

**Std IX - Dr Homi Bhabha Bal Vaidyanik Spardha  
2014 Test Paper**

(c) Air moves from cold areas to hot areas and moist air moves towards dry air. (d) The strongest wind and heaviest rain are found at the center of a cyclonic storm.

4. The equation related to momentum of a system is

$$m_2(v_2 - u_2) = m_1(v_1 - u_1)$$

where symbols have usual meaning. This may be because of \_\_\_\_\_.

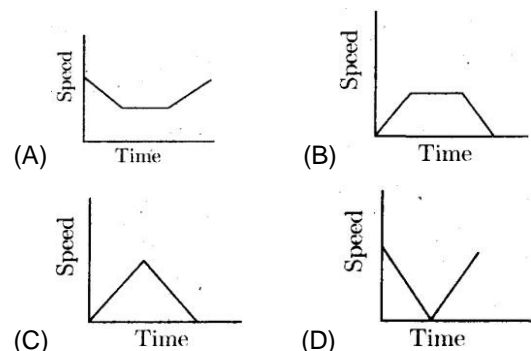
- (a)  $m_1$  is much bigger than  $m_2$
- (b) some external forces are acting
- (c) momentum is neither created nor destroyed
- (d) direction of  $u_1$  and  $u_2$  are not opposite

5. Plane mirror produces magnification of \_\_\_\_\_.

- (a) -1
- (b) +1
- (c) zero
- (d) between 0 to  $\infty$

6. Which of the following speed - time graphs will represent the case of:

"A cricket ball thrown vertically upwards and returning to the hands of the thrower".



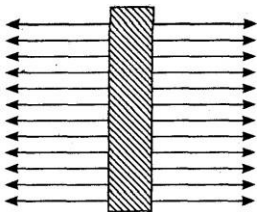
7. In a Celsius scale thermometer, range between freezing point and boiling points of water is divided into 100 equal parts. Whereas, the same range is divided into how many equal parts in Fahrenheit scale?

- (a) 120
- (b) 150
- (c) 180
- (d) 210

**1. Which property of Lead is useful to stop dangerous radiations from radioactive materials?**

- (a) High density
- (b) Specific crystalline structure
- (c) High melting point
- (d) Atomic structure

**2. Select correct option for the following diagram**



- (a) Newton's third law
- (b) Partial refraction of light
- (c) Magnetic lines of force for infinitely long 'north' pole of magnet
- (d) Law of conservation of energy

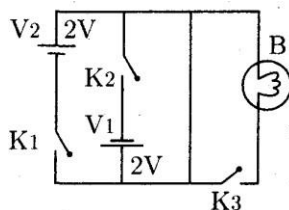
**3. Select correct option for air pressure.**

- (a) The air pressure at a certain location is inversely proportional to its height from sea level, temperature and -humidity.
- (b) The cyclone is a system of very high pressure clouds at the center and very high speed winds revolving around it with rain.

8. Two persons manage to push a motorcar of mass 1,200 kg along a levelled road. The same motorcar can be pushed by three persons to produce an acceleration of  $0.2 \text{ m/s}^2$ . With what force does each person push the motorcar? (All persons push with same muscular effort)

- (a) 80 N (b) 120 N (c) 240 N (d) 2,400 N

9. Identify minimum keys to be closed in the following circuit so that bulb B will glow?



- (a)  $K_1$ ,  $K_2$  and  $K_3$  (b)  $K_2$  and  $K_3$  (c)  $K_1$  (d)  $K_2$

10. Select the correct property responsible for radioactivity.

- (a) Temperature and heavy nucleus  
(b) Chemical composition and temperature  
(c) Heavy nucleus (d) Pressure and heavy nucleus

11. What happens to the energy absorbed naturally in water?

- (a) It is reflected completely  
(b) It becomes negligible as it is absorbed in water.  
(c) It can not be used. (d) It is used by aquatic life

12. Select correct option for, "The two days in a year on which the Sun rise exactly in the East."

- (a) March 21 and September 23 (b) June 21 and December 22  
(c) January 14 and June 21 (d) May 22 and November 23

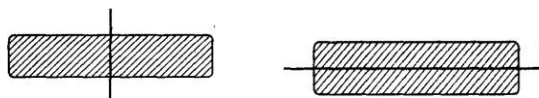
13. A tuning fork produces sound wave of wavelength 0.5 m. If the velocity of sound wave in air is 330 m/s, find the frequency of fork?

- (a) 1,650 Hz (b) 660 Hz (c) 66 Hz (d) 16.5 Hz

14. EMF of cell does not depend on which of the following parameters?

- (a) Nature and concentration of electrolyte.  
(b) Distance between electrodes.  
(c) Nature of electrodes. (d) Temperature of electrolyte.

