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SCIENCE

Maximum Marks: 100

SAMPLE PAPER

IOA SCIENCE OLYMPIAD - 2019 - 20

Test Booklet Series

Set - 0

	C	DO NC	DT OP	EN TH	IS BO	OKLET	L ASK	ED TC) DO S	50		
Roll No.:												
Student's Name:												

Maximum Time: 75 Minutes

- 1. Please **DO NOT OPEN** the contest booklet until the proctor has given permission to start.
- 2. There are 40 questions in this paper. 2 points, 3 points will be awarded for each correct question in Foundation, and Exploration respectively. 1 point will be deducted for each incorrect answer, and no penalty for skipping a question.
- 3. All questions are compulsory. There is only ONE correct answer to each question.
- 4. No electronic devices capable of storing and displaying visual information are allowed during the exam.
- 5. Use of **calculator** is strictly prohibited in the exam.
- 6. Fill your Name, Roll No., Grade and School Name in the answer sheet.
- 7. To mark your choice of answers by darkening the circles in the Answer Sheet, use an HB Pencil or a **Blue/Black Ball Point Pen** only.
- 8. Shade your answer clearly as per the example is shown below:



Email: exam@internationalolympiadacademy.com, Website: www.internationalolympiadacademy.com, www.mathkangaroo.in, Phone: +91-8368118421

		Found	ation: (2 POINTS)	
1	Which of the following	statements is correct?		
1.	 (A) Electrons are gained (B) Electrons are gained (C) Electrons are gained (D) Electrons are gained 	by oxidizing agent as it by oxidizing agent as it by the reducing agent by the reducing agent	t undergoes reduction t undergoes oxidation as it undergoes oxidation as it undergoes reduction	1
2.	How much energy will 2 (A) 10 ⁵ KJ	kg of a fuel yield on co (B) 10 ⁷ KJ	omplete combustion, if its (C) 10 ⁹ KJ	calorific value is 50 kJ/g (D) 10 ⁴ KJ
3.	Which of the following is (A) CaCO ₃ + 2HCI \rightarrow CaC (C) N ₂ + 3H \rightarrow 2NH ₃	s a reversible reaction? $I_2 + H_2O + CO_2$	(B) 2 Mg + O ₂ \rightarrow 2 MgO (D) Fe + CuSO ₄ + CU	
4.	The magnetic field line (A) Straight	es due to a straight w (B) circular	ire carrying a current ar (C) parabolic	e (D) elliptical
5.	What is the word for the (A) Diurnal	e kind of animal that is (B) Crepuscular	active at dawn and dusk? (C) Nocturnal	(D) Matutinal
6.	Crude common salt is hy (A) CaSO4 and MgSO4 (E	ygroscopic because of i 3) CaCl2 and MgCl2	mpurities of (C) CaBr2 and MgBr2	(D) None of these
7.	The charge on an electromany electrons will be flags (A) 1.6×10^{19} (B	on is known to be 1.6 × lowing through the circ 8) 1 .6 × 10 ⁻¹⁹	2 10 ^{- 19} coulomb. In a circu cuit in a second? (C) 0.625 × 10 ¹⁹	it the current flowing is 1 (D) 0.625×10^{12}
8.	The energy of a neutron convert it into a thermal (A) 10^2 (F	released during a fissio I neutron. 8) 10⁵	on process should be red	uced by about
9.	Which of the following is (A) Ca $(OH)_2$ (B	s the strongest base? 3) Sr (OH)2	(C) Ba (OH)₂	(D) Mg (OH) ₂
10.	Magnetic field strengtl value at the same dista	h due to a short bar m ince on the equatorial	nagnet on its axial line a line?	t a distance x is B. Wha
	(A) B/2 (B	3) B	(C) 2 B	(D) 4B

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11. For the following circuit, the potential difference between X and Y in volt is



(A) 1 (C) 2

12. Which of the following graphs show that the boiling point changes the homologous series alkenes?



13. The velocity-time graph of a linear motion is shown below:



The displacement from the origin after						
8 seconds is						
(A) 18 m	(B) 16 m	(C) 6 m	(D) 6 cm			

- **14.** A zig- zag line separates the metals from non-metals almost in the middle of the modern periodic table. These elements placed borderline have properties like
 - I. The electro negativities are between those of the metals and nonmetals

