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**SCIENCE** 

Maximum Marks: 100

# SAMPLE PAPER

# IOA SCIENCE OLYMPIAD - 2019 - 20

**Test Booklet Series** 

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Roll No.:													
Student's Name:													

# **Maximum Time: 75 Minutes**

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- 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:



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#### INTERNATIONAL OLYMPIAD ACADEMY

#### Foundation: (2 POINTS)

- 1. The precaution for preventing seeds from insects can be made by
  - (A) Sowing the properly
  - (B) Rejecting the unhealthy plants
  - (C) Timely inspection of the store houses
  - (D) Spraying of chemicals before hand
- 2. The different measures which help to increase crop yield are
  - (A) Improving soil fertility by scientific methods and protection of plant from pests and weeds
  - (B) Following suitable agricultural practices and control of plant diseases
  - (C) Use good quality seeds and awareness of new agricultural technology
  - (D) All of the above
- **3.** Growth and multiplication of micro- organisms is better in
  - (A) Wet soil because it allows multiplication due to the presence of air
  - (B) Dry soil because it allows multiplication due to the absence of air and water
  - (C) Tiger soil because it allows multiplication due to the presence of air and water
  - (D) Loose soil because it allows multiplication due to the presence of air and water
- **4.** Indian farmers are unhappy over the introduction of "Terminator seed Technology" because the seeds produced by this technology are expected to
  - (A) Give rise to sexually sterile plant
  - (B) From low-yielding plants despite the high quality
  - (C) Show poor germination
  - (D) Give rise to the plants incapable of forming viable seeds
- 5. What are the causes of food poisoning?
  - (A) Food poisoning could be due to the consumption of food spoilt by some microorganisms
  - (B) Microorganisms that grow on our food sometimes produce toxic substances which causes food poisoning
  - (C) Toxic substances make the food poisonous causing serious illness and even death
  - (D) Both a and c
- 6. Which of the following is not a food preservative?
  - (A) Sodium benzoate and sodium metabisulphite
  - (B) Dried leaf of neem
  - (C) Salt and sugar
  - (D) Sorbic acid and sodium sorbate
- 7. Virus is a connective link between living and non living because
  I. The reason for being nonliving is they neither grow nor reproduce once outside the host cell
  II. They can be considered living as they multiply very fast and grow when entered the host cell
  (A) Only I
  (B) Only II
  (C) Both I and II
  (D) None of the above

INTERNATIONAL OLYMPIAD ACADEMY
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- 8. Plastic containers are preferred over iron containers for storing food because, plastic is
  I. Non-reactive II. Durable III. Cheap and light in weight
  IV. Corrosion resistant
  (A) I and II
  (B) II and III
  (C) III and IV
  (D) All of the above
- 9. The disadvantages of using synthetic fibers are

  They are cheap and affordable
  They are wrinkle free thus, do not need ironing
  They do not need maintenance like natural fibers
  They melt easily and are prone to heat damage
  They dry quickly and do not shrink
  They are more elastic as compared to natural fibers
  (A) Only II
  (B) Only IV
  (C) Only V

  (D) Both IV and VI
- **10.** What are the factors that differentiate the different types of fibers?I. StrengthII. Water absorbing capacityIII. Nature of burningIV. CostV. Durability(A) I, II, III AND IV(B) II, III and IV(C) I, II, III, IV and V(D) III and V
- 11. Observe the diagram show below and choose correct option for this.



I. Figure P shows structure of a monomer while figure Q Shows structure of a polymerII. Small boxes in the above structures represent monomers which are joined to give a polymerIII. Figure P shows structure of a linear polymer while Q shows structure of a cross linked polymer(A) I and II(B) I and III(C) II and III(D) All of the above

# 12. Choose the correct statement from the following

Grade – 8

- (A) It is difficult to transport natural gas through pipes
- (B) The disadvantage of natural gas is that it cannot be used directly for burning in homes
- (C) Natural gas is stored under high pressure as compressed natural gas
- (D) Natural gas cannot be used for power generation
- 14. The components of petroleum differ in their(A) Boiling points(B) Melting points(C) Freezing points(D) Cooling points