15. A magnet is divided into two equal parts by two methods as shown in diagram. ,



Method 1

Method 2

Choose correct statement/s from following

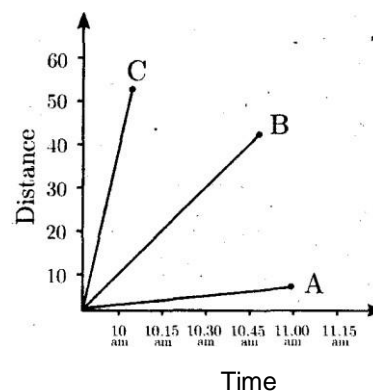
- I) Both methods will give two independent magnets  
II) Two independent magnets are possible only with method 1  
III) Method 2 will lead to zero magnetism in two pieces

- (a) Statement I (b) Statement II  
(c) Statement III (d) Statement II and III

16. In the formation of sea and land breezes, which of the following methods of heat transfer are observed?

- (a) Conduction and Radiation (b) Conduction and Convection  
(c) Convection (d) Convection and Radiation

17. Time - Distance graph of 3 methods of transport A, B and C is plotted.



Select the correct option for A, B and C?

- (a) A : Car, B : Bullock - Cart, C : Ant  
(b) A : Person walking, B : Car, C : Aircraft

(c) A : Bullock - Cart, B : Tortoise, C : Person walking

(d) A : Ant, B : Aircraft, C : Car

18. Which of the following statements are true?

I) Potential energy is stored in a system in a sense that, it could later result in motion

II) When block slides on a floor, energy is dissipated in the form of heat

III) SI unit of potential energy is same as work

IV) If friction is neglected, the speed of child at the bottom of a slide does not depend on the shape of slide

(a) I and II (b) I, II and IV (c) II, III and IV (d) I, II, III and IV

19. Which of the following characteristics is not applicable to plasma state?

(a) Plasma state does not have definite shape

(b) Plasma state does not have definite volume (c) Plasma state is not necessarily an ionized state

(d) Plasma state is electrically conductive

20. Which of the following is *not* a unit of length?

(a) Angstrom (b) Light year (c) Fermi (d) Radian

21. In a simple pendulum experiment, value of  $g$  is calculated with formula

$$g = \frac{4\pi^2 L}{T^2}$$

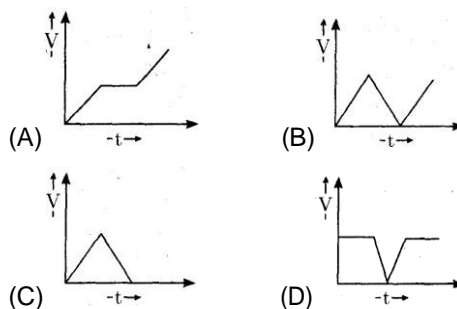
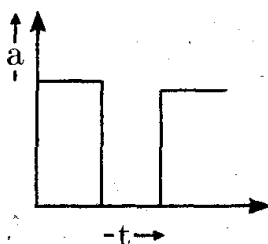
Keeping the length constant, experiment was

performed 4 times viz a, b, c and d. In these repetitions, errors reported in measurement of  $L$  and  $T$  respectively. In which of the following cases is the error in the value of  $g$  the minimum.

(a) 0.5 cm, 0.5 s (b) 0.1 cm, 0.1 s

(c) 0.1 cm, 1 s (d) 0.2 cm, 0.2 s

22. Acceleration - time graph of a body is shown. The corresponding velocity time graph of the same body will be ?



23. Human eye consists of a sphere called the eye ball with a lens in front and a layer of light sensitive cells at the back. This lens' nature is \_\_\_\_\_.

(a) semi transparent (b) opaque (c) transparent

(d) non transparent at centre and transparent at outer edge

24. Which of the following precautions are to be observed during a thunderstorm? <sup>7</sup>

I) Never take shelter under the only tree in open area.

II) Carry an open umbrella

III) Choose high places during storm

IV) Crouch down, but don't lie flat on ground.

V) Avoid contact with running water

(a) I, IV, V (b) I, II, IV, V (c) I, II, III, IV (d) I, III

25. One horse power = \_\_\_\_\_ watt.

(a) 786 (b) 764 (c) 748 (d) 746

26. In case of sound, which of the following is transmitted by a wave?

(a) Amplitude

(b) Velocity

(c) Energy

(d) Frequency

27. For any ray diagram, which of the following statements is true ?

(a) Characteristic dimensions of object are much smaller than the wavelength of light

(b) Characteristic dimensions of object are much larger than the wavelength of light .

(c) Characteristic dimensions of object are almost of same order of wavelength of light

(d) .Characteristic dimensions of object are not measurable

28. Why we can not see the shadow of planets and satellites.

- (a) They are too big in size (b) There is no screen in space
- (c) They are far away from the sun
- (d) There is no medium in space

29. Which of the following substances will show maximum increase in temperature, if they have same mass and heated equally?