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	II. Reactivity depends III. They often make (IV. Their ionization e	s on properties of othe good semiconductors nergies are between th	er elements in reaction hose of the metals and n	onmetals
	(A) I and II	(B) II and III	(C) I, II, III and IV	(D) II and IV
15.	In group VIII of Mend having atomic mass 5 I. Cobalt has the prop II. In order to group e III. Elements in this g	leleev's periodic table, 58.71? perties similar to rhodi elements with similar p roup was placed accor	why does cobalt with at um properties together, coba ding to their electroposit	omic mass 58.93 appears before nickel Ilt was placed before nickel tive character
	(A) I, II and III	(B) I and II	(C) Only II	(D) Only III
16.	Coagulopathies are the deficiency causes coa I. Albumin II. Fibrinogen III. Prothrombin IV. Thrombokinase (A) I and III	he conditions characte agulopathies. (B) I, II, III, and IV	erized by the inability of b (C) II, III and IV	blood to clot. Identify the protein whos (D) III and IV

- 17. What types of pollination is the flower shown in the given figure is likely to be adapted for?
 - (A) Insect- pollination and self-pollination
 - (B) Insect-pollination and cross-pollination
 - (C) Wind-pollination and self-pollination
 - (D) Wind-pollination and cross-pollination
- **18.** If a plant is showing the phenomenon of apical dominance, then the processes that can enhance growth of lateral buds is
 - (A) The removal of pith of the stem
 - (C) The removal of all leaves from plant
- (B) Application of auxins at the root end

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- (D) Girdling of the stem
- 19. What is the function of sympathetic stimulation?
 - (A) It Inhibits heart beat
 - (B) It accelerates heart beat
 - (C) It performs both the above functions under different conditions
 - (D) It does neither of the above function

20.	The pituitary gland is	often described as	"The Leader of Endocrine	Orchestra" because it			
	 Controls activities of all other endocrine organs in vertebrates 						
	II. Controls activities of thyroid gland, gonads and adrenal cortex						
	III. Controls growth in vertebrates						
	IV. IS responsible for	gigantism					
	(A) Only I	(B) II and III	(C) I and IV	(D) Only II			

Grade – 10



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Exploration (3 POINT)

21. Which of the following is correct about the sensory receptors and their location in the body?

	I. Gustatoreceptors: I II. Thermoreceptors: III. Olfactoreceptors: IV. Phonoreceptor: Lo V. Statoreceptors: Lo	ocated in taste buds on Located in skin Located in olfactory epit ocated in inner ear cated in inner ear	tongue and other parts	s of buccal cavity			
	VI. Tangoreceptors: T	actile or touch receptors	s present in skin				
	VII. Pain and Pressure	e receptors: Located in sl	kin and deeper tissues				
	(A) I, II, III, IV and VI		(B) II, III, IV and VI				
	(C) I, II, III, IV, V, VI an	d VII	(D) III, IV, V and VII				
22.	Study of evolution of	human being indicates t	hat				
	(A) There is no chang	e because of environmer	ntal changes				
	(B) The difference in	colour, size and looks is t	he result of environme	ental changes			
	(C) Environmental ch	anges sometime cause cl	hanges				
	(D) New species elimi	nate the existing species	5				
23.	Which of the followin I. Inherited traits are are traits which are o II. Inherited traits are due to changes in ger III. Example of inherit	g incorrectly shows the o those which occur due to btained by the organism passed down from one ne, but are more the phy red trait is hair colour. Ex	difference between inh o a property of the gen in its course of life generation to the next sical changes which car ample of acquired trait	erited traits and acquired traits? es. Acquired traits on the other hand, or are inherited. Acquired traits are not nnot be inherited			
	(A) I and III	(B) II and III	(C) Only I	(D) None of the above			
24	The market of a latitude		under of				
24.	(A) Analogous organ	ng memorane is an exam	(B) Homologous orga	n			
	(C) Vestigial organ		(D) Essential organ				
			(2) 200011101 018011				
25.	A diminished image of an object is to be obtained on a screen 1.0 m from it. It can be achieved by appropriately placing						
	(A) A concave mirror	of suitable focal length	(B) A convex lens of f	ocal length less than 0.25 m			
	(C) A concave lens of	suitable focal length	(D) A convex mirror o	of suitable focal length			
26.	The image of a small	bulb at the wall of a roor	n is to be obtained on ssible focal length of th	the opposite wall 3 m away by means of			
	(A) 0.75 m	(B) 1 m	(C) 2 m	(D) 1.5 m			
27	Read the following st:	atements and mark the c	correct option				
_,,	Statement 2. The hur	al human eye can clearly	see all the objects bey	ond a certain minimum distance			
27.	Statement 1. A norma Statement 2. The hur	atements and mark the c al human eye can clearly nan eye has the capacity	see all the objects bey to suitably adjust the f	ond a certain minimum distance focal length of its lens to a certain extent			

- (A) Only 1 is correct(B) Only 2 is correct(C) Both 1 and 2 are correct(D) Both 1 and are incorrect
 - Grade 10

