

NEHRU SCIENCE CENTRE MUMBAI
(A UNIT OF NATIONAL COUNCIL OF SCIENCE MUSEUMS)
MINISTRY OF CULTURE, GOVT. OF INDIA

Time : 2½ Hrs.

M. M. : 100

APTITUDE TEST FOR SELECTION OF EDUCATION ASSISTANT 'A'

Name of the candidate :	Father's name :
Contact mobile no. : Email Id :	Signature with date :

Section-A (60 Marks)

(Multiple Choice)

Please encircle ☐ the correct answer on the given answer sheet.

Please note that more than one circle in any question will be treated as wrong one. If you have put more circles, please ☒ all others except the one you think is correct ☐ a ☒ b c d

Please return the question paper/answer sheet to the invigilator within the given time limit. There is no negative marking. Question numbers 1 to 60 carry 1 mark each.

<p>Q1. The clear sky appears blue because (a) blue light gets absorbed in the atmosphere (b) ultraviolet radiations are absorbed in the atmosphere (c) violet and blue lights get scattered more than lights of all other colours by the atmosphere (d) light of all other colours is scattered more than the violet and blue colour lights by the atmosphere</p> <p>Q2. Rahul visited a Natural Gas Compressing Unit and found that the gas can be liquefied under specific conditions of temperature and pressure. While sharing his experience with friends he got confused. Help him to identify the correct set of conditions (a) Low temperature, low pressure (b) High temperature, low pressure (c) Low temperature, high pressure (d) High temperature, high pressure</p> <p>Q3. One of the following processes is not a step involved in the water-cycle operating in nature (a) evaporation (b) transpiration (c) precipitation (d) photosynthesis</p> <p>Q4. A boy is whirling a stone tied with a string in an horizontal circular path. If the string breaks, the stone (a) will continue to move in the circular path (b) will move along a straight line towards the centre of the circular path (c) will move along a straight line tangential to the circular path (d) will move along a straight line perpendicular to the circular path away from the boy</p> <p>Q5. The oxidant which is used as an antiseptic is (a) KBrO_3 (b) KMnO_4 (c) CrO_3 (d) KNO_3</p>	<p>Q6. Fats are stored in human body as (a) cuboidal epithelium (b) adipose tissue (c) bones (d) cartilage</p> <p>Q7. When we change feeble sound to loud sound we increase its (a) frequency (b) amplitude (c) velocity (d) wavelength</p> <p>Q8. During summer, water kept in an earthen pot becomes cool because of the phenomenon of (a) diffusion (b) transpiration (c) osmosis (d) evaporation</p> <p>Q9. Which of the following does not lose their nucleus at maturity? (a) Companion cells (b) Red blood cells (c) Vessel (d) Sieve tube cells</p> <p>Q10. Rocket works on the principle of conservation of (a) mass (b) energy (c) momentum (d) velocity</p> <p>Q11. Which of the following can be used to form a real image always? (a) Concave mirror only (b) Plane mirror only (c) Convex mirror only (d) None of these</p> <p>Q12. If your diet is deficient in sour fruits then you are supposed to suffer from (a) Rickets (b) Beri Beri (c) Scurvy (d) Night blindness</p> <p>Q13. The focal length of the eye lens increases when eye muscles (a) are relaxed and lens becomes thinner (b) contract and lens becomes thicker (c) are relaxed and lens becomes thicker (d) contract and lens becomes thinner</p>
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Q14. For a fixed mass of gas at constant temperature, if we decrease volume, the pressure will _____.

- (a) also decrease (b) increase
(c) remains constant (d) none of these

Q15. A small baby plant coming out of a seed is called _____.

- (a) Grain (b) Root
(c) Dispersal (d) Seedling

Q16. Twinkling of stars is due to atmospheric

- (a) dispersion of light by water droplets
(b) refraction of light by different layers of varying refractive indices
(c) scattering of light by dust particles
(d) internal reflection of light by clouds

Q17. Diamond is an allotropic form of

- (a) Carbon (b) Hydrogen
(c) Nitrogen (d) Silicon

Q18. The atmosphere of the earth is heated by radiations which are mainly

- (a) radiated by the sun
(b) re-radiated by land
(c) re-radiated by water
(d) re-radiated by land and water

Q19. Which from the following is true for "Sound"?