- (a) Water (b) Mercury (c) Kerosene (d) Glass

30. Select correct option for "an ultrasound wave passed through a defective surface"

- (a) Frequency of ultrasound changes if passed through the defective area
- (b) Ultrasound will pass through undeviated if there is any defect
- (c) Ultrasound gets reflected back from the defective area
- (d) Ultrasound wave gets absorbed in a the defective area

31. Which of the following indicators would show colour change when metallic oxide is mixed with water?

- I) Blue litmus II) Phenolphthalein III) Turmeric
- IV) Methyl Orange

- (a) Only II (b) II and III (c) I and III (d) I, II and III

32. Sodium can be stored in kerosene, because\_\_\_\_\_.

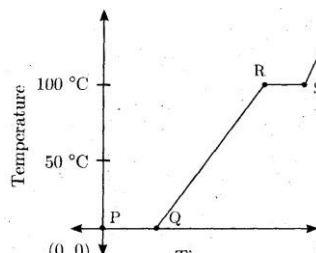
- I) Sodium gets oxidised easily.
- II) Sodium is highly reactive with water
- III) Kerosene is an inert hydrocarbon
- IV) Density of Sodium is higher than kerosene

- (a) I and II (b) I, II and III (c) III and IV (d) I, II, III and IV

33. For a bulb to glow in the circuit of conductivity apparatus, aqueous solution of which of the following should be placed in it?

- (a) Ethyl alcohol (b) Table salt
- (c) Powdered sugar (d) Glycerin

34. Observe the following graph of an experiment of conversion of ice into water and water into ice. Select false statement in case of these observations?



- (a) Temperature remains steady during change of state
- (b) Process of boiling takes more time than melting
- (c) Ice will start floating on water at point Q
- (d) Dimensions of graph will vary according to pressure conditions

35. \_\_\_\_\_ formulated the law of constant proportion.

- (a) Proust (b) Newton
- (c) Lavoisier (d) Mosley

36. Iron can displace\_\_\_\_\_from its salt solution.

- (a) Zinc (b) Potassium
- (c) Sodium (d) Copper

37. If dry blue and red litmus papers are held in a jar of dry Sulphur dioxide, what will be the colour change? :

- (a) Blue litmus will turn red
- (b) Both litmus will remain as they are
- (c) Red litmus will turn blue
- (d) Both litmus will get covered by yellow sulphur dust

38. Consider substances A, B, C and D.

I) From a mixture of C and D, D can be separated from C by filtration method

II) From a mixture of A and D. D can be separated from A by using a magnet

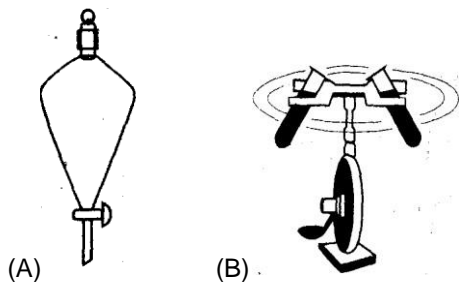
III) From a mixture of B and C, B can be separated from C. by using a

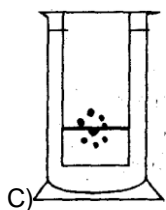
separating funnel.

Then A, B, C and D would be respectively:

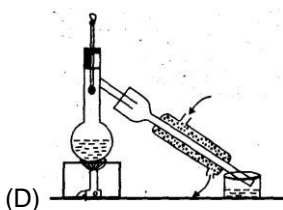
- (a) Sand, Kerosene, Water, Iron
- (b) Iron, Sand, Water, Kerosene
- (c) Sand, Chloroform, Water, Iron
- (d) Iron, Chloroform, Water, Sand

39. How many of the following configurations represent purely metallic elements?  
2,8,7    2,8,1    2,8,4    2,8,3  
(a) 1    (b) 2    (c) 3    (d) 4
40. 1.825 g of HCl in 500 ml of water will make \_\_\_\_\_.  
(a) 0.1 M HCl    (b) 0.05 M HCl  
(c) 1 M HCl    (d) 0.5 M HCl
41. Select a group of elements showing same atomicity.  
(a) Phosphorus, Sulphur, Carbon  
(b) Oxygen, Helium, Hydrogen  
(c) Helium, Argon, Chlorine  
(d) Oxygen, Nitrogen, Chlorine
42. Which of the following elements are present in cellulose?  
(a) Carbon, Hydrogen, Oxygen  
(b) Hydrogen, Oxygen, Nitrogen  
(c) Carbon, Nitrogen, Oxygen  
(d) Carbon, Hydrogen, Iron
43. Which of the following has highest pH value?  
(a) Sweat    (b) Gastric juice  
(c) Blood    (d) Tears
44. What will a farmer use to improve the quality of alkaline soil?  
(a) Lime    (b) Gypsum  
(c) Chemical fertilizers  
(d) Organic substances
45. What is the similarity in Sodium bicarbonate and Sodium carbonate?  
(a) Number of atoms    (b) Molecular formula (c) Structural formula    (d) Physical properties]
46. Which of the following pair of elements represent a mole ratio of 1:1?  
(a) 10 g of Calcium and 12 g of Magnesium  
(b) 12 g of Magnesium and 6 g of Carbon  
(c) 12 g of Carbon and 20 g of Calcium  
(d) 20 g of Sodium and 20 g of Calcium
47. Which of the following information about the reaction of CaO with water is not true?  
(a) CaO reacts with water vigorously  
(b) During the reaction the test tube becomes hot (c) CaO reacts with water to form slaked lime  
(d) During the reaction test tube becomes cold
48. Find the odd one out on the basis of type of colloid.  
(a) Idli    (b) Cake    (c) Cheese    (d) Dhokla
49. In which of the following situations thermometer will show decrease in temperature? (a) NaOH dissolved in water  
(b) NH<sub>4</sub>Cl dissolved in water  
(c) NaOH added in HCl  
(d) Conc. H<sub>2</sub>SO<sub>4</sub> added to water
50. The M shell is the valance shell in \_\_\_\_\_.  
(a) Br    (b) S    (c) Be    (d) Fe
51. When concentrated sulphuric acid is slowly poured on sugar, sugar turns into black spongy mass. What is the role of sulphuric acid in this process?  
(a) A reducing agent    (b) A dehydrating agent (c) An Oxidizing agent (d) A catalyst
52. Select the odd one out on the basis of type of reaction:  
(a) Rusting    (b) Photosynthesis  
(c) Combustion    (d) Fermentation
53. Which of the following radicals is monovalent?  
(a) Chlorate    (b) Oxide  
(c) Sulphite    (d) Sulphate
54. Which of the following methodology is used for identifying pigments present in plants?