Grade – 10

ng of radius r carrying u	iniformly distributed charge
The ratio of its magnet	ic moment and angular mo
(B) q/2m	(C) m/q

- **33.** Which of the following is the best way to demagnetize a magnet using the heating method? (A) Heat the magnet in boiling water and allow it to cool in the north-south direction
 - (B) Heat the magnet to become red hot and allow it to cool in the east-west direction
 - (C) Heat the magnet to become red hot and allow it to cool in the north-south directions
 - (D) Heat the magnet in boiling water and allow it to cool in the east-west direction

34. Three identical bulbs are connected in parallel with a battery. The current drawn from the battery is 6A. If one of the bulbs gets fused, what be the total current drawn from the battery? (A) 4 A (B) 2 A (C) 6 A (D) 8

35.	Involuntary actions includ	ing blood pressure, salivati	on and vomiting are contro	lled by the	in
	the hind-brain.				
	(A) Medals	(B) Cerebellum	(C) Medulla	(D) Cerebrum	

29. In the circuit L1, L2. L3, and L4 are four light bulbs. L1 and L2 are labeled "220 V, 25 W". L3 and L4 are labeled "220 V and 60 W". What will be the sequence of the brightness of the four bulbs starting from the brightest

- (A) 2, 3, 4, 1
 - (B) 4, 2, 1, 3
 - (C) 3, 4, 1, 2
 - (D) 1, 4, 3, 2
- 30. A '0 to 300 V' voltmeter has a guaranteed accuracy of 1% of full-scale reading. The voltage measured by the instrument is 83 V. The percentage limiting error is (

	e percentage miniti		
A) 95%	(B) 4.85%	(C) 3.62%	(D) 1.81%

- **31.** It is desired to photograph the image of an object placed at a distance of 3 m from a plane mirror. The camera, which is at a distance of 4.5 m from the mirror. Should be focused for a distance of (B) 4.5 m (C) 6 m (D) 7.5 m (A) 3 m
- 32. A thin uniform rir e q and m rotates about its axis with angular velocity. mentum is (A) q/m(D) m/2q

(B) 72%

the new wire. What is the percentage change in its resistance? (A) 80% (C) 70% (D) 75%

28. A wire has a resistance 16 Ω . If is melted and drawn into a wire of half its length. Calculate the resistance of

to the dimmest, when voltage U is applied?



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- Litter fall х Decomposition Soil Solution Up take Ran off Weathering Υ (A) X – Detritus Y – rock minerals (B) X- Rock minerals Y - humus (C) X – Sand Y – Rock particles (D) None of the above
- **40.** The given diagram shows the phosphorous cycling in a terrestrial ecosystem. Identify correct option for X and Y.

Flow of carbon - one -way

Producers

39. (C) Flow of energy – one-way Flow of carbon - cyclical

Consumers

(A) Only I	(B) Only II	(C) I, II and III	(D)
What is the patie	re of the flow of operations	I flow of carbon through an o	constam2
what is the natur	e of the now of energy and	i now of carbon through an e	cosystem
(A) Flow of energy	y – cyclical	Flow of carbon – on	e - way
(B) Flow of energy	v – cyclical	Flow of carbon - cvc	lical

A) Only I	(B) Only II	(C) I, II and III	(D)
Vhat is the nature	e of the flow of energy and	flow of carbon through an e	cosystem
A) Flow of energy	– cyclical	Flow of carbon – one	e - way

Nhat is the nature of the flow of energ	y and flow of carbon through an ecosystem
A) Flow of energy – cyclical	Flow of carbon – one - way
B) Flow of energy – cyclical	Flow of carbon - cyclical

That disease			
. Here X represe	ents byssinosis, or "brown li	ung disease"	
) Only I	(B) Only II	(C) I, II and III	(D) I and II
(h			
hat is the natu	re of the flow of energy and	flow of carbon through an e	cosystem?

36. Which of the following forms energy leads to least environmental pollutions in the process of its harnessing and utilization? (C) Solar energy (D) Geothermal energy (B) Nuclear energy

37. Which of the following represents way to strike a balance between environment and development?

(C) Only III

38. Marks is a worker of cotton textile industry. He is susceptible to X disease. Which of the following is correct

II. It is endotoxins that come from the cell walls of gram-negative bacteria that grow on the cotton causing

I. Recycling of the non-biodegradable wastes like plastic, glass etc. II. Replenishment of the forest resources along with industrialization **III.** Increasing the number of decomposers in the environment

(B) Only II

I. It is not the cotton dust that directly causes that disease

- - (A) Thermal energy

(A) Only I

III

about X diseases?

(D) Flow of energy - one - way

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(D) Both I and II