- (a) Sound cannot travel through a vacuum
(b) Sound cannot travel through gases
(c) Sound cannot travel through liquids
(d) Sound cannot travel through solids

Q20. The gas, commonly known as "laughing gas", is

- (a) Carbon Dioxide (b) Sulphur Dioxide
(c) Nitrous Oxide (d) Sodium Oxide

Q21. Amphibians do not have the following

- (a) Three chambered heart (b) Gills or lungs
(c) Scales (d) Mucus glands

Q22. A few substances are arranged in the increasing order of 'forces of attraction' between their particles. Which one of the following represents a correct arrangement?

- (a) Water, air, wind (b) Air, sugar, oil
(c) Oxygen, water, sugar (d) Salt, juice, air

Q23. One of the following factors does not lead to soil formation in nature

- (a) the sun (b) water
(c) wind (d) polythene bags

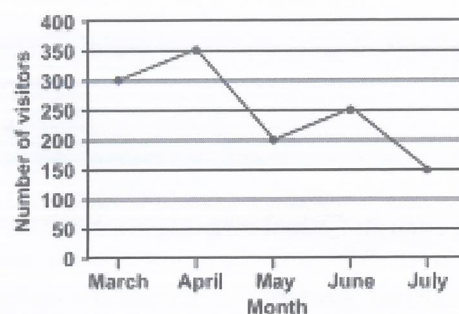
Q24. Girth of stem increases due to

- (a) apical meristem (b) lateral meristem
(c) intercalary meristem (d) vertical meristem

Q25. Which of the following is not a greenhouse gas?

- (a) Methane (b) Carbon dioxide
(c) Carbon monoxide (d) Ammonia

Q26. The line graph shows the number of people who visited a museum from March to July. How many more visitors were there in April than in June?



- (a) 200 (b) 350
(c) 150 (d) 100

Q27. "Every Drop Counts" is a slogan related to

- (a) counting of drops of any liquid.
(b) counting of water drops.
(c) importance of water.
(d) importance of counting

Q28. Mountaineers carry oxygen cylinders with them because

- (a) there is no oxygen on high mountains.
(b) there is deficiency of oxygen on mountains at high altitude.
(c) oxygen is used for cooking.
(d) oxygen keeps them warm at low temperature.

Q29. When we blow air into the balloon it inflates because:

- (a) Air particles diffuse into the balloon
(b) The temperature of air in the balloon increases
(c) Air particles collide with the walls of the balloon and exert pressure on them
(d) Rubber is elastic in nature

Q30. 1 nanometer = ?

- (a) 10^{-3} meter (b) 10^{-6} meter
(c) 10^{-9} meter (d) 10^{-12} meter

Q31. The term "water-pollution" can be defined in several ways. Which of the following statements does not give the correct definition?

- (a) The addition of undesirable substances to water-bodies
(b) The removal of desirable substances from water-bodies
(c) A change in pressure of the water bodies
(d) A change in temperature of the water bodies

Q32. The organisms which cause diseases in plants and animals are called:

- (a) Pathogens (b) Vectors
(c) Insects (d) Worms

Q33. The property to flow is unique to fluids. Which one of the following statements is correct?

- (a) Only gases behave like fluids
(b) Gases and solids behave like fluids
(c) Gases and liquids behave like fluids
(d) Only liquids are fluids

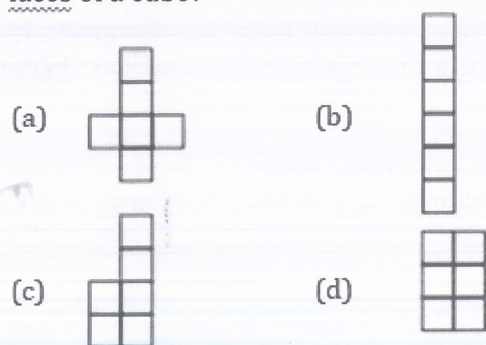
Q34. A hockey player is moving northward and suddenly turns westward with the same speed to avoid an opponent. The force that acts on the player is

- (a) frictional force along westward.
(b) muscle force along southward.
(c) frictional force along south-west.
(d) muscle force along south-west.