C)



(D)

55. Which of the following is not chemical effect of electric current?

- (a) Artificial golden jewellery  
(b) Anodized cookware  
(c) Wheel cap (d) Cast iron

56. In ayurvedic preparation of *suvarnabhasma*, what purity of gold will be used?

- (a) 42 % + Silver (b) 58.5 % with Copper (c) 91.8 % amalgam (d) 24 carat

57. Complete the analogy :

Re-mouldable plastic : Nylon :: Non-rernouldable plastic ::

- (a) Thermocole (b) Formica  
(c) Polythene (d) PVC

58. Which of the following is chemical formula for heavy water?

- (a) D<sub>2</sub>O (b) H<sub>2</sub>O<sub>2</sub> (c) D<sub>2</sub>O<sub>2</sub> (d) H<sub>3</sub>O

59. Identify Mercurous chloride from the following

- (a) Hg<sub>2</sub>Cl<sub>4</sub> (b) HgCl<sub>2</sub>  
(c) Hg<sub>2</sub>Cl<sub>2</sub> (d) HgCl<sub>4</sub>

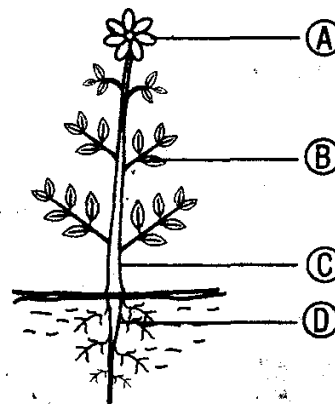
60. Which of the following works on the principle of Tyndall effect?

- (a) Camera (b) Laparoscope  
(c) Doppler Radar (d) Ultra microscope

61. Select the odd one out on the basis of presence of Chitin?

- (a) Prawn shell (b) Yeast  
(c) Rhinoceros horn (d) Butterfly wing

62. Select irrelevant label for natural vegetative propagation.



63. Choose the *incorrect* statement for active hormones.

- (a) They are produced in small amount  
(b) They are stored in the body  
(c) They help maintain homeostasis  
(d) They are produced by endocrine glands

64. In a family there are 2 boys and 1 girl. What is the chance that the next child will be a girl? (a) 100 % (b) 25 % (c) 75 % (d) 50 %

65. Ulva belongs to which of the following?

- (a) Kingdom : Monera  
(b) Kingdom : Protista  
(c) Kingdom : Plantae; Division : Thallophyta (d) Kingdom :

Plantae; Division : Bryophyta

66. What is a nucleoid? '

- (a) It is a small nucleus  
(b) Distinct chromosomes seen during cell division  
(c) Membrane bound nucleus of amoeba  
(d) Undefined region of cytoplasm containing DNA

67. What, is Kaposi's sarcoma?

- (a) A type of cancer  
(b) A type of neuromuscular .dystrophy  
(c) Local oedema caused due to Histamine  
(d) Endemic disease of Kerala

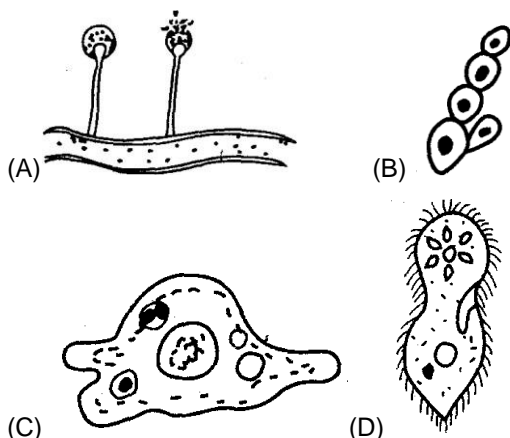
If you set yourself up for success,  
**anything**  
is possible

