BIRLA INDUSTRIAL & TECHNOLOGICAL MUSEUM
(A unit of National Council of Science Museums)
19A, Gurusaday Road, Kolkata – 700 019
Written Test for recruitment of Education Assistant 'A' at BITM, Kolkata

Date: 24.02.2023

Maximum Marks: 100
Time: 2 hours.

Roll No: _____   Signature:_____

General Instructions:

1. All questions in **Part–I** are compulsory.
2. To answer objective type questions put a (√) mark on the correct answer in the question paper itself from the 4 alternatives given below against each question.
3. To change answer, put (X) on previous answer and (√) the fresh answer.
4. For answering Descriptive type questions in **Part–II**, use separate sheets to be provided by the office.
5. Smart phone/smart watch are to be put on switched off mode in the examination hall.
6. There is no negative marking.

Part - I

Please select the right alternative: (1 X 60) = 60

1. The capacity of a bucket used in bathroom is 25 litre. How many buckets of water can be stored in a 1 m^2 storage tank?

   a. 60   b. 30   c. 40   d. 20

2. The elements that are called Hallogens

   a. VIIIA   b. VIIA   c. VIIB   d. VIIIB

3. A boy starts from his house and travels 5 km to reach the market. After purchasing his book, he returns to his house then the magnitude of displacement of the boy is

   a. 5 km   b. Zero   c. 15 km   d. 10 km

4. The temperature at the bottom of waterfall will be more than that at the top because...

   a. Large area of falling water heat up due to sun rays

   b. Falling water takes heat from the Sun

   c. At the bottom potential energy of water is large

   d. The potentil energy of falling water is converted into heat.

5. Which of the following statements is true?

   a. The sound and light waves are both longitudinal waves

   b. Both the sound and the light waves are transverse waves

   c. In air sound waves are transverse and the light waves are longitudinal

   d. In air the sound waves are longitudinal and the light waves are transverse

6. In which of the following the speed of sound will be maximum?

   a. Water   b. Steel   c. Air   d. Vacuum

7. The ratio of resistance of the filament of two bulbs is 1 : 2. If both of these are connected in parallel, then the ratio of loss of power will be....

   a. 1 : 1   b. 1 : 4   c. 1 : 2   d. 2 : 1

8. When seen in blue light a red rose will appear as....

   a. Violet   b. Red   c. White   d. Black

9. Who discovered that white light consists of seven colours, first of all?

   a. Raman   b. Huygen   c. Maxwell   d. Newton

10. The 'Red shift' observed in the spectrum of a galaxy shows that

    a. The stars emitting red light are present in the galaxy

    b. The universe is contracting

    c. The universe is expanding

    d. The galaxy is red hot

11. The age of different layers of the earth are ascertained by the use of isotopes of..

    a. C (Carbon)   b. P (Phosphorous)   c. Pb (Lead)   d. I (Iodine)

12. A scooter's engine is of which type?

    a. External combustion engine

    b. Internal comustion engine

    c. Neither internal combustion engine nor external combustion engine

    d. Both internal combustion engine and external combustion engine

13. Which of the following is easier to be lifted by a helium-filled balloon?

    a. 1 kg Iron   b. 1 kg cotton   c. 1 kg water   d. 1 kg ice

14. Two bodies with masses m1 and m2 are moving with equal kinetic energy. Their linear momenta are numerically in the ratio..

    a. m_1/m_2 b. m_2/m_1 c. $\sqrt{m_1/m_2}$ d. $\sqrt{m_2/m_1}$

15. This disease is caused in the human body due to the deficiency of Vitamin C

    a. Night blindness   b. Beri-beri   c. Scurvy   d. Infertility

16. It is used in the preparation of dry cell

    a. NaCl   b. Na_2CO_3 c. NH_4Cl d. $NaHCO_3$

17. The molecular formula of saturated hydrocarbon is

    a. C_nH_{2n+2} b. C_nH_{2n} c. C_nH_{2n+1} d. All of these

18. On heating sodium acetate with soda-lime what is obtained?

    a. Ethylene   b. Methane   c. Ethane   d. All of these

19. Dry ice is

    a. Solid CO_2 b. Solid NH_3 c. Solid N_2 d. Solid CO(with ice)

