



Stage III



Grades 7-10

CREST Teacher Science Olympiad (CTSO)

Sample Paper

Pattern and Marking Scheme

Stage	Topic/Section	No. of Questions	Marks per Question	Total Marks
For stage III (Grades 7-8)	Practical Science	30	3	90
	Achiever's Section	20	6	120
Grand Total		50		210

The total duration of the exam is 60 minutes.

Note: For every incorrect answer, there's a penalty of 1/3rd of the total marks allotted to that question.

Syllabus

Nutrition in Various Organisms, Synthetic Fibres and Plastics, Thermal Energy, Acids, Bases and Salts, Chemical Reaction and Changes, Adaptations of Animals to Climate, Winds, Storms and Cyclone, Distribution of Natural Resources, Respiration in Organisms, Transportation in Plants and Animals, Reproduction in Plants and Animals, Motion, Electric Current and Its Effect, Light, Micro-organisms, Metals and Non-metals, Natural Resources, Combustion, Flame and Fuel, Cell, Force and Pressure, Sound Waves, Chemical Effects of Electric Current, Some Natural Phenomena, Earth, Stars and Solar System, Pollution of Air and Water

For more details visit: <https://www.crestolympiads.com/teacher-science-olympiad>

Practical Science(Each Question is 3 Marks)

- Find the wavelength in the air at 20°C of an 18 Hz sound wave, which is one of the lowest frequencies that is detectable by the human ear. Take speed of sound = 343 m/s
 - 19 m
 - 20 m
 - 23 m
 - 29 m
- Consider the following statements and choose the correct option:
Statement 1: The motion of a freely falling body is an example of a uniformly accelerated rectilinear motion.
Statement 2: Acceleration may happen due to either change in speed or a change in direction or a change in both speed and direction simultaneously.
 - Statement 1 is correct but statement 2 is incorrect.
 - Statement 1 is incorrect but statement 2 is correct.
 - Both the statements are correct.
 - Both the statements are incorrect.
- During a Go Karting, a car does 8 laps of a 300 m course. It takes 4 minutes to complete the race.
What was the average speed of the Go Kart?
 - 75 m/s
 - 10 m/s
 - 1.25 m/s
 - 600 m/s
- Why is the circulatory system of mammals described as a double circulation?
 - Blood flows firstly through arteries and then through veins.
 - Blood flows through the heart twice during one complete circuit of the body.
 - Blood flows firstly through the atria and then through the ventricles.
 - The atria and the ventricles contract alternately.
- Consider the following statements and choose the correct option:
Statement 1: A thick glass tumbler break when a hot liquid is poured into it.
Statement 2: The outside of the glass expands faster because the heat comes to it faster than the inside so it cracks under pressure.
 - Both the statements are correct and statement 2 is the correct explanation of statement 1.
 - Both the statements are correct but statement 2 is not the correct explanation of statement 1.
 - Statement 1 is correct but statement 2 is incorrect.
 - Statement 1 is incorrect but statement 2 is correct.
- How are bacteria useful to us?
 - It decomposes organic wastes (such as vegetable peels, animal remains, and faeces etc.).
 - It is used in the preparation of medicines.
 - It increases soil fertility by fixing nitrogen.
 - 1 only
 - 1 and 3 only
 - 2 and 3 only
 - 1, 2, and 3
- Which of the following is incorrectly matched?
 - Bacteria: Tuberculosis
 - Virus: Hepatitis A
 - Protozoa: Malaria
 - Virus: Cholera
 - 1 only
 - 2 and 4 only
 - 4 only
 - 2, 3 and 4