68. Select the *incorrect* statement.

- (a) Linnaeus suggested Binomial Nomenclature system.
- (b) Whittaker suggested five kingdom classification
- (c) Theophrastus classified animals as aquatic, amphibians, aerial and terrestrial
- (d) Leeuwenhock first observed living cells of bacteria and protozoan

69. Which of the following will show all the 3 characters mentioned below?

- I) Unicellular structure
- II) Respire anaerobically
- III) Cause fermentation of sugar solution



70. Select the *incorrect* statement.

- (a) TB bacteria can attack kidneys
- (b) The severity of disease depends upon the number of disease causing germs in the body
- (c) Acute diseases last long
- (d) Allergic reactions can lead to diarrhoea

71. Select the *incorrect* pair.

- (a) Apis florae : The little bee
- (b) Bos indicus : Buffallow
- (c) Rhode island : Layer
- (d) Rohu : Marine fish

072. Choose the odd one out on the basis of occurrence of separate male and female flowers of same species on separate plaiits.

- (a) Papaya
- (b) Bitter gourd (*Karela*)
- (c) Dates (*Khajoor*)
- (d) *Bhindi*

73. Which of the following food should be a part of winter diet?

- (a) Soyabean
- (b) *Ragi*
- (c) Black *Til*
- (d) Low fat milk

74. Choose the correct option: Plasmolysis -

- (a) is a process where cell has to spend energy
- (b) occurs when water enters the cell
- (c) takes place when cell is placed in hypertonic solution
- (d) is an irreversible process.

75. What is the effect of harmful drug *ganja* on nervous system?

- (a) Nervous system gets stimulated.
- (b) Nervous system gets depressed.
- (c) *Ganja* gives sedative effect (sleep).
- (d) *Ganja* gives hallucinations. .

76. Proteins synthesized in the endoplasmic reticulum are biochemically modified by enzymes present in \_\_\_\_\_

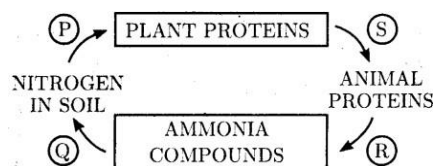
- (a) Cisternae of Golgi Apparatus
- (b) Ribosomes
- (c) Cristae of Golgi Apparatus
- (d) Vesicles of Golgi Apparatus

77. Which of the following disease is caused by a protozoan?

- (a) Typhoid
- (b) Cholera
- (c) Malaria
- (d) Filariasis

78. The diagram shows some stages in the nitrogen cycle.

Which stages involve role of bacteria?



- (a) P and Q
- (b) P and R
- (c) R and S
- (d) P, R and S

79. What is the role of Bile in human?

- I) To mix fatty acids and glycerol together
- II) To assimilate food
- III) To neutralize acidic flood
- IV) To digest proteins

- (a) Only I (b) Only III  
(c) I and II (d) I, II and III

80. A person is suffering from loss of body weight, persistent cough, blood stained sputum, fever and chill. Which of the following will be the causative agent of the disease you would diagnose from above symptoms?

- (a) Plasmodium falciparum  
(b) Salmonella typhi  
(c) Mycobacterium tuberculosis  
(d) Vibrio cholerae

81. Which is the rarest blood group in human? (a) AB Rh -ve

- (b) O Rh -ve  
(c) A Rh -ve (d) B Rh -ve

82. Select the living cell of the following.

- (a) Cells containing suberin  
(b) Cambium cells  
(c) Cell of phloem fibers of green stem  
(d) Cells containing lignin

83. Select appropriate factors for soil formation

- I) Freezing of water  
II) Extreme heat  
III) Rainwater  
IV) Flow of river

- (a) I and II (b) I, III, and IV  
(c) III and IV (d) I, II, III and IV

84. Coconut shows

- (a) trimerous flower  
(b) two cotyledons in seed  
(c) prominent primary root  
(d) reticulate venation

85. A virus contains

- (a) DNA (b) RNA  
(c) DNA and RNA (d) DNA or RNA

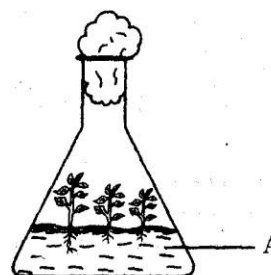
Q. 86. Which of the following is not a nitrogenous compound?