Q35. In malignant tumors, the cells proliferate, grow rapidly and move to other parts of the body to form new tumors. This stage of disease is called:

- (a) metagenesis (b) metastasis
(c) teratogenesis (d) mitosis

Q36. Which net, when folded, will cover all the faces of a cube?



Q37. Tincture of iodine has antiseptic properties. This solution is made by dissolving

- (a) iodine in potassium iodide (b) iodine in vaseline
(c) iodine in water (d) iodine in alcohol

Q38. Which is not an aquatic animal?

- (a) Hydra (b) Jelly fish
(c) Corals (d) Filaria

Q39. Before playing the orchestra in a musical concert, a sitarist tries to adjust the tension and pluck the string suitably. By doing so, he is adjusting

- (a) intensity of sound only
(b) amplitude of sound only
(c) frequency of the sitar string with the frequency of other musical instruments
(d) loudness of sound

Q40. The value of acceleration due to gravity

- (a) is same on equator and poles
(b) is least on poles
(c) is least on equator
(d) increases from pole to equator

Q41. Spinal cord originates from:

- (a) Cerebrum (b) Cerebellum
(c) Medulla (d) Pons

Q42. Which of the following letters does not have any line of symmetry?

- (a) E (b) T
(c) N (d) X

Q43. The total set of carbon emissions caused by an individual is called –

- (a) carbon cycle (b) carbon handprint
(c) carbon footprint (d) carbon summary

Q44. Which of the following statements about the electron is incorrect?

- (a) It is a negatively charged particle.
(b) The mass of electron is equal to the mass of neutron.
(c) It is a basic constituent of all atoms.
(d) It is a constituent of cathode rays

Q45. Which gas is produced on burning of fossil fuels?

- (a) Sulphur dioxide (b) Oxygen
(c) Nitrogen (d) Carbon dioxide

Q46. The primary treatment of waste water involves the removal of:

- (a) dissolved impurities (b) stable particles
(c) toxic substances (d) harmful bacteria

Q47. Solar System is in _____ galaxy.

- (a) Milky Way (b) Andromeda
(c) Proxima Centauri (d) None of the above

Q48. The clinical test that is used for diagnosis of typhoid is:

- (a) ELISA (b) ESR
(c) PCR (d) Widal

Q49. The maximum load a wire can withstand without breaking, when its length is reduced to half of its original length, will

- (a) be double. (b) be half.
(c) be four times. (d) remain same.

Q50. Which condition out of the following will increase the evaporation of water?

- (a) Increase in temperature of water
(b) Decrease in temperature of water
(c) Less exposed surface area of water
(d) Adding common salt to water

Q51. Rohan's father experienced a heart attack. Doctor told him that his blood vessels have become narrower. What could be the reason for this?

- (a) His diet has an excess of roughage and water.
- (b) His diet lacks proper amount of vitamins and minerals.
- (c) His diet has an excess of fats and carbohydrates.
- (d) His diet lacks proper amount of proteins and carbohydrates.

Q52. Ultrasound has frequency of vibration

- (a) between 20 and 20,000 Hz
- (b) below 20 Hz
- (c) above 20,000 Hz
- (d) between 500 and 10,000 Hz

Q53. Cork cells are made impervious to water and gases by the presence of

- (a) cellulose
- (b) lipids
- (c) suberin
- (d) lignin

Q54. Ice is floating on water in a beaker when ice completely melts then level of water in beaker:

- (a) Increases
- (b) Remains the same
- (c) Decreases
- (d) First increases then decreases

Q55. Pick one material from the following which is completely soluble in water.

- (a) Chalk powder
- (b) Tea leaves
- (c) Glucose
- (d) Saw dust

Q56. Transpiration is a process in which plants

- (a) receive water from soil.
- (b) absorb water vapour from air.
- (c) prepare food from water.
- (d) release water vapour.

Q57. The earth is an approximate sphere. If the interior contained matter which is not of the same density everywhere, then on the surface of the earth, the acceleration due to gravity

- (a) will be directed towards the centre but not the same everywhere.
- (b) will have the same value everywhere but not directed towards the centre.
- (c) will be same everywhere in magnitude directed towards the centre.
- (d) cannot be zero at any point.