- 8.** Fill in the blanks:
- A dangerous disease that affects human and cattle is caused by a ___I___ called ___II___.
 - Citrus Canker is caused by ___III___ and spreads through Air.
 - Rust of wheat is caused by ___IV___ and spreads through air or seeds.
- I - bacterium, II - Bacillus Anthracis, III - bacteria, IV - fungi
 - I - bacterium, II - Anthrax, III - bacteria, IV - fungi
 - I - virus, II - Anthrax, III - fungi, IV - bacteria
 - I - bacteria, II - Bacillus Anthracis, III - virus, IV - bacteria
- 9.** Consider the following clues and identify the fibre:
- Clue 1: It resembles silk in appearance, texture and shine. Hence, it is also known as Artificial Silk.
- Clue 2: It uses natural material (wood pulp) and can be woven like silk fibre.
- Clue 3: It is cheaper than silk and can be dyed in a variety of colours.
- Cotton
 - Jute
 - Rayon
 - Silk
- 10.** What would make the best material for wrapping around a mug to keep a hot drink warm for as long as possible?
- Aluminium foil
 - Bubble wrap
 - Copper foil
 - Paper wrap
- 11.** Identify the metals that have water soluble-chlorides:
- Silver
 - Iron
 - Zinc
- 1 and 2
 - 2 and 3
 - 1 and 3
 - 1, 2 and 3
- 12.** In which list do all three blood vessels carry oxygenated blood?
- Aorta, pulmonary artery, renal artery
 - Aorta, pulmonary vein, renal artery
 - Vena cava, pulmonary artery, renal vein
 - Vena cava, pulmonary vein, renal vein
- 13.** Atmospheric nitrogen has to be combined with other elements, or fixed, in order to be used by plants. Lightning is one way that nitrogen is fixed. When lightning occurs, the extreme heat breaks the bonds in nitrogen molecules, allowing nitrogen to combine with oxygen and form nitrogen oxides. In what way is most of the nitrogen fixed by lightning made available for use by plants?
- It is moved by the wind toward dry areas.
 - It is incorporated into the exoskeletons of flying insects that eat plants.
 - It is inhaled and exhaled by birds roosting in trees during rainstorms.
 - It is carried by rain to the soil.
- 14.** Consider the following statements and choose the correct option:
- Statement 1: During exhalation ribs move up and outwards and diaphragm moves down.
- Statement 2: During inhalation ribs move down and inwards, while diaphragm moves up to its former position and chest cavity is reduced in size.
- Statement 1 is correct but statement 2 is incorrect.
 - Statement 1 is incorrect but statement 2 is correct.
 - Both the statements are correct.
 - Both the statements are incorrect.

15. Arrange the following fuels in increasing order of their calorific value. Hydrogen, Wood, Diesel, Coal, Methane

- Wood, Coal, Diesel, Methane, Hydrogen
- Coal, Diesel, Wood, Methane, Hydrogen
- Hydrogen, Methane, Diesel, Coal, Wood
- Hydrogen, Methane, Coal, Diesel, Wood

16. Which of the following three statements are true regarding lysosomes?

- Lysosomal enzymes are active at acidic pH.
- Lysosomes are implicated in inclusion-cell disease.
- Lysosomes are formed from late endosomes.

- 1 only
- 2 only
- 2 and 3 only
- 1, 2 and 3

17. Which one of the following correctly matches the structure of a cell to its function?

- Cell structure: Cell membrane
Function: It gives the cell its shape.
- Cell structure: Nucleus
Function: It gives the cell energy to function.
- Cell structure: Cytoplasm
Function: It allows substances to move around within the cell.
- Cell structure: Cell wall
Function: It controls the substances that can enter or leave the cell.

18. Fill in the blanks:

_____ have a pouch-like structure. They are located above the _____ and connect with the _____. They also secrete a fluid that provides nourishment to the sperms.

- Seminal vesicles, prostate gland, vas deferens
- Prostate gland, urethra, testes
- Scrotum, urethra, vas deferens
- Seminal vesicles, scrotum, vas deferens

19. Which of the following statements is/are correct?

- The Amoeba divides itself into more than two fragments where each fragment then regenerates and develops into a new organism. It is called Binary Fission.
- Amoeba consists of only one cell.
- The Amoeba possesses different bulges on itself called Buds. These buds develop into individuals.
- Each amoeba can possess a different number of buds.