20. The valency of SO_4^{-2} radical is

    a. 1   b. 2   c. 3   d. 4

21. The volume of 1 mole of any gas at N.T.P. will be

    a. 22.4 litre   b. 20.4 litre   c. 22.8 litre   d. 24.4 litre

22. Calgon is

    a. Washing soda   b. Sodium hexametaphosphate

    c. Sodium phosphate   d. Sodium silicate

23. Resistance of a wire is R ohm. If it is stretched to make its length double then its resistance becomes

    a. 2R   b. R/2   c. 4R   d. root 2R

24. A red body is illuminated by white light and observed through a transparent blue glass. What colour will the body appear to be?

    a. BLACK   b. BLUE   c. RED   d. WHITE

25. For a body to be in equilibrium under the action of unequal forces, minimum number of these forces must be

    a. 5   b. 4   c. 3   d. 2

26. Who developed the 'C'-language for computer

    a. James Gosling   b. Dennis Ritchie   c. Charles Babbage   d. Ken Thompson

27. The wavelength of de - Broglie's matter wave is

    a. $\lambda = h/mv$ b. $\lambda = c/v$ c. $\lambda = hc/E$ d. none of these

28. Who invented Radio Carbon dating method for determine the age of fossils

    a. Charles Lenz   b. Benjamin Franklin   c. Willad Libby   d. Robert Koch

29. The largest natural satellite in the solar system

    a. Demos   b. Iris   c. Ganymede   d. Titan

30. Weight of man on Earth is 60 Kg. What is his weight on Moon?

    a. 10 Kg   b. 20 kg   c. 6 kg   d. 60K

31. The largest mangrove forest is located in which part of India

    a. Andhra Pradesh   b. Andaman & Nicobar   c. West Bengal   d. Gujarat

32. The population of a country increased by an average of 2% per year from 2000 to 2003. If the population of this country was 20,00,000 on December 31, 2003, then the population of this country on January 1, 2000, to the nearest thousand would have been

    a. 18,46,000   b. 18,52,000   c. 10,00,000   d. 15, 00, 000

33. If f(x) is an odd function, then | f(x) | is

    a. an odd function   b. an even function   c. neither odd nor even   d. even and odd

34. When an external magnetic field is applied, what happens to the protons in a sample?

    a. All proton align with the field

    b. All protons align opposite to the field

    c. Some protons align with the field and some align opposite to it.

    d. All protons assume a random orientation

35. Presence of which among the following minerals in Banana makes them slightly radioactive?

    a. Sodium   b. Calcium   c. Magnesium   d. Pottasium

36. Which of the following is the most active chemically?

    a. Chlorine   b. Flourine   c. Lithium   d. Iodine

37. Which among the following is the correct decreasing of bio elements in Human Body?

    a. Oxygen, Hydrogen, Carbon, Nitrogen, Calcium and Phosphorus

    b. Oxygen, Carbon, Hydrogen, Nitrogen, Calcium and phosphorus.

    c. Hydrogen, Oxygen, Carbon, Nitrogen, Calcium and phosphorus.

