

# PISA LIKE TEST ITEMS

## SCIENTIFIC LITERACY

### ANSWERS

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## CHAPTER 1) ANALYZING WEIGHT

- i. Yes.
- ii. Initial point is in 0. What is the unit of the weighing machine? Pound or Kilogram.
- iii. It will be more.
- iv. It will be less.
- v. The weight of water displaced by the mug is greater than the weight of weight of the mug. The up thrust depends on the amount of water displaced.

## CHAPTER 2) BLOOD GROUP INHERITANCE

1.1 A, B, AB & O

1.2 Karl Landsteiner.

2.1 Because the serum has antibodies and the red blood cells have antigens. The antigen antibody reaction takes place to agglutinate the blood.

2.2 Matching of blood group is necessary before blood transfusion.

2.3

If your blood type is:	You can give to:	You can receive from:
A	A, AB	A, O
B	B, AB	B, O
AB	AB Only	All blood types
O	All blood types	O only

3.1 Ans: O.

3.2 Ans: It is a recessive character but has more allelic frequencies in the population . O blood group is due to the recessive allele "ii". This allelic frequencies is more in the given population.

4.1 b) 50%

The man has B blood group      Alleles for B blood group -  $I^B I^B$  ,  $I^B i$

Blood group of woman – O      Alleles for O blood group – ii

I probability:

$I^B I^B \times ii$  - result -  $I^B i$  - All the children will have B blood group

II probability:

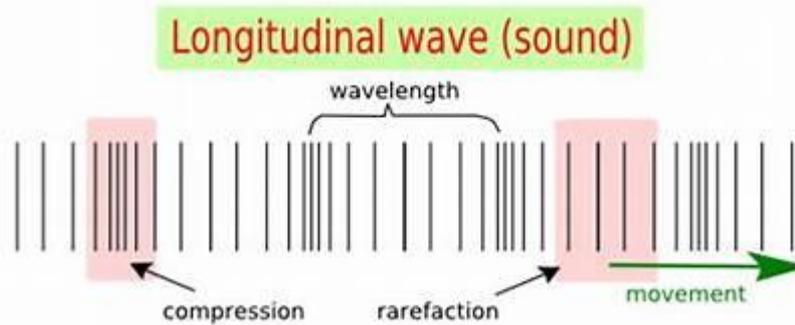
$I^B i \times ii$  - result -  $I^B i$  (B) , ii (O) – 50% of his children are B type and 50% are with O type blood.

## CHAPTER 3) COIN EXPERIMENT

- I) ANTI CLOCKWISE
- II) TWO ROTATION
- III) A-SIX, B-TWO
- IV) 1:1:1
- V) B- 4sec    C- 2sec

## CHAPTER 4) THE DIAGNOSTICS TOOL

1. The principle used in ultrasound is the probe collects the sound waves that bounces back from the organ and a computer uses the reflected signals of sound waves to create an image.
2. Sound waves propagate by longitudinal motion. figure –



3. Ultrasound works a range higher than 20,00Hz. The diagnostic ultra sound range is between 2.5- 14 MHz.
4. Echo obtained from a large regular surface is more intense and from a small irregular surface it is scattered.
5. As the Blood has high velocity ,it will show a low intensity reflected signal because it has low density in comparison to tissues which have high density .

## CHAPTER 5) 'DNA' ki kahani 'LADDER' ki zubani

ANSWERS ARE NOT AVAILABLE.

## CHAPTER 6) EAR - THE SOUND MACHINE

1. Ans: It demonstrates sound makes objects to vibrate
2. Ans: Vibrating Objects produce sound
- 1.2 Ans: Ear Drum
- 2.1 Ans: a) 20 Hz and 20 KHz
- 2.2 Ans: Below 20 Hz – Infrasound, Above 20 KHz – Ultrasound
- 2.3 Ans: b) Vibrations occur in the ear drum, but we will not be able to recognize the sound, because the waves are too small and fast for the inner ear to transmit vibrations
- 3.1 Ans: Yes, ear ossicles play a vital role in hearing. They pick up the vibrations from ear drum and amplify the sound. The sound waves then travel to the fluid filled cochlea.
- 3.2 Ans: c) Once the sound waves reach the inner ear, they are converted into electrical impulses and they are transmitted to the brain through auditory nerves. The brain then translates the electrical impulses as sound.
- 3.3 Ans: Perforations in our ear drum can be treated by a physician. Hence the chances of losing the hearing ability is less.

If untreated it may lead to bacterial infections and affect the middle ear. In such cases there is a chance of losing hearing ability.

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3.4 Elephants flap their ears to cool their body or to reduce the heat

[Elephants](#) are huge, which means they produce a lot of body heat. Since [elephants](#) also typically live in very hot climates, it is essential for them to have a very efficient way to get rid of their extra body heat.