#### INTERNATIONAL OLYMPIAD ACADEMY

# 15. Low temperature carbonization

- (A) Is mainly for producing the smokeless domestic coke
- (B) Produces higher Quantity of gas than high temperature carbonization
- (C) Is meant for the production of 'metallurgical coke
- (D) None of these
- 16. Which of the following is false statement?
  - (A) Ideal fuel is cheap and easily available
  - (B) Complete combustion of a fuel gives carbon monoxide gas
  - (C) Inflammable substances have very low ignition temperature
  - (D) Combustion produces heat and light
- **17.** Fuel gases containing hydrocarbons (i.e. coke over gas) are not preheated before burning, mainly because (A) It reduces its calorific value tremendously
  - (B) The hydrocarbons crack thereby choking and fouling the heat transfer surface by carbon soot
  - (C) It reduces its flame temperature tremendously
  - (D) There are chances of explosion during preheating
- 18. Which of the following pairs will give displacement reactions?
  - (A) Magnesium chloride solution and aluminum metal
  - (B) Silver nitrate solution and copper metal
  - (C) Ferrous sulphate solution and silver metal
  - (D) Sodium chloride solution
- **19.** Zoei put a strip of burning metal in jar filled with carbon dioxide gas as shown in the diagram to check the reactivity of metal. What will be the result of Zoei's experiment if the metal is more reactive than carbon?
  - I. It will remain lit with a bright flame producing black fragments (carbon)
  - **II.** It will remain lit with a bright flame producing white powder
  - III. No reaction will occur
  - (A) Only I (B) Only II
  - (C) Both I and II (D) None of the above



- **20.** Which of the following statements explains why 99.99% copper is used in manufacturing high quality electrical wires for audio equipment?
  - (A) Copper is a good conductor of electricity
  - (B) Copper which is of a high purity can conduct electric current better
  - (C) 99.99% copper is almost free of impurities
  - (D) 99.99% copper is less ductile and cannot be stretched easily



**21.** Three experiments to investigate the reactivities of three metals are shown.



What is the correct order of reactivity (most reactive  $\rightarrow$  least reactive) for these three metals?

- (A) Chromium, Manganese, Nickel
- (C) Manganese, Nickel, Chromium

(B) Manganese, Chromium, Nickel (D) Nickel, Chromium, Manganese

**22.** Which of the following correctly shows the difference between menarche and menopause? I. Menarche is the start of menstrual flow in the life of a female but menopause is the stoppage of menstrual flow in the female

II. Menarche occurs at puberty but menopause occurs at 45-50 years of age

II. Menarche marks the end of reproductive life of a women but menopause marks the beginning of reproductive life of a women

(A) I and II (B) II and III (C) Both a and B (D) Only III

23. Two persons (A and B) stand 170 m away from a wall as shown below. The separation between A and B is 340m. Person A fires a gun at a certain moment. Both persons heard the firing twice. wall



Given the speed of sound in air to be 340 m s<sup>-1</sup>, what is the time interval between the two firing sounds received by B?

(A) 0.12 s (B) 0.41 s (C) 0.50 s (D) 1.00 s

- 24. The pituitary gland is often described as "The Leader of Endocrine Orchestra" because it
  - (A) Controls activities of all other endocrine organs in vertebrates
  - (B) Controls activities of thyroid gland, gonads and adrenal cortex
  - (C) Controls growth in vertebrates
  - (D) Is responsible for gigantic
- 25. A person standing midway between the two walls of a room 15 m high looks into a plane mirror fixed on the wall. The minimum length of the plane mirror required for him to see the full-length image of the wall behind him is equal is

(A) 15 m (B) 10 m

Grade – 8

(C) 5 m



5

- 26. Which of the following is correct for the X gland shown in the given figure?I. It produces adrenalineII. It Produces hormone that helps in regulating blood sugar
  - **III.** It produces hormone that helps in regulating blood suga
  - (A) Lond U
  - (A) I and II (B) II and III
  - (C) Both a and b (D) None of the above