- 2 only
- 2 and 3 only
- 3 and 4 only
- 1, 2 and 4 only

20. When is a tractor exerting the greatest amount of force pulling a weight?

a.  **Mass of tractor: 5,000 kg**
Acceleration: 3 m/s^2

b.  **Mass of tractor: 4,000 kg**
Acceleration: 4 m/s^2

c.  **Mass of tractor: 2,000 kg**
Acceleration: 6 m/s^2

d.  **Mass of tractor: 5,000 kg**
Acceleration: 3 m/s^2

21. If you shout across a canyon and hear the echo 0.9 s later, how wide is the canyon? The speed of sound is 343 m/s.

- a. 154.35 m b. 140 m
- c. 137.8 m d. 308.7 m

22. Photosynthesis and cellular respiration both involve the use and release of gases. Which statement correctly identifies the role of gases in the two processes?

- a. Photosynthesis and cellular respiration both use carbon dioxide and release oxygen.
- b. Photosynthesis and cellular respiration both use oxygen and release carbon dioxide.
- c. Cellular respiration uses oxygen and releases carbon dioxide, while photosynthesis uses carbon dioxide and releases oxygen.
- d. Cellular respiration uses carbon dioxide and releases oxygen, while photosynthesis uses oxygen and releases carbon dioxide.

23. Which statements about plant transpiration are correct?

- a. Plants transpire most when- air is dry
Plants transpire least when- temperature is high
- b. Plants transpire most when- light intensity is high
plants transpire least when- air is humid
- c. Plants transpire most when- light intensity is low
Plants transpire least when- temperature is low
- d. Plants transpire most when- temperature is cold
Plants transpire least when- light intensity is high

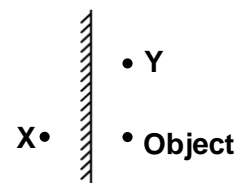
24. Which of the following statement is incorrect?

- a. Electroplating is the process of depositing a layer of any desired metal on another material using electricity. It's one of the most frequent uses of electric current's chemical effects.
- b. Pure water doesn't conduct electricity.
- c. Bathroom taps made of iron or steel are electroplated with chromium metal to prevent their corrosion or rusting.
- d. A fuse bulb glows even if the filament gets broken.

25. Which of the following is incorrect regarding do's and don'ts during a lightning?

- a. An open place is not safe.
- b. Stay away from poles or other metal objects.
- c. Just squat on the ground if you don't find a place to hide.
- d. Carry an umbrella during a thunderstorm

26. An object is placed in front of mirror. Where is the image formed and what is the nature of the image?



- a. Image location: X
Image type: Real
- b. Image location: X
Image type: Virtual
- c. Image location: Y
Image type: Real
- d. Image location: Y
Image type: Virtual

27. When a ray of light from air enters a block of glass at an angle, what change in direction will the ray take?

- The ray will move towards the normal.
- The ray will move at a 90° to the incident ray.
- The ray will move away from the normal.
- The ray won't move at all.

28. Which of the following changes when a ray travels from one medium to another?

- Frequency
 - Wavelength
 - Velocity
 - Amplitude
- 1 only
 - 2 and 3 only
 - 2, 3 and 4 only
 - 1, 2, 3 and 4

29. Identify all of the following three constellations and asterisms that would be visible in the December night sky over the North Pole:

- Cassiopeia
- Crux
- The Big Dipper

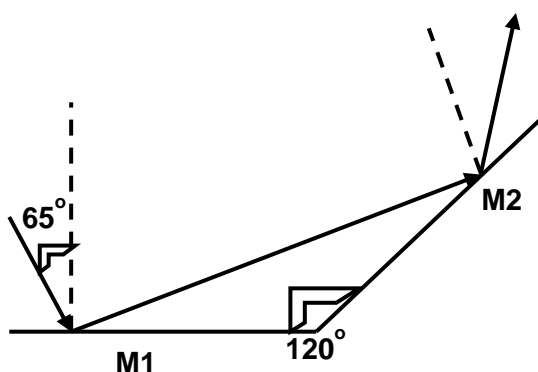
- 1 and 2
- 1 and 3
- Only 1
- 1, 2 and 3

30. Root hairs are tiny cellular projections that grow from the epidermal layer of roots. What is their primary function?