On the inside of an elephant's ears, present a web of tiny [blood vessels](#). The skin of the ear is very thin, and the blood vessels are very close to the surface. When the temperature of the elephant's blood is greater than the temperature of his surroundings, heat is released from the ears.

They also act like giant fans. As elephants flap their ears back and forth, they create a light breeze that can speed up the cooling process.

## **CHAPTER 7) HOW TO MAKE A SIMPLE ELECTRIC MOTOR**

### **Question 1.1**

Ans :- The motor will continue to spin when pushed in the right direction.

### **Question 1.2**

Ans :- The motor will not spin when the initial push is in the opposite direction.

### **Question 1.3**

Ans :- According to Fleming's left-hand rule. The direction of motion produced by the force experienced is given in a fixed direction.

### **Question 1.4**

Ans :- We need a way to periodically break the circuit so that it pulses on and off in time with the rotation of the coil.

### **Question 1.5**

Ans :- The speed of the spinning coil will increase.

### **Question 1.6**

Ans :- So that the flow of current gets cut. The coil will then complete one full circle due to the initial momentum. Again, the current will set up and the motor will start moving.

### **Question 1.7**

Ans :- The speed of the spinning coil will increase.

### **Question 1.8**

Ans :- The speed of the spinning coil will increase.

### **Question 1.9**

Ans :- Fleming's left hand rule.

### **Question 1.10**

Ans :- The direction of the spin will get reversed.

### **Question 1.11**

Ans :- If we keep the magnet above the spinning coil then, either, the coil will start spinning faster or the coil will start spinning slower.

### **Question 1.12**

Ans :- The direction of the spin will get reversed.

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## **CHAPTER 8) ELECTRIC ENERGY**

A1- Mechanical energy

A2- Yes, because of magnetic field produced

A3- depends upon the strength of the current produced

A4- yes, intensity of bulb increases

A5- (i) no, because battery provides DC

(ii) Yes, iron rod become magnetized

(iii) Yes, magnetic field is produced in wooden apparatus because of current flowing

A6- number of turns can be increased, rod can be rotated fast etc

A7- May be no proper insulation is maintained, may be no proper connections with LED etc

## **CHAPTER 9) "Utna lo Thali me Na jaye naali me"**

Answers

1. a.

2. Breakfast=5.08kg/day

Lunch=16.83kg/day

Snack=5.2kg/day

Dinner=14.67kg/day

3. 2761.8ml

4. Food wastage is related to size of plate used to serve

## **CHAPTER 10) FUN WITH GUN**

**ANSWERS ARE NOT AVAILABLE.**

## **CHAPTER 11) FUN WITH ONIONS**

Ans1. In some cases it will move and in some cases it does not.

Ans 2. It will hit other onions.

Ans 3. Yes, all the metallic bobs move in a same way.

Ans 4. Yes two metallic bobs will come out from another side.

Ans 5. Yes three metallic bobs will come out from another side.

Ans 6. Law of conservation of momentum

Ans 7. The total momentum before the collision and after the collision remain the same.  
 $m_1v_1 = m_2v_2$

## **CHAPTER 12) HEIGHT VS AGE**

**ANSWERS ARE NOT AVAILABLE.**

## **CHAPTER 13) EFFECT OF IRRIGATION ON CROP PRODUCTION**

**ANSWERS ARE NOT AVAILABLE.**

### **CHAPTER 14) JOSHIJI KI CHHADI**

A1- Equal to the weight of the stick.

A2-About 10 cm or may differ from student to student.

A3- When the distance between bag and hand increases we experience more force as our index finger acts as fulcrum and we apply downward force from our palm. The distance between index finger and palm does not change so we need to apply more force.

A4- Closest to the bag.

A5-Here  $F_1 \times L_1 = F_2 \times L_2$  or  $F_2 = F_1 \times L_1 / L_2$

Putting  $F_1 = 1\text{N}$ ,  $L_1 = 30\text{ cm}$  and  $L_2 = 30\text{ cm}$  we can find force needed is 3N

A6- No, with the increase in distance force goes on increasing.

A7- Force increases.

A8- 9 N, calculation is same as in answer No.5.

A9- Total force is 1 N plus 9 N in downward plus 10 N in upward direction i.e. total 20 N.

A10 – We should hold the stick closest to the bag

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### **CHAPTER 15) MODERN AQUAPONICS**

**ANSWERS ARE NOT AVAILABLE.**

### **CHAPTER 16) MODES OF VIBRATION IN STANDING WAVE-EKTARA**

**Answer-**

(a) 5 overtone

(b) 4 cm

(c) True

(d) 60 Hz

(e) 24 cm

(f) Frequency will be double.