- (A) Protein (B) Nucleic acid  
(C) Enzyme (D) Fructose

Q. 87. Which of the following statements is false?

- (A) Chlorophyll is present in a type of chromoplast  
(B) A chloroplast can get converted to other types of chromoplast  
(C) Carotene is an orange coloured chromoplast (D) Leucoplasts are colourless plastids

Q. 88. Understand the technique in the given figure and select appropriate option for A?



- (A) Agar (B) Wax  
(C) Dry Cotton (D) Glass wool

Q. 89. The largest organ in human body is\_\_\_\_\_.

- (A) liver (B) stomach  
(C) large intestine (D) skin

Q. 90. Select the common connective tissue for nose, trachea and pinna of ear?

- (A) Mucus (B) Ligament  
(C) Cartilage (D) Tendon

Q. 91. Who amongst the following is known as "forest man of India"?

- (A) Jadav Payeng  
(B) Chandika Prasad Bhatt  
(C) Sunderlal Bahuguna  
(D) Popatrao Pawar

Q. 92. Choose the incorrect statement about Kepler - 186f?

- (A) It is 10 % larger than the Earth  
(B) The Sun is brighter on Kepler 186f  
(C) Its period of revolution is 130 days  
(D) It is an exoplanet .



Q. 93. You are solving this paper on OMR sheet. What does OMR stand for?

- (A) Optimum Mark Reader
- (B) Optical Mark Recognition
- (C) Operated Mark Reader
- (D) Oval Mark Reader

Q. 94. What is La Nina?

- (A) Cold water current in Atlantic Ocean
- (B) Warm water current in Pacific Ocean.
- (C) Warm water current in Atlantic Ocean
- (D) Cold water current in Pacific Ocean

Q. 95. Haffkine Institute recently has developed economical medicine for gas

gangrene. In this disease a gas is produced in the infected part.

Proportion of which gas is maximum in it?

- (A) Carbon dioxide (B) Ammonia
- (C) Nitrogen (D) Oxygen

**Read the paragraph and answer Q. 96 to Q. 100.**

#### MAN, MERCURY AND MINAMATA

Man's intervention with nature has culminated in severe consequences in the past. Outbreak of Minamata disease due to Mercury pollution in Japan is one such example we all know. Mercury, (quick silver) placed in group II B of periodic table has an atomic weight of 200.59 amu and its atomic number is 80. It is scarcer than Uranium contributing only 0.5 ppb of Earth's crust. Density of liquid Hg at 25 °C is 13.53 g/cm<sup>3</sup>.

Though Mercury occurs naturally in Earth's bio-geo-chemical system, human activities like mining and fossil fuel burning etc. have increased its concentration in the atmosphere. In aquatic ecosystems micro organisms metabolize elemental Mercury to Methyl mercury which is a potent neurotoxin. Living organisms are exposed to Methyl mercury as it bio-accumulates through multiple levels in the food chain.

Minamata can be considered as an important incidence because before it,

placenta was thought to protect foetus (developing human baby in uterus)

against toxicants, but in case of Methyl mercury it was observed that placenta

bio-accumulates it in the foetus.

The Minamata disaster teaches us the value of our environment and health.

In October 2013, a new international convention to control Mercury emissions

was opened called, Minamata Convention.

Q. 96. Arrange the following in ascending order of their availability on Earth?

- (A) Au, Ag, Hg, U (B) Hg, U, Au, Ag
- (C) U, Hg, Ag, Au (D) Ag, Hg, U, Au, Oxygen

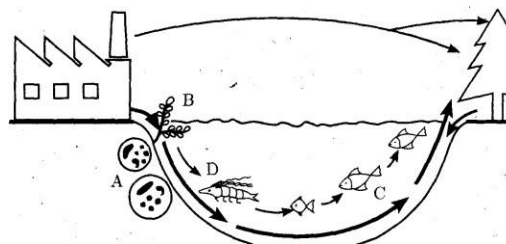
Q. 97. Which of the following is primarily caused due to Methyl mercury\_\_\_\_\_

- (A) Fever (B) Allergic rashes
- (C) Ringing in ears (D) Gall stone

Q. 98. Which of the following actions will you choose so as to reduce Mercury pollution at your level ?

- (A) Disposing CFL bulbs properly
- (B) Disposing chemicals in car batteries properly (C) Disposing empty aerosol cans properly
- (D) All of these