- Anchoring the rest of the root into the soil.
- Displacing soil particles so the root can grow further.
- Capturing soil nematodes for use as a carbon source.
- Increasing the root's surface area to absorb more nutrients.

Achievers' Section (Each Question is 6 Marks)

31. When two mirrors M1 and M2 are arranged at an angle of 120° , what will be the angle of the last reflected ray?



- 55°
- 65°
- 75°
- 35°

32. Consider the following statements and choose the correct option:
Statement 1: The cell wall is responsible for providing shape and support to the cell.

Statement 2: Cytoplasm is found in plant cells but not in animal cells.

- Statement 1 is correct but statement 2 is incorrect.
- Statement 1 is incorrect but statement 2 is correct.
- Both the statements are correct.
- Both the statements are incorrect.

33. Read the given paragraph here few words have been italicised. Select the correct statement regarding them.

Protozoa are simple plant-like organisms which are usually aquatic in nature. They *contain* a cell wall and chlorophyll and can make their own food by photosynthesis. They can be unicellular or multicellular. Some of common examples are *diatoms*, *Chlamydomonas*, and *seaweed*.

- a. *Contain* should be replaced by *does not contain*.
- b. *Seaweed* should be replaced by *amoeba*.
- c. *Protozoa* should be replaced by *algae*.
- d. *Diatoms* should be replaced by *mono atoms*.

34. Consider the following statements and choose the correct option:

Statement 1: Thermoplastics can melt under heat after curing while thermoset plastics retain their form and stay solid under heat once cured.

Statement 2: Polythene and PVC are some of examples of thermoplastics.

Statement 3: Melamine is a versatile material. It resists fire and can tolerate heat better than other plastics.

- a. Statement 1 is correct but statement 2 and 3 are incorrect.
- b. Statement 1 is incorrect but statement 2 and 3 are correct.
- c. Statement 1 and 3 are correct but statement 2 is incorrect.
- d. All the statements are correct.

35. Which of the following statements is/are correct?

1. Ammonium salts undergo decomposition when warmed with an alkali.
2. Even though ammonia is itself a weak base, it is very volatile and can easily be displaced from the salt by another alkali.
3. The damp litmus paper will turn from blue to red if ammonia is present.

- a. 1 only
- b. 2 and 3 only
- c. 1 and 2 only
- d. 1, 2 and 3

36. Which of the following statements is NOT true regarding alloys?

- W. Alloys are generally more brittle than the metals from which they are made.

- X. Alloys are generally harder than the metals from which they are made.
- Y. Alloys are generally better electric conductors than the metals from which they are made.
- Z. Alloys are generally worse thermal conductors than the metals from which they are made.

- a. Only X
- b. Only Y
- c. Y and Z
- d. Z and X

37. Three metals X, Y, and Z undergo the following reactions:

- i. Y displaces X from its salt solution.
- ii. Z displaces both X and Y from their salt solutions.

Arrange the metals in the increasing order of reactivity:

- a. X, Y, Z
- b. Y, Z, X
- c. Z, Y, X
- d. X, Z, Y

38. Four pupils, A, B, C and D, examined the following two types of cells, X and Y, under a microscope.

They recorded their observations in a table as shown below.

A tick (✓) indicated the presence of the cell part.

Who among the four pupils had made the correct observations about the two cells, X and Y?

Pupil	Cell	Cell wall	Cytoplasm	Cell membrane	Chloroplast
A	X		✓		✓
B	Y	✓		✓	✓
C	X	✓	✓	✓	
D	Y	✓	✓	✓	✓



Cell X



Cell Y

- a. A and B only

- b. C and D only
- c. A, B and D only
- d. B, C and D only

39. Leo observed three cells. X, Y and Z, and completed the table below. A tick (✓) indicates that the part was observed in the cell.

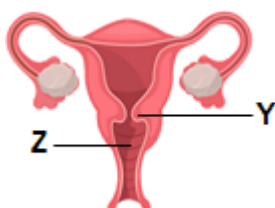
Based on what he had observed, he classified the three cells, X, Y and Z, into two groups.