Q58. All genes located on the same chromosome:

- (a) Form different groups depending upon their relative distance
- (b) Form one linkage group
- (c) Will not form any linkage groups
- (d) Form interactive groups that affect the phenotype

Q59. Neutral insulator P is rubbed with neutral insulator Q. Insulator P becomes positively charged after the rub. Which of the following statements is correct?

- (a) P loses some electrons to insulator Q.
- (b) Q loses some electrons to insulator P.
- (c) P gains positive charge from insulator Q.
- (d) Q gains positive charge from insulator P.

Q60. Rusting of an article made up of iron is called

- (a) corrosion and it is a physical as well as chemical change
- (b) dissolution and it is a physical change
- (c) corrosion and it is a chemical change
- (d) dissolution and it is a chemical change

Section-B (40 Marks)

(Physical Sciences)

(Descriptive type)

Note- Question numbers 1 to 5 carry 2 marks each. Question numbers 6 to 10 carry 4 marks each. Question 11 carries 10 marks.

- Q1. Why does microwave oven heats up a food item containing water molecules most efficiently?
- Q2. Two bodies of unequal mass are moving in the same direction with equal kinetic energy. The two bodies are brought to rest by applying retarding force of same magnitude. How would the distance moved by them before coming to rest compare?
- Q3. Two identical solid balls, one of ivory and the other of wet-clay, are dropped from the same height on the floor. Which one will rise to a greater height after striking the floor and why?
- Q4. Why does a metal bar appear hotter than a wooden bar at the same temperature? Equivalently it also appears cooler than wooden bar if they are both colder than room temperature.
- Q5. Suppose gravity of earth suddenly becomes zero, then in which direction will the moon begin to move if no other celestial body affects it?
- Q6. The gas pedal in a car is called the accelerator. (a) Are there any other controls in the car that can be considered accelerators? (b) When is the gas pedal not an accelerator?
- Q7. A fat man and a small boy stand facing each other on frictionless ice. They put their hands together and push against each other so that they move apart. (a) Who moves away with the higher speed? (b) Who moves farther while their hands are in contact?
- Q8. A large and a small balloon are connected by a tube with taps. Can you predict what happens when the taps are opened so that air can move between the balloons?
- Q9. When 500 mL of water and 500 mL of ethanol are mixed the resulting volume is less than 1 L. How?
- Q10. Two balls of the same size but of different materials, rubber and iron are kept on the smooth floor of a moving train. The brakes are applied suddenly to stop the train. Will the balls start rolling? If so, in which direction? Will they move with the same speed? Give reasons for your answer.
- Q11. Write short note on **any one** of the following:
- (a) Digital India
 - (b) Green Chemistry
 - (c) Water-A Precious Resource
 - (d) Indian heritage in Science & Technology
 - (e) Nanotechnology

Section-B (40 Marks)

(Life Sciences)

(Descriptive type)

Note- Question numbers 1 to 5 carry 2 marks each. Question numbers 6 to 10 carry 4 marks each. Question 11 carries 10 marks.

Q1. If a fresh water fish is placed in aquarium containing sea water, will the fish be able to survive? Explain giving reasons.

Q2. What roles do enzymes play in detergents that we use for washing clothes? Are these enzymes produced from some unique microorganisms?

Q3. While doing a PCR, 'denaturation' step is missed. What will be its effect on the process?

Q4. Why mother's milk is considered the most appropriate food for a new born infant?

Q5. How is sulphur important for plants? Name the amino acids in which it is present.

Q6. What is DNA polymorphism? Why is it important to study it?

Q7. Give the full form of CT and MRI. How are they different from each other? Where are they used?

Q8. Gene expression can be controlled with the help of RNA. Explain the method with an example.

Q9. Palm is a monocotyledonous plant, yet it increases in girth. Why and how?

Q10. Explain the concept of the Blue Revolution.

Q11. Write short note on **any one** of the following:

- (a) Climate change & Global warming
- (b) New Age Vaccines
- (c) Zoonotic Diseases – a global threat to human health
- (d) Technologies in Medical Science
- (e) Cleanliness & Healthcare