**

QID: 247

Marks: 1

Which of the following is correct about the properties of Sound waves?

Please mark (✓) for the correct answer.

- A. Sound waves are longitudinal waves
- B. Sound waves are transverse waves
- C. Sound waves are both longitudinal and transverse
- D. None of the above

What colour are your eyes if you have comparatively little pigment in your iris?

Please mark (✓) for the correct answer.

- A. Blue
- B. Grey
- C. Black
- D. Brown
- E. Yellow

In which parts of the body are cells not replaced when they die?

Please mark (✓) for the correct answer.

- A. Kidneys
- B. Muscles
- C. Skin
- D. Brain

What happens to the brain after a night of heavy drinking?

Please mark (✓) for the correct answer.

- A. The brain become dehydrated and shrinks away from the skull
- B. The brain swells, causing a splitting headache
- C. The nerve endings in the base of the brain become inflamed
- D. Brain activity increases and the surfeit of thoughts causes a headache

What is the largest organ of the human body?

Please mark (✓) for the correct answer.

- A. The brain
- B. The liver
- C. The spine
- D. The skin

Sweat is the main cause of body odor.

Please mark (✓) for the correct answer.

- A. True
- B. False

**Question: 16 of 27**

QID: 309

Marks: 1

Trapped heat inside the earth is known as\_\_\_\_\_

Please mark (✓) for the correct answer.

- A. Heat energy
- B. Kinetic energy
- C. Geothermal energy
- D. Thermal energy

**Question: 17 of 27**

QID: 305

Marks: 1

Dead organisms are transformed into petroleum and natural gas in

Please mark (✓) for the correct answer.

- A. presence of air
- B. absence of air
- C. presence of sunlight
- D. none of the above

**Question: 18 of 27**

QID: 306

Marks: 1

Oils release sulfur dioxide gas when they burn.

Please mark (✓) for the correct answer.

- A. True
- B. False

**Question: 19 of 27**

QID: 307

Marks: 1

In hydroelectricity power\_\_\_\_\_

Please mark (✓) for the correct answer.

- A. Kinetic energy is transferred to potential
- B. Potential energy is transferred to kinetic
- C. Solar energy is transferred to wind energy
- D. Wind energy is transferred to solar energy

**Question: 20 of 27**

QID: 302

Marks: 1

Suppose a boy is enjoying a ride on a merry-go-round which is moving with a constant speed of 10 m/s. It implies that the boy is

Please mark (✓) for the correct answer.

- A. at rest
- B. moving with no acceleration
- C. in accelerated motion
- D. moving with uniform velocity

A cheetah is a wild cat. Its most prominent feature is its high running speed and fast acceleration. It can accelerate from rest to its maximum running speed of about  $30 \text{ ms}^{-1}$  in just 3.0s. (For comparison, a fast sports car like a Porsche takes about 4.0 s to attain the same speed).

Though the cheetah can accelerate and run very fast, it cannot run a long distance at its maximum speed because it quickly gets tired. Thus, if it cannot catch its prey within that limit, it has to forgo the hunt.

Consider a cheetah of mass 50kg. It starts from rest and accelerates for 3.0s to reach its maximum speed of  $30\text{ms}^{-1}$ . It then continues to run for 20s at this speed.

a) Calculate the average acceleration of this cheetah required to reach its maximum speed. **(2 MARKS)**

Please write your answer below.

b) Calculate the distance travelled during the first 3.0s, assuming that the acceleration is uniform. **(02 MARKS)**

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Please write your answer below.

c) The cheetah has to do work against friction, mostly due to air. Assume that this frictional force is always 100 N. Calculate the total mechanical work done by the cheetah during the first 23.0s of its motion.

Please write your answer below.



d) During the first 23.0s, the body temperature of the cheetah rises from  $38.5^{\circ}\text{C}$  to  $40.0^{\circ}\text{C}$ . Take the specific heat of the body of the cheetah to be  $4.2 \text{ kJ kg}^{-1} \text{ K}^{-1}$ .

If the rise in body temperature is linear during this time, calculate the total heat generated by the cheetah's metabolism. Neglect any heat loss to the surroundings. **(02 MARKS)**

Please write your answer below.

e) Assume that some of the energy generated by the cheetah's body increases its temperature and the rest corresponds to the mechanical work done. Calculate the fraction of the total generated energy that is converted to kinetic energy. **(2 MARKS)**

Please write your answer below.

f) Write down the balanced chemical reaction for aerobic respiration. **(2 MARKS)**

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Please write your answer below.

g) If the cheetah requires 400 kJ of energy, calculate the volume of oxygen required if all this energy is to be obtained by aerobic respiration. Take the molar volume of oxygen gas to be 24.5 litres. **(4 MARKS)**

Please write your answer below.

--- END OF QUESTION PAPER ---

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## Answer Key

No	Question Type	QID	Correct Answer
Question - 1	Yes/No	468	A
Question - 2	Yes/No	469	B
Question - 3	Yes/No	470	B
Question - 4	Yes/No	471	A
Question - 5	Yes/No	472	B
Question - 6	Multiple Choice (Radiobutton)	251	B
Question - 7	Multiple Choice (Radiobutton)	250	B
Question - 8	Multiple Choice (Radiobutton)	249	C
Question - 9	Multiple Choice (Radiobutton)	248	B
Question - 10	Multiple Choice (Radiobutton)	247	A
Question - 11	Multiple Choice (Radiobutton)	363	A
Question - 12	Multiple Choice (Radiobutton)	362	A
Question - 13	Multiple Choice (Radiobutton)	361	A
Question - 14	Multiple Choice (Radiobutton)	360	D
Question - 15	True/False	359	B
Question - 16	Multiple Choice (Radiobutton)	309	C
Question - 17	Multiple Choice (Radiobutton)	305	B
Question - 18	True/False	306	A
Question - 19	Multiple Choice (Radiobutton)	307	B
Question - 20	Multiple Choice (Radiobutton)	302	C
Question - 21	Essay (Evaluted by Admin)	290	Essay Type Question
Question - 22	Essay (Evaluted by Admin)	291	Essay Type Question
Question - 23	Essay (Evaluted by Admin)	292	Essay Type Question
Question - 24	Essay (Evaluted by Admin)	293	Essay Type Question
Question - 25	Essay (Evaluted by Admin)	294	Essay Type Question
Question - 26	Essay (Evaluted by Admin)	295	Essay Type Question
Question - 27	Essay (Evaluted by Admin)	296	Essay Type Question

--- END OF ANSWER KEY ---