Parts of Cell	Cell X	Cell Y	Cell Z
Cytoplasm	✓	✓	✓
Cell wall	✓		✓
Cell membrane	✓	✓	✓
Chloroplasts			✓
Nucleus	✓	✓	✓

Which of the following shows the correct classification?

- a. Animal cells: Y
Plant cells: X, Z
- b. Animal cells: X,Z
Plant cells: Y
- c. Animal cell: X, Y
Plant cells: Z
- d. Animal cells: Z
Plant cells: X, Y

40. The diagram below shows the female reproductive system of a human. When a woman removed both her ovaries, her doctor informed her that she will not be able to get pregnant. Which one of the following statements explains why she will not be able to get pregnant?



- a. The sperm cells entering Z will die.
- b. The sperm cells will not be able to enter Y.
- c. The woman will not be able to produce egg cells for fertilization.
- d. The ovary will not be able to meet the sperm cell for fertilization

41. Certain species of whiptail lizards have only female individuals and no males. These lizards reproduce asexually. What is one disadvantage of asexual reproduction for these lizards?

- a. A new population can be established by a single individual in a relatively short period of time.
- b. All the members of a population are genetically very similar and less able to survive environmental changes.
- c. They are smaller than lizards that reproduce sexually.
- d. They are more likely to develop a variety of tail lengths.

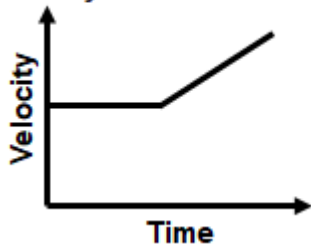
42. Which statement best explains how a planet affects the orbital path of a comet as the comet passes by the planet?

- a. The speed of the comet creates an area of low pressure as the comet passes by, pulling the planet toward the comet.
- b. The magnetic fields of the comet and the planet produce similar charges, pushing the two objects apart as the comet passes by.
- c. The planet has a stronger gravitational field than the comet has, and the comet is pulled slightly toward the planet as it passes by.
- d. The gravitational field of the planet pulls the comet, which does not have a gravitational field, toward the planet as the comet passes by.

43. Two opposing forces acted on a wheeled cart during an investigation. The graph shows the velocity of the cart over time.

Which conclusion is best supported by the data shown in the graph?

Velocity of a Cart over Time



- The forces acting on the cart were consistently balanced.
- The forces acting on the cart were consistently unbalanced.
- The forces acting on the cart were balanced and then became unbalanced.
- The forces acting on the cart were unbalanced and then became balanced.

44. When an object with a volume of 10 cubic meters is completely submerged in water, what is the buoyant force on the object in newtons if the density of water is 1000 kg/m³? Given that acceleration due to gravity is 9.8 m/s².

- 23000
- 30000
- 98000
- 123000

45. A horizontal force of 90 N is applied to a 20-kilogram block that is initially at rest on a horizontal surface. The coefficient of static friction between the block and the surface is 0.5 and the coefficient of kinetic friction of 0.2. In m/s², what is the acceleration of the block?

- 0
- 1
- 2
- 3

46. Sound wave X has amplitude, A, and frequency, f. Sound Y is louder and lower in pitch than sound X. Choose the correct regarding the relation between their amplitude and frequency.

- Sound Y has amplitude higher than A and frequency higher than f.

- Sound Y has amplitude higher than A and frequency lower than f.
- Sound Y has amplitude lower than A and frequency higher than f.
- Sound Y has amplitude lower than A and frequency lower than f.

47. Fill in the blanks:

In electroplating, the metal dissolved from the ___I___ can be plated onto the ___II___. The ___III___ is provided with direct current, oxidizing and dissolving its metal atoms in the electrolyte solution. At the ___IV___ the dissolved metal ions are decreased and the metal is placed on the product.