### **CHAPTER 17: MULCHING**

**ANSWERS ARE NOT AVAILABLE.**

### **CHAPTER 18) THE NARROW ESCAPE:**

**ANSWERS ARE NOT AVAILABLE.**

## CHAPTER 19) NIPAH

Answers:

- 1.Avoid consuming infected fruits
- Stay away from the people who are infected
- Avoid animal to human transmission
- Maintain personal hygiene
- Any one point full credit

2. High survival rate:-

Early detection of the disease and appropriate symptomatic treatment at the right time.

Personal hygiene

Less infection rate:

Isolation of the infected people, Awareness about the disease

- 2 Points each – full credit
- Antibiotics selectively acts on the cell wall of bacteria and it dissolve the cell wall of bacteria causing the complete lysis of the bacterial cell. Whereas virus do not have cell wall.
- Write answer- full credit
- The same symptoms may be shown in the case of other diseases like pneumonia, influenza, viral encephalitis etc. So the people of that area must have affected by any of these diseases.
- Any genuine assumption- full credit

## CHAPTER 20) QUALITY OF WATER

1. Answer-b
2. Answer-d
3. Answer: d
4. Answer: d

## CHAPTER 21) THE REVOLUTION OF MOON

**ANSWERS ARE NOT AVAILABLE.**

## CHAPTER 22) SOLAR COOKER

1. Black surface is a good heat absorbent
2. No plastic cannot be used in place of glass because the plastic cannot create green house effect in the box, heat cannot be trapped inside .
3. Yes glass wool can be replaced by any insulator such as paper piece.
4. Solar energy is a source of renewable source and pollution free.
5. Saves current utility bill, gives you freedom and control over the electricity and provides clean and renewal energy.
6. The temperature produced in concave reflector type solar cooker is usually in the range 180°C to 200°C depending on its size and the quality of reflecting surface.

## CHAPTER 23) THE SOLAR GENERATOR & CHARKA GENERATOR

### The solar generator

#### Answers-

- (i) Ultimately from the sun
- (ii) Yes
- (iii) No.

### Charka Generator

#### Answers-

- (i) Second one
- (ii) Yes I do agree, because the voltage must be varying in nature.
- (iii) 10 times. (Think how)
- (iv) Do this activity and then answer.

## CHAPTER 24) TOPIC SPRINKLER SYSTEM

ANSWERS ARE NOT AVAILABLE.

## CHAPTER 25) STRAW FLUTE SCIENCE

- 1.1 **Ans:** - As the length of the straw increases, the frequency will decrease and the loudness will increase
- 2 **Ans:** - In the shorter straw we would expect the pitch of the sound to be higher because as the length will become shorter, the distance will decrease and so the number of vibrations will be more on a shorter path.
- 3 **Ans :-**The pitch of voice of females is higher than men, we can hear it more clearly.

## CHAPTER 26) SURVIVAL OF THE FITTEST & PITCHER PERFECT

### Survival of the fittest

Answer1. a.

Answer 2. b

Answer 3. c

Answer 4. New beat rate=108

Cardiac output=  $108 \times 70 \text{ ml} = 7560 \text{ ml}$  or 7.56 litre

### PITCHER PERFECT

Answers1. (c) 85

Answer 2. Volume of sphere is  $\frac{4}{3} \pi r^3$

$$r = 21 \text{ cm}$$

Volume =  $38808 \text{ cm}^3 = 38.808 \text{ litres}$

Volume of water diffuses = 12 litres

Water left = 26.808 litres

Answer 3. Though this method is good for conserving water but at the same time it may cause soil erosion so this method should be used in limited areas and for limited crops only in those areas where water scarcity or salinity is high.

### **CHAPTER 27) SWING ON SWING**

A1- Time period decreases because effective length between point of suspension and centre of gravity of girl decreases.

A2- Does not vary. Time period does not depend upon mass.

A4- Time period increases since value of  $g$  on moon is less than that on the earth

A5- No. In vacuum  $g$  is zero.

### **CHAPTER 28) SWINGS INSIDE A STRAW**

**Answers:**

1. The air column vibrates.
2. Yes, the pitch of the sound is increased.
3. Every time when length of the straw decreases, the amount of air vibrating inside decreases, which receives the energy when we blow.
4. Yes, it will be uniform as the pitch is inversely proportional to length.
5. 'A' will match as pitch increases from 'Sa' to 'Ni'. Therefore, length should decrease.
6. The pitch will become half as the amount of air doubles for blow, on doubling the diameter.
7. The length of the air column increases, so the amount of air vibrating in it gets more and pitch decreases.
8. Yes, the sound changes on changing material of the straw.
9. Lungs, wind pipe, buccal cavity, lips and fingers.

### **CHAPTER 29) SYRINGE GENERATOR**

**Answers**

1. Not continuously.
2. No, because there is no change in magnetic flux.
3. More rate of change of flux.
4. (iii)
5. Brightness will increase, then it will reduce to zero then increase.
6. Yes

### **CHAPTER 30) THE EGGY BUSINESS**

Ans 1.