**For Q. 99 and Q. 100, observe the following diagram**



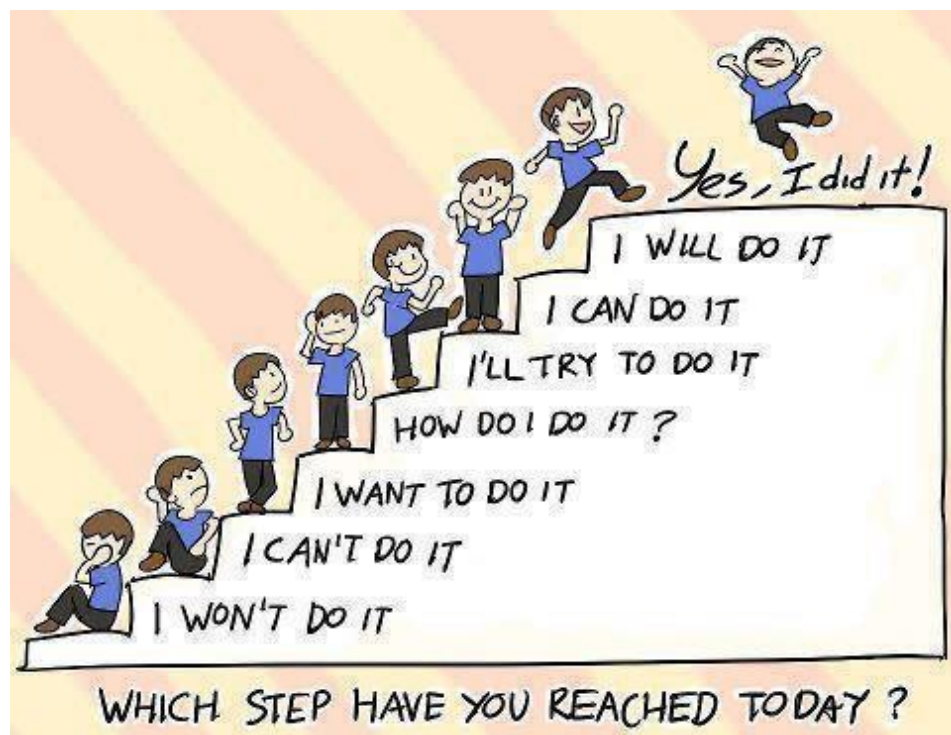
Q. 99. With respect to Bio-magnification of Mercury, consumption of which of the following options will prove to be most harmful?

- (a) A (b) D (c) B (d) C

Q. 100. Select the correct option for conversion of Mercury into Methyl mercury.

- (a) A (b) D (c) B (d) C

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## Test Paper Solution

1. **(b)** Closely packed atomic, structure of Lead results in its high density which in turn is useful to stop total radiations.
2. **(c)** Magnetic lines of force originates from north pole and ends on south pole. These lines never intersect each other. In given diagram, option C would be most appropriate because the magnet is infinitely long.
3. **(a)**
4. **(b)** Under the condition of 'No External Force Acting' law of conservation of momentum is  $m_1 v_1 + m_2 v_2 = m_1 u_1 + m_2 u_2$ .

1 1      2 2      1 1      2 2

Due to inequality sign mentioned in given question, option B is appropriate.

5. **(c)** Magnification = Image size/Object size

Hence answer C

6. **(c)** When ball is thrown in upward direction, gravitational force acts against its speed. Hence its speed reduces. It becomes zero when it reaches to maximum height and then increases under gravitational force.

7. **(c)** Fahrenheit is a thermodynamic temperature scale, where freezing point of water is 32 °F and boiling point is 212 °F. This puts the boiling and freezing points of water exactly 180 degrees apart.

8. **(a)**  $m = 1200 \text{ kg}$

$$a = 0.2 \text{ m/s}^2$$

$$\text{Total } f = ma = 1200 \times 0.2 = 240 \text{ N} \dots$$

$$\text{Force by individual person} = 240/3 = 80 \text{ N}$$

9. **(a)**

10. **(c)**

11. **(d)**

12. **(a)**

13. **(b)**  $v = 330 \text{ m/s}$

$$A = 0.5 \text{ m} \quad v = n \lambda \quad n = v/\lambda = 330/0.5 = 660 \text{ Hz}$$

14. **(b)**

15. **(a)**

16. **(c)** Temperature differences at the Earth's surface occur whenever there are differences in surface substance. Along the coast, large areas of land heat up more quickly than adjacent sea water. Air near the land surface is heated by radiation and conduction, expands and begins to rise. This is convection. To replace the rising air, cooler air is drawn from the surface of the sea resulting sea breeze. In the night, when land cools faster than sea, the land breeze starts flowing.

17. **(b)**

18. **(d)** All four statements are various aspects of potential energy and properties of conversion of potential energy to kinetic energy. All are true.

19. **(c)**

20. **(a)** Radian measures angle.

Hence, final error in  $g$  will be minimum.

22. **(a)** Acceleration = Rate of change of velocity.

When acceleration is zero, velocity is constant. Hence, answer is A.

23. **(c)**

24. **(a)** In a thunderstorm, an open umbrella can work as lightning arrester. Hence it should be avoided. Standing tall at high places can prove to be dangerous for the same reason. It is advisable to take precautions listed in option A.

25. **(d)**

26. **(c)**

21. **(b)** Option B gives the minimum error in measurement of  $L$  and  $T$ . (Same system of measurement to be noted).

27. (b) Wavelength of light is in terms of angstrom.

$$1 \text{ \AA} = 10^{-8} \text{ cm}$$

This proves that the characteristic dimensions of the objects are much larger than the wavelength of light as mentioned in option B

28. (b)

29. (b)

30. (c) The defective areas exhibit a change of density than the normal region. The ultrasound waves of low intensity travel through the object and get reflected from regions where there is a change in the density.

The reflected waves are converted into electric signals to form an image. This technique is used in ultrasonography.

31. (b) Solution of Metallic oxide is alkaline in nature.