- **27.** Which of the following statements correctly show the role of luteinizing hormone (LH) and follicle stimulating hormone (FSH) in male and female?
  - I. In males, LH stimulates the synthesis and secretion of hormones called androgens from testis
  - II. FSH and androgens regulate spermatogenesis
  - **III.** In females, LH induces ovulation of fully mature follicles (Graafian follicles) and maintains the corpus luteum formed from the remains of the Graafian follicles after ovulation
  - **IV.** FSH stimulates growth and development of the ovarian follicles in females
  - (A) I and II (B) II and III (C) I, II and III (D) I, II, III and IV
- 28. Which of the following statement is correct?
  - (A) When you are not moving there is no force exerting on you
  - (B) When there is no force exerting on you, you cannot move
  - (C) When you are not moving there is no net force exerting on you
  - (D) There must always be force acting on you when you move
- **29.** An object is moving in a straight line on a smooth surface at 6m/s when a constant force acts on from the opposite direction. If the force is held constant for a long time, how long will the object move?
  - (A) It will decelerate, stop and then move in the opposite direction with a constant acceleration
  - (B) It will stop moving immediately when the force is applied
  - (C) It will decelerate and then stop
  - (D) It will decelerate, stop and then move in the opposite direction with a constant speed
- **30.** Forces P and Q act at a point O as shown in the diagram. The angle between their lines of action is fixed at angle $\theta$ , greater than 90° but lesser than 180° if the magnitudes of P and Q can be varied, the line of action of their resultant can be made to lie \_\_\_\_\_\_.



- **31.** Which of the following are applications of ultrasound?
  - i. To scan the womb of pregnant lady
  - **ii.** To break up kidney stones and gall stones.
  - iii. To detect flaws in metals.
  - (A) i and ii only (B) ii and iii only

(C) i and iii only

(D) i, ii and iii only

- **32.** What happens when a wave travels through a medium?
  - (A) Particles are transferred from one place another
  - (B) Energy is transferred in a periodic manner
  - (C) Energy is transferred at a constant speed
  - (D) None of the above statements is applicable
- 33. Lightning occurs five kilometers away from a village. If the speed of sound is 330 m/s, approximately, how long will it take a person in this village to hear the thunder? (Approximately)
  (A) 1,650 seconds
  (B) 15 seconds
  (C) Immediately
  (D) 5 seconds
- 34. What is resistance of a conductor?

(A) When there are more atoms and molecules in conductor than free electrons, so at to restrict movement of electrons on getting current

- (B) When conductor has equal number of free electrons and atoms and molecules
- (C) Wen there are more free electrons than molecules and there is no restriction in movement of electrons
- on getting current
- (D) None of these
- **35.** The resistivity of a copper wire
  - (A) Decrease with increase in its cross section
  - (B) Increase with increase in its length
  - (C) Increase with increase with its temperature
  - (D) Increase with increase in its cross- section
- **36.** When a temperature rises, the drift velocity of the free electrons decreases. Hence for given applied voltage (A) The electric current decreases, which increases the electrical resistance
  - (B) The electric current increases, which increases the electrical resistance
  - (C) Only electric resistance decreases and current remain same

(B) Only 2

- (D) None of the above
- 37. As you move object away from a convex mirror, its image becomes \_\_\_\_\_\_ and moves towards \_\_\_\_\_\_
  (A) Smaller, infinity (B) Smaller, focus (C) Enlarged, infinity (D) Enlarged, focus
- **38.** Which of the following effects is/are correct when using a thin converging lens instead of a thick converging lens
  - 1. The image formed will be brighter
  - 2. The focal length will be longer
  - **3.** The image formed will always

(C)	Only 3
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(D) All 1, 2 and 3

Grade – 8

(A) Only 1

**39.** Which of the following are true?

**1.** An incident ray parallel to the principal axis after after emerging from the Converging lens will always pass through the focal point F of the lens.

**2.** An incident ray that passes through the focal point of a converging lens will travel in parallel to the principal axis after emerging from converging lens.

**3.** A ray that passes through the optical centre of a thin converging lens will not be refracted by the lens and continues travel along its original path.

(A) 1 and 2 only (B) 2 and 3 only (C) 1 and 3 only (D) 1, 2 and 3

## **40.** Which of the following is not the effect of refraction?

(A) Chopsticks appear to be bent in clear soup

(B) A fish appears to be larger in water

(C) Light travelling through optical fibre

(D) A man appears to be smaller from the point of view of a fish.