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IGO INTERNATIONAL CYBER OLYMPIAD	NISO NATIONAL INTERACTIVE SCIENCE OLYMPIAD	NIMO NATIONAL INTERACTIVE MATHS OLYMPIAD	NBTO NATIONAL BIOTECHNOLOGY OLYMPIAD	IEO INTERNATIONAL ENGLISH OLYMPIAD	IGO INTERNATIONAL G.K. OLYMPIAD
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**NATIONAL
BIOTECHNOLOGY
OLYMPIAD**

N B T O

10
Class

A1
Paper
Code

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Creating
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IMPORTANT INFORMATION

1. You are allowed additional 10 minutes to fill the required details in the **RESPONSE SHEET**.
2. The question paper is made as per syllabus guidelines & pattern given in the information Booklet. The Question Paper for Classes 1 to 6 contains 25 Questions each to be answered in 40 minutes. The Question paper for classes 7 to 12 contains 50 Questions each to be answered in 60 minutes. All questions are compulsory. Further instructions are given in the instruction letter to the coordinator teacher.
3. Use the response sheet to mark your responses by darkening the required circle. The response sheet has to be returned to the foundation, duly filled in. The student can retain the Question Paper.

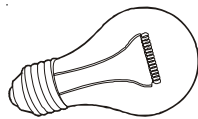
GENERAL KNOWLEDGE

1. How many years does it take glass to decompose?
(1) 100 years or less (2) 100 to 500 years
(3) Over 1 million years (4) None of these
2. What percentage of solar energy is left uncaptured by plants?
(1) 1% (2) 99%
(3) 50% (4) None of these
3. Identify the incorrect statement
(1) a tsunami is a series of waves generated when water in a lake or the sea is rapidly displaced on a massive scale
(2) a tsunami is an after effect of an earthquake on the sea bed.
(3) a tsunami has smaller amplitude (wave height) offshore and a very long wavelength
(4) none of the above.
4. When temperature in summers decreases below 46°C then a camel gets relief by –
(1) Sitting under the shade of desert trees
(2) Increasing its body temperature to 42°C
(3) Storing water in its body
(4) None of these
5. The layer of the atmosphere where weather phenomena are most marked is-
(1) Troposphere (2) Stratosphere
(3) Ionosphere (4) None of these
6. How many times can glass be recycled?
(1) None, glass can't be recycled
(2) Forever
(3) Once
(4) None of these
7. The undesirable change in the physical, chemical or biological characteristics of our environment, land or water is called
(1) Pollution (2) Physical change
(3) Biological disturbance (4) None of these
8. On a warm sunny afternoon, ocean water splashed onto a rock. A short time later, the rock was dry. Which statement **best** explains what happened to the water on the rock?
(1) Heat caused the water to become a gas.
(2) Heat melted the water and it disappeared.
(3) Salt caused the water to become a gas.
(4) None of these
9. After a rainstorm, a big pile of rocks blocked part of a mountain road. Which event **most likely** caused the rocks to move onto the road?
(1) a tsunami (2) a blizzard
(3) a landslide (4) none of these

10. Which tool would **best** help a student closely observe the smallest living thing in a drop of pond water?
- (1) telescope
 - (2) microscope
 - (3) hand lens
 - (4) none of these

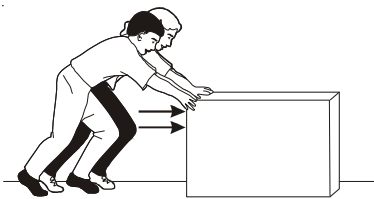
LIFE SCIENCE

11. Which human activity can have the *greatest* positive effect on global climate change by helping to reduce the amount of carbon dioxide in the atmosphere?
- (1) removing trees to build houses
 - (2) recycling plastics to manufacture materials
 - (3) limiting internal combustion engines that power automobiles
 - (4) none of these
12. An incandescent light bulb is shown below.



A typical incandescent light bulb has an energy efficiency of about ten percent. What is the meaning of this statement?

- (1) Ten percent of the bulb's light energy becomes heat energy.
 - (2) Ten percent of the energy used by the bulb becomes light energy.
 - (3) The bulb uses ten percent less electrical energy than other bulbs.
 - (4) The bulb will save ten percent on electrical energy costs per year.
13. Why do eukaryotic cells require mitochondria?
- (1) to break down cell debris for recycling
 - (2) to control division for cell reproduction
 - (3) to release stored energy for cell activities
 - (4) none of these
14. Two people are trying to push a large box across a floor. Each person pushes with an equal amount of force.



The total amount of force they exert on the box is 500 newtons. Despite their efforts, the box will not move. What is the amount of force exerted by the box on *each* person?