32. (d) Sodium donates valence electron. Hence it gets oxidised easily.

33. (b) Table salt will get ionised. Rest of the options are organic compounds.

34. (c)

35. (a)

36. (d) Elements above Hydrogen in activity series will displace elements below it,

37. (b) In the given activity, polar water molecule is absent. Hence

Sulphur dioxide will not exhibit acidic character.

38. (c) Density of chloroform is more than that of water.

39. (b) Metals donate electrons.

40. (a) Molecular mass of  $\text{HCl} = 36.5$

$\text{g. (H} = 1, \text{Cl} = 35.5)$

Here, 1.825 g of  $\text{HCl}$  is added in 500 ml of water, i. e.

$1.825 \times 2 = 3.65 \text{ g in 1000 ml of water.}$

1 M of  $\text{HCl} = 36.5 \text{ g}$

$3.65 = 0.1 \text{ M of HCl.}$

41. (d) All are diatomic molecules.

42. (a) Cellulose is a carbohydrate.

43. (c)

44. (d) Organic substance like humus is acidic in nature. It will help in soil correction.

45. (b) Molecular formula of Sodium carbonate is  $\text{Na}_2\text{CO}_3$  and that of Sodium bicarbonate is  $\text{NaHCO}_3$
46. (b)
47. (d) Given reaction is an exothermic reaction.
48. (c) Rest of the options are examples of air in solid type.
49. (b) When  $\text{NH}_4\text{Cl}$  is added to the flask containing water, the solution becomes colder as the salt takes heat from the surrounding water.  
This is an endothermic reaction.
50. (b)
51. (b)
52. (b) Rest of the reactions are oxidation reactions. These reactions also fall under the category of slow reactions.
53. (a)
54. (c) Paper chromatography is a technique used to separate pigments present in plants.
55. (d)
56. (d) *Suvarnabhasma* is an ayurvedic formulation prepared by a series of processes. It contains about 90% of pure gold particles and 10% of other herbs to convert gold into therapeutic form.
57. (b)
58. (a)
59. (c)
60. (d)
61. (c) Rhinoceros' horn is made of keratin.
62. (a) Flowers are plant's reproductive structures sexually.
63. (a)
64. (d) Irrespective of the gender of previous child, there is an equal chance of male or female child's birth.
65. (c)
66. (d) The nucleoid (nucleus-like) is an irregularly-shaped region within the cell of a prokaryote that contains all or most of the genetic material including DNA. In eukaryotes, the nucleus is surrounded by a nuclear membrane.
67. (a)
68. (a)
69. (b) Option B is yeast which fulfills all three characters mentioned in the question. Mucor (option A) is multicellular; while amoeba and paramecium (option C and D respectively) are unicellular aerobes.
70. (c)
71. (a) *Bos indicus* is a breed of cow; Rhode island are broilers and • *Rohu* is a fresh water fish.
72. (a) In *bhindi* the flower is bisexual i. e. male and female reproductive parts are present in same flower. Whereas in other examples it is not so. Male and female flowers are separate.
73. (c) In winter, we should eat oil seeds like black *til*.
74. (c) Plasmolysis is a type of osmosis where cell loses water (solvent) through cell membrane (a semi permeable membrane) when placed in hypertonic medium. It is a reversible process where no energy expenditure is observed.
75. (d) *Ganja* is primarily a hallucinogen.
76. (a)
77. (c) Malaria is caused due to a protozoan plasmodium sps. Typhoid and cholera are bacterial diseases, while filariasis is caused by worm.
78. (d)
79. (b) Bile is secreted in liver and stored in gall bladder. It contains bile salts and bile pigments. Bile salts neutralise the acidity of chyme (end product of digestion in stomach which is acidic due to  $\text{HCl}$  secretion by gastric cells) and ease out the lipid digestion of emulsifying lipids in food. Bile pigments impart colour to faeces.
80. (b) The symptoms signify possibility of tuberculosis (TB).
81. (a)
82. (b) Option A is cork cells, option D shows xylem cells which are dead cells. .
83. (d)
84. (a)
85. (d)
86. (d) Fructose is fruit sugar i. e. a carbohydrate made up of Carbon, Hydrogen and Nitrogen.
87. (c) Carotene is a pigment and not a plastid. Chlorophyll is a pigment and chloroplast is a plastid.
88. (a) The technique shown in the diagram is tissue culture where agar is used as a medium for cell growth.
89. (d) 90. (c)
91. (a) 92. (b)
93. (b) 94. (d)
95. (c) 96. (a)
97. (c) Methyl mercury is a neurotoxin.
98. (a) CFL (Compact Fluorescent Lamp) bulbs contain Mercury.  
Hence improper disposal can lead to Mercury pollution. Rest of the two options do not cause Mercury pollution.
99. (c) Mercury accumulates in the tissues of aquatic living beings.  
As we go higher in food chain, the concentration of toxicant increases as compared to the concentration in immediate lower level.
100. (a) In case of aquatic ecosystems, micro organisms convert elemental Mercury to methyl mercury.

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