    d. Carbon, Nitrogen, Oxygen Calcium, Hydrogen and phosphorus

38. Which of these is not a natural polymer?

    a. Starch   b. Cellulose   c. Proteins   d. Bakelite

39. Which is the most malleable metal?

    a. Copper   b. Silver   c. Gold   d. Aluminium

40. The language mainly used for business data processing is

    a. FORTRAN   b. PASCAL   c. COBOL   d. ALGOL

41. Which of the following gas is responsible for burning of eyes when we cut an onion?

    a. Chlorine   b. Helium   c. Sulphur   d. Methane

42. How many values an Electron spin quantum number can have?

    a. 1   b. 2   c. 4   d. 8

43. A simple pendulum is taken inside a deep mine. Relative to the period of oscillation on the surface, the time period inside the mine

    a. remains the same   b. decreases   c. increases   d. becomes infinite

44. When a planet moves around the sun, its

    a. areal velocity is constant   b. areal velocity depends on its position

    c. linear velocity is constant   d. angular velocity is constant

45. The absorption of ink by blotting paper involves

    a. viscosity of ink   b. capillary action phenomenon

    c. diffusion of ink through the blotting   d. siphon action

46. Betatron is a device for accelerating

    a. Proton   b. Neutron   c. Electron   d. None of these

47. Soaps are made in different colours. But why is soap's lather always white in colour?

    a. Light striking the large collection of soap bubbles gets scattered

    b. Soap film is more or less white in colour

    c. Light striking the soap bubbles get dispersed

    d. Due to scattering of light by the thick soap film

48. Find the maximum velocity for the overturn of a car moving on a circular track of radius 100 m. The co-efficient of friction between the road and tyre is 0.2

    a. 0.14 m/s   b. 140 m/s   c. 1.4 km/s   d. 14 m/s

49. Of the following properties of a wave, the one that is independent of the other is its

    a. amplitude   b. velocity   c. wavelength   d. frequency

50. Point A is at a lower electrical potential than point B. An electron between them on the line joining them will

    a. move towards A   b. move towards B

    c. move at right angles to the line joining A and B   d. remain at rest

51. On a clean glass plate a drop of water spreads to form a thin layer whereas a drop of mercury remains almost spherical because

    a. mercury is a metal

    b. density of mercury is greater than that of water

    c. cohesion of mercury is greater than its adhesion with glass

    d. cohesion of water is greater than its adhesion with glass

52. When we carry a bucket of water with one hand, why do we tend to hold the free arm out horizontally?

    a. To support the weight of bucket

    b. To shift the centre of gravity away from the bucket of water

    c. To ensure water doesn't spill from the bucket

    d. To shift the centre of gravity into the bucket of water

53. A standing wave is formed on a tightly stretched string. The distance between a node and an antinode is:

   a. 1/8 wavelength   b. 1/4 wavelength   c. 1/2 wavelength   d. 1 wavelength

54. No two electrons will have all the four quantum numbers equal. This statement is known as

   a. Pauli exclusion principle   b. Uncertainty principle

   c. Hund's rule   d. Aufbaue's principle

55. The change in internal energy of the gas is directly proportional to

   a. The change in volume   b. Change in pressure

   c. Change in temperature   d. None of these

56. The optical spectrum has wavelengths ranging from

   a. 10 nm to 10^6 nm   b. 10nm to 770 nm   c. 370 nm to 770 nm   d. 370 nm to 10^6nm

57. Which of the following is electromagnetic in nature?

   a. Alpha rays   b. Beta rays   c. Gamma rays   d. Cathode rays

58. If $f(x) = 2 + x^3$ then $f^{-1}(x) =$

   a. $\sqrt[3]{x} + 2$ b. $\sqrt[3]{x} - 2$ c. $\sqrt[3]{x + 2}$ d. $\sqrt[3]{x - 2}$

59. The probability of an impossible event is

   a. ½   b. 1   c. 0   d. None

60. Two letters are taken at random from the word "HOME". The probability that at least one is a vowel is

   a. ½   b. 2/3   c. 5/6   d. None

PART-II

Write a short note on any two of the following topics: (2 x 20) = 40

1. James web telescope

2. Genome editing Pros & Cons

3. Impact of Science Centres/Museums on society

4. Developments of S&T in 75 years of Independent India

5. Artificial intelligence

6. The Indian COVID vaccine