- (1) 0 newtons
 - (2) 250 newtons
 - (3) 500 newtons
 - (4) 1,500 newtons
15. Which statement *best* explains how iron can become a magnet?
- (1) Electrons are easily removed.
 - (2) Electrons spin in a unique direction.
 - (3) Atoms are strongly bonded together.
 - (4) None of these

16. What is a primary function that kidneys perform for the excretory system?
- (1) They control sensory input using nerve cells.
 - (2) They conduct chemical digestion using hormones.
 - (3) They remove waste from blood using filtration structures.
 - (4) None of these

17. In 1909, Ernest Rutherford conducted an experiment in which he shot a beam of positively-charged particles at a thin gold foil. Based on the model of the atom at that time, Rutherford hypothesized that these particles would pass straight through the gold foil and hit a target (diagram 1). Rutherford's results are shown in diagram 2.

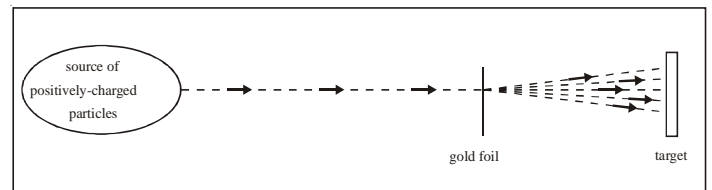


DIAGRAM 1

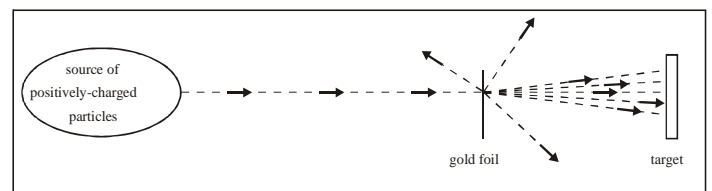


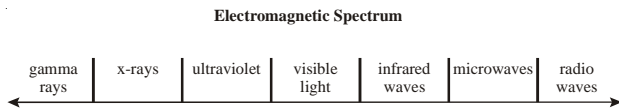
DIAGRAM 2

Which evaluation of Rutherford's hypothesis is *most* reasonable?

- (1) It was supported because some of the particles went through the foil without changing direction.
 - (2) It was supported because some of the particles changed direction as they went through the foil.
 - (3) It was not supported because some of the particles went straight through the foil without changing direction.
 - (4) It was not supported because some of the particles changed direction as they went through the foil.
18. Which statement describes the relationship between a structure and function of the lungs?
- (1) The surface area of the lungs allows for the exchange of oxygen with the blood.
 - (2) The surface area of the lungs allows for the warming of cold air before entering the blood.
 - (3) The softness of the lungs allows for the movement of nutrients from the lungs to the blood.
 - (4) None of these
19. A lake is surrounded by hills covered with trees and shrubs. Which statement correctly describes how a change to the plants in this area will affect this environment?
- (1) Adding plants to the hillsides will increase sedimentation in the lake.
 - (2) Adding plants to the edge of the lake will increase erosion by the lake.

- (3) Removing plants from the hillsides will increase erosion on the hills.
 (4) None of these

20. A diagram of the electromagnetic spectrum is shown below.



Sunscreen is a lotion used to protect skin from exposure to the Sun. This sunscreen protects a person's skin from wavelengths that are

- (1) longer than radio waves but shorter than x-rays.
 (2) longer than x-rays but shorter than infrared waves.
 (3) longer than microwaves but shorter than infrared waves.
 (4) longer than visible light waves but shorter than radio waves.
21. Which team would be *most* appropriate for determining whether life exists on Mars?
 (1) two meteorologists and two astronomers
 (2) two physicists and two mathematicians
 (3) a pilot, a navigator, a technician, and an engineer
 (4) a biologist, a chemist, an engineer, and a geologist
22. Alpha particle radiation will *most likely* result when
 (1) two atoms are near one another.
 (2) the nucleus becomes unstable.
 (3) atoms become charged.
 (4) electrons gain energy.
23. According to the periodic table, which statement correctly describes the change from a neutral atom of an element to its ion?
 (1) A fluorine atom forms a F^{-1} ion by losing one electron.
 (2) A sodium atom forms a Na^{+1} ion by losing two electrons.
 (3) A magnesium atom forms a Mg^{+2} ion by gaining two electrons.
 (4) A phosphorus atom forms a P^{-3} ion by gaining three electrons.
24. The circulation of blood from right ventricle to left auricle via pulmonary artery and pulmonary vein is called
 (1) Systemic circulation (2) Double Circulation
 (3) Pulmonary circulation (4) None of these
25. Which statement *best* describes the Big Bang Theory?
 (1) Galaxies within the universe collided about 13.5 billion years ago forming the present objects in the universe.
 (2) Existing objects in the universe move randomly with the potential of colliding in about 13.5 billion years.
 (3) Galaxies throughout the universe moved toward each other after an event that occurred about 13.5 billion years ago.
 (4) Most objects in the universe are moving away from each other as a result of an event that occurred about 13.5 billion years ago.
26. In the late twentieth century as people became more concerned about protecting their environment, scientists researched better ways to

