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(30 October 1909 – 24 January 1966)
Father of Indian nuclear programme
Adams Prize (1942)
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MSAT (Mathematics & Science Ability Test)

9th Std.   50 Questions   45 Minutes   200 Marks   Negative Marking (+4, -1)

1. The decimal representation of $\frac{-16}{45}$

   A) $0.\overline{35}$ B) $-3.\bar{5}$ C) $0.35\overline{55}$ D) $3.\bar{5}$

2. $\frac{2.3^{n+1}+7.3^{n-1}}{3^{n+2}-2\left(\frac{1}{3}\right)^{1-n}} =$

   A) 1   B) 3   C) -1   D) 0

3. If $\left(\frac{2}{3}\right)^{x+2} = \left(\frac{3}{2}\right)^{2-2x}$, then x =

   A) 1   B) 3   C) 4   D) 0

4. The greatest number among $\sqrt[3]{9}, \sqrt[4]{11}, \sqrt[6]{17}$ is

   A) $\sqrt[3]{9}$ B) $\sqrt[4]{11}$ C) $\sqrt[6]{17}$ D) Can Not be determined

5. The value of $\frac{15}{\sqrt{10}+\sqrt{20}+\sqrt{40}-\sqrt{5}-\sqrt{80}}$ is

   A) $\sqrt{5}(5+\sqrt{2})$ B) $\sqrt{5}(2+\sqrt{2})$ C) $\sqrt{5}(1+\sqrt{2})$ D) $\sqrt{5}(3+\sqrt{2})$

6. The rationalizing factor of $a^{1/3} + a^{-1/3}$ is

   A) $a^{1/3} - a^{-1/3}$ B) $a^{2/3} + a^{-2/3}$ C) $a^{2/3} - a^{-2/3}$ D) $a^{2/3} + a^{-2/3} - 1$

7. $\sqrt{(3+\sqrt{5})}$ is equal to

   A) $\sqrt{5}+1$ B) $\sqrt{3}+\sqrt{2}$ C) $(\sqrt{5}+1)/\sqrt{2}$ D) $\frac{1}{2}(\sqrt{5}+1)$

8. $\sqrt[4]{(17+12\sqrt{2})} =$

   A) $\sqrt{2}+1$ B) $2^{1/4}(\sqrt{2}+1)$ C) $2\sqrt{2}+1$ D) None of these

9. The value of 0.9999…in the form p/q is, where p and q are integers.

   A) 1/9   B) 9/10   C) 2/9   D) 1

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10. The rational number between ½ and 1/3 is

   A) 2/5   B) 1/5   C) 3/5   D) 4/5

11. 1.272727...... can be expressed in rational form as

   A) 14/99   B) 14/11   C) 11/14   D) 99/14

12. If $x = 2^{1/3} - 2^{-1/3}$, Then $2x^3 + 6x =$

   A) 14   B) -14   C) $8\sqrt{3}$ D) $-8\sqrt{3}$

13. Which of the following is a pure surd?

   A) $\sqrt{3}$ B) $3^3\sqrt{5}$ C) $\sqrt{12}$ D) $33\sqrt{9}$

14. The value of 1/3 of 15^{27} is

   A) 5^{27} B) 15^9 C) 5.15^{26} D) 5.3^9

15. Which of the following numbers has the terminal decimal representation

   A) 1/7   B) 1/3   C) 3/5   D) 17/3

16. The fundamental particles present in the nucleus of an atom are

   A) Alpha particles and electrons   B) Neutrons and protons   C) Neutrons and electrons   D) Electrons, neutrons and protons

17. Number of neutron in C^{12} is

   A) 6   B) 7   C) 8   D) 9

18. Heaviest particle

   A) Meson   B) Neutron   C) Proton   D) Electron

19. The nucleus of helium contains

   A) Four protons   B) Four neutrons   C) Two neutrons and two protons   D) Four protons and two electrons

20. The number of electrons in an atom of an element is equal to its

   A) Atomic weight   B) Atomic number   C) Equivalent weight   D) Electron affinity

21. Which of the following are isoelectronic with one another

   A) Na^+ and Ne   B) K^+ and O   C) Ne and O   D) Na+ and K^+

22. The number of electrons in one molecule of CO_2 are

   A) 22   B) 44   C) 66   D) 88

23. Chlorine atom differs from chloride ion in the number of

   A) Proton   B) Neutron   C) Electrons   D) Protons and electrons

24. Neutrons are found in atoms of all elements except in

    A) Chlorine   B) Oxygen   C) Argon   D) Hydrogen

25. The nitride ion in lithium nitride is composed of

    A) 7 protons + 10 electrons   B) 10 protons + 10 electrons   C) 7 protons + 7 protons   D) 10 protons + 7 electrons

26. Tritium is the isotope of

    A) Hydrogen   B) Oxygen   C) Carbon   D) Sulpher

27. Which of the following is always a whole number

    A) Atomic weight   B) Atomic radii   C) Equivalent weight   D) Atomic number

28. Which has maximum molecules?

    A) 7 g NH_2 B) 16 g NO_2 C) 2 g H_2 D) 16 g O_2

29. Noble gases are?

    A) Monoatomic   B) Triatomic   C) Diatomic   D) None

30. Atomicity of Ammonium sulphate molecule is

    A) 4   B) 10   C) 12   D) 15

31. A body of mass m kg is lifted by a man to a height of one metre in 30 sec. Another man lifts the same mass to the same height in 60 sec. The work done by them are in the ratio

    A) 1 : 2   B) 1 : 1   C) 2 : 1   D) 4 : 1

32. The same retarding force is applied to stop a train. The train stops after 80 m. If the speed is doubled, then the distance will be

    A) The same   B) Doubled   C) Halved   D) Four times

33. The distance between two consecutive crests in a wave train produced in a string is 5 cm. If 2 complete waves pass through any point per second, the velocity of the wave is

    A) 10 cm/sec   B) 2.5 cm/sec   C) 5 cm/sec   D) 15 cm/sec

34. A 50kg man with 20kg load on his head climbs up 20 steps of 0.25m height each. The work done in climbing is

    A) 5 J   B) 350 J   C) 100 J   D) 3430 J

35. A light and a heavy body have equal momentum. Which one has greater K.E

    A) The light body   B) The heavy body   C) The K.E. are equal   D) Data is incomplete

36. A weight lifter lifts 300 kg from the ground to a height of 2 meter in 3 second. The average power generated by him is

    A) 5880 watt   B) 4410 watt   C) 2205 watt   D) 1960 watt

37. A force applied by an engine of a train of mass 2.05×10^6 kg changes its velocity from 5m/s to 25 m/s in 5 minutes. The power of the engine is

    A) 1.025 MW
    B) 2.05 MW
    C) 5 MW
    D) 6 MW