- a. 35-40degree
- b. iv
- c. Closed box will not allow any air to enter and the embryo will die due to lack of oxygen.
- d. All eggs may not hatch. More eggs will hatch at the bottom of the hill due to higher temperature and more oxygen.(less Oxygen content at higher altitude)

Ans 2. C

Ans 3. May become uncomfortable and stiff and also develop bed sores

Ans 4. Any 2 of the below.

- a) Temperature between 35 – 40 C
- b) High Oxygen level
- c) Turning of eggs during incubation
- d) Proper ventilation

## **CHAPTER 31) WATER & CANDLE ACTIVITY & POTABLE WATER**

### **WATER & CANDLE ACTIVITY**

Ans. a) A lit candle needs to draw oxygen from the air in order to continue burning. If you limit the amount of air available, the candle's flame eventually goes out once it uses up all the oxygen.

Ans. b) The candle heats the air and expands it. This cancels the depletion of the oxygen temporarily and the water level stays down. When the oxygen is depleted, the candle goes out and the air cools. The volume of the air decreases and the water rises.

Ans. c) The volume of air available will be more and flame of candle takes longer time to go out.

Ans. d) Correct graph by given set of given data

Ans. e) The relationship between no. of candles and rise of liquid is non-linear. Although if no. of candles increases, rise of liquid also increases.

### **POTABLE WATER**

Ans. a) As per U.S. Environmental Protection Agency (EPA) it is 0.010 mg/L.

Ans. b) Arsenic can enter the water supply from natural deposits in the earth or from industrial and agricultural pollution.

Ans. c) Arsenic does not easily enter the body through the skin. Bathing, swimming and showering with water is safe, if we avoid swallowing the water.

Ans. d) One can remove arsenic from your water by using a water cooler with reverse osmosis built-in, a process that forces water through a semi-permeable membrane under pressure that will leave contaminants behind and dispense more pure and healthy drinking water.

Ans. e) Chronic exposure to arsenic is also associated with an increased risk of skin, bladder, lung, kidney and prostate cancer.

## **CHAPTER 32) WATER POWER PLANTS**

Key – value points

1. Yes. The water moves from T1 to T2, due to difference in water and salt concentration through a semi permeable membrane.
2. a. Pressure and volume increases in the ocean water container.  
When water moves from river water container to sea water container due to difference in water and salt concentration , the volume of water and pressure increases in the sea water container and so the water moves through the container .

3. i) It uses renewable energy – water is a renewable source of energy, it can be renewed within short time through rain.  
ii) Causes no pollution.  
iii) Economical – using less energy for production and the resource is only water.
4. If the river water tank is filled with polluted water, then the fresh water cannot move into the sea water container, because there is no difference in salt and water concentration between the two water bodies.

### **CHAPTER 33) WHY DOES WATER RISE?**

**Answers:**

- 1 - To see the movement of water easily
- 2 - So that we can see rise of water level completely.
- 3 - Oxygen; Carbon di oxide.
- 4 - At first, the flame heats the air inside the container and this hot air expands quickly. Some of the expanding air escapes from under the vase where you might have seen some bubbles. When the flame fades and goes out, the air in the container cools and cooler air contracts or takes up less space. That contraction creates a weak vacuum – or lower pressure – in the container. Where’s the higher pressure is outside the container pressing down on the water in the dish. The outside air pushes water into the container until the pressure is equalized inside and outside the container. The water stops rising when that pressure equalization is reached.
- 5 - No it requires high pressure. Otherwise the rate of dissolving is very slow.
- 6 - Turmeric, Potassium permanganate, water soluble dyes etc.

### **CHAPTER 34) THE WORLD OF GREEN PLANTS & BANANA STORY (केले वाला)**

**THE WORLD OF GREEN PLANTS**

- Ans.1: Seven colours  
 Ans.2: Light source, Object / tree, Eye, Brain  
 Ans.3: No  
 Ans.4: Green, as this colour is not absorbed by the plant  
 Ans.5: Black, as yellow colour is fully absorbed by plant, no light emitted, so black colour plant.
- .....

**BANANA STORY (केले वाला)**

- Ans.1: 10 bananas  
 Ans.2: Prefer to buy from local market. As Rs.60/kg = 10 bananas but Rs.60/dozen = 12 bananas. So a benefit of 2 bananas from local market.  
 Ans.3: Prefer to buy from shop 1.  
 Reason:  
 1 banana = 100gm.  
 Therefore 1 kg = 10 bananas = Rs 40/- (Rate of 1 banana = Rs. 4/-)  
 If rate is Rs. 60/- per dozen then (Rate per banana = Rs.5/-)
- .....