- (1) recycle nonrenewable resources.
 (2) increase pesticide runoff into rivers.
 (3) eliminate the use of renewable resources.
 (4) add chlorofluorocarbons to the atmosphere.

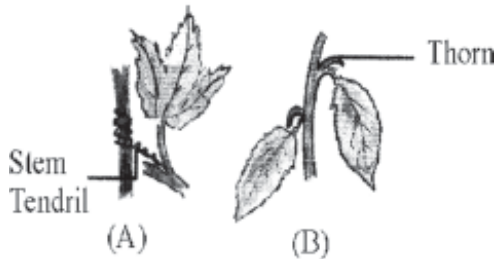
27. Which structure completes the circulatory pathway?

heart → artery → ? → vein → heart

- (1) aorta (2) atrium
 (3) ventricle (4) capillary
28. Which of the following is correct about the direction of flow of nerve impulse along a neuron?
 (1) Axon → Cell body → Dendrite
 (2) Cell body → Dendrite → Axon
 (3) Dendrite → Cell body → Axon
 (4) None of these
29. Glacial moraines are primarily the result of which of these processes?
 (1) transportation and deposition of rocks
 (2) chemical weathering and erosion of rocks
 (3) transportation and metamorphism of rocks
 (4) metamorphism and physical weathering of rocks
30. When an atom of sodium and an atom of fluorine combine to form the salt, sodium fluoride, an ionic bond, is formed. Which statement correctly describes the behavior of the valence electron in the ionic bond?
 (1) An electron from the fluorine atom moves to the sodium atom forming two ions.
 (2) An electron from the sodium atom moves to the fluorine atom forming two ions.
 (3) An electron from the fluorine atom is shared with the sodium atom forming a sodium ion.
 (4) An electron from the sodium atom is shared with the fluorine atom forming a fluoride ion.
31. Which experiment was used by Mendel?
 (1) Chick pea (2) Wild pea
 (3) Garden pea (4) None of these
32. Which sequence shows the correct pathway through which waste travels in the excretory system?
 (1) renal vein → kidney → ureter → urethra → bladder
 (2) renal artery → kidney → ureter → bladder → urethra
 (3) kidney → ureter → renal artery → bladder → urethra
 (4) urethra → kidney → ureter → renal artery → bladder
33. What are the basic structural units of living organisms?
 (1) cells (2) nuclei
 (3) organs (4) tissues
34. Which statement explains the function of the diaphragm and its effect on the chest cavity during inhalation?
 (1) The diaphragm relaxes to decrease volume and decrease pressure.
 (2) The diaphragm contracts to increase volume and decrease pressure.
 (3) The diaphragm relaxes to increase volume and increase pressure.
 (4) The diaphragm contracts to decrease volume and increase pressure.

35. According to the periodic table, the neutral atom of what element has 4 protons, 5 neutrons, and 4 electrons?
- (1) beryllium (2) boron
(3) fluorine (4) aluminum

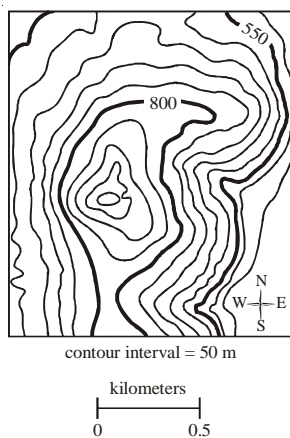
36. In the figures are two structures shown –



- A. Stem tendril in *Passiflora* and
B. Thorn of *Bougainvillea*

These two are :

- (1) Heterologous organs (2) Homologous organs
(3) Vestigial organs (4) Analogous organs
37. Which landform would *most likely* be created when two oceanic plates converge?
- (1) a volcanic island arc
(2) a large watershed area
(3) a smooth continental shelf
(4) a chain of continental mountains
38. Select analogous organs from the given options?
- (1) Scale of fishes and shell of mollusca
(2) Forelimbs of frog and bird
(3) Wings of birds and insects
(4) None of these
39. Who proposed the theory of natural selection.
- (1) Lamarck (2) Charles Darwin
(3) Mendel (4) None of these
40. Part of a topographical map is shown below.