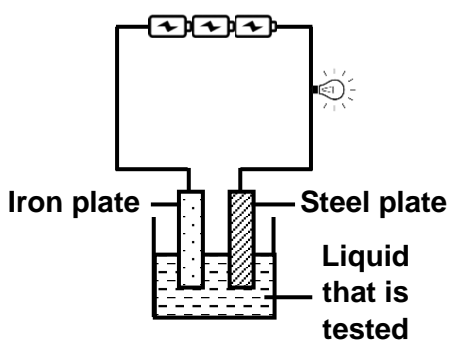
- I - anode, II - cathode, III - anode, IV - cathode
- I - cathode, II - anode, III - anode, IV - cathode
- I - anode, II - cathode, III - cathode, IV - anode
- I - cathode, II - anode, III - cathode, IV - anode

48. Maureen sets up an experiment as shown below:

The same set-up has been used to test three different types of liquid. The results are shown in the table.

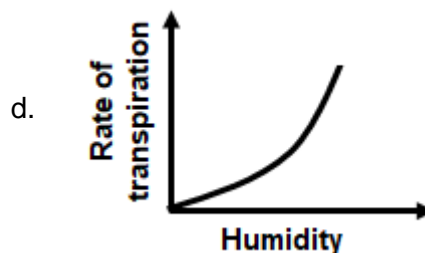
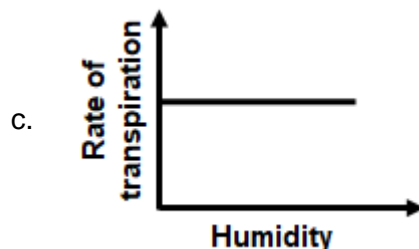
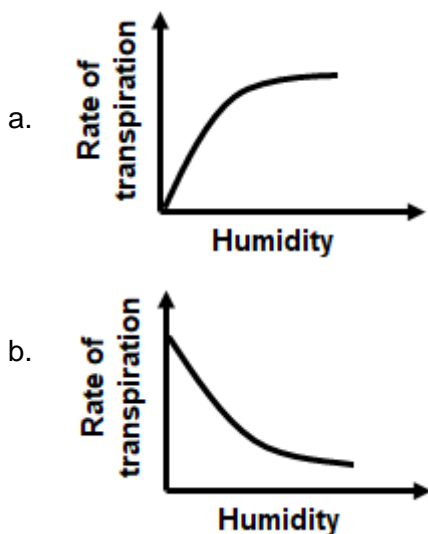
Types of liquid	Brightness of bulb		
	Bright	Brighter	Brightest
Liquid X	✓		
Liquid Y			✓
Liquid Z		✓	

Based on the information given above, what is the aim of the experiment?



- To find out if the type of metal affects the brightness of the bulb.
- To find out if all the liquids conduct electricity.
- To find out if the type of liquid affects the brightness of the bulb.
- To find out if metals allow electricity to pass through.

49. Which graph shows most clearly what will happen to the rate of transpiration as humidity increases?



50. Match the following:

	Column I		Column II
1.	Rapid Combustion	a.	Burning of phosphorus at room temperature
2.	Spontaneous combustion	b.	Burning of LPG in Gas Stove
3.	Explosive combustion	c.	Bacterial composting inside organic materials
		d.	Burning of firecrackers
		e.	Forest fires

- 1 - c; 2 - b, c, e; 3 - d
- 1 - e; 2 - b, c, a; 3 - d
- 1 - c; 2 - b, c, d; 3 - e
- 1 - b; 2 - a, c, e; 3 - d

Answer Key

- | | | | | | | | | | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1. a | 2. c | 3. b | 4. b | 5. c | 6. d | 7. b | 8. a | 9. c | 10. b |
| 11. b | 12. b | 13. d | 14. d | 15. a | 16. d | 17. c | 18. a | 19. a | 20. c |
| 21. a | 22. c | 23. b | 24. d | 25. d | 26. b | 27. a | 28. c | 29. b | 30. d |
| 31. a | 32. a | 33. c | 34. d | 35. d | 36. b | 37. a | 38. b | 39. a | 40. c |
| 41. b | 42. c | 43. c | 44. c | 45. a | 46. b | 47. a | 48. c | 49. b | 50. d |