Which feature is **most likely** shown on the map?

- (1) lake (2) river
(3) island (4) mountain

EtG INTERACTIVE SECTION

41. The terms gas exchange, diaphragm, and inhale are **most** closely associated with which system in the human body?
- (1) circulatory (2) digestive
(3) excretory (4) respiratory
42. Geotropism is a paratonic movement which is caused by unilateral application of force of gravity. The given picture states that



- (1) Stem shows negative geotropism
(2) Roots are positively geotropic
(3) Both (1) and (2)
(4) None of these
43. The process shown in the given figure is

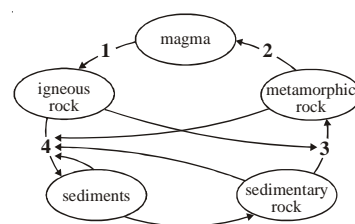


- (1) Cleavage (2) Fertilization
(3) Assimilation (4) Budding.
44. A teacher lights a candle that is placed inside a beaker.



What will **most likely** happen to the flame if carbon dioxide is added to the beaker?

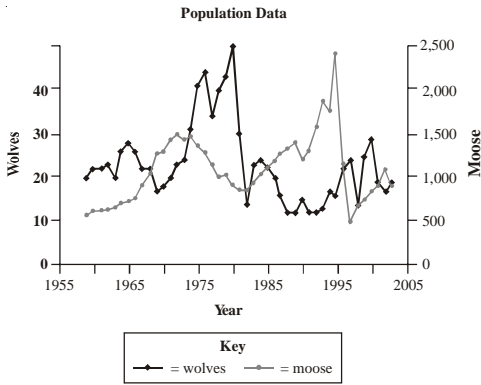
- (1) It will go out.
(2) It will stay the same.
(3) It will burn explosively.
(4) It will burn more brightly.
45. A rock cycle diagram is shown below.



What happens to rocks at location 3 in the diagram?

- (1) heating and pressing
- (2) melting and cooling
- (3) weathering and eroding
- (4) compacting and cementing

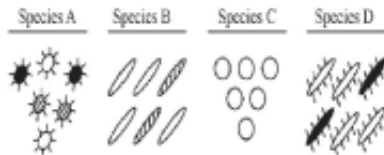
46. Examine the population curves for wolves and moose in the graph below.



Which statement correctly describes the population relationship between the wolves and moose from 1968 to 1973?

- (1) As the moose population increased the wolf population increased.
- (2) As the moose population increased the wolf population decreased.
- (3) As the wolf population decreased the moose population decreased.
- (4) As the wolf population increased the moose population decreased.

47. The diagram below represents four different species of bacteria

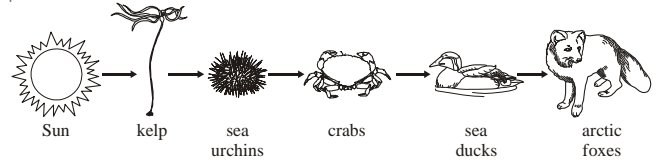


Which statement is correct concerning the chances of survival for these species if there is a change in the environment?

- (1) Species A has the best chance of survival because it has the most genetic diversity.

- (2) Species C has the best chance of survival because it has no gene mutations.
- (3) Neither species B nor species D will survive because they compete for the same resources.
- (4) None of the species will survive because bacteria reproduce asexually.

48. The picture below shows an ocean bay food chain.



Sea otters move into the ocean bay. They eat all the sea urchins. This change will cause the

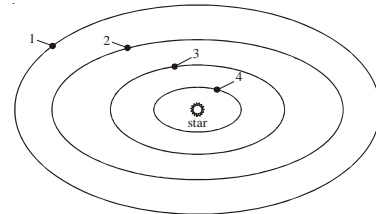
- (1) kelp to have less food.
- (2) crabs to have more food.
- (3) sea ducks to have less food.
- (4) arctic foxes to have more food.

49. In Alaska, there are fewer hours of daylight in the winter than in the summer.

Which statement **best** explains why this difference occurs?

- (1) The Sun burns hotter in the summer.
- (2) The Sun moves below the horizon in the summer.
- (3) The Northern Hemisphere is closer to the Sun in the winter.
- (4) The Northern Hemisphere is tilted away from the Sun in the winter.

50. There are four planets and a star in the solar system below.



The planets move around the center star in different orbits. Which planet has an orbit that is in the same relative position from its star as Earth's orbit is from the Sun?

- (1) planet 1
- (2) planet 2
- (3) planet 3
- (4) planet 4



END OF THE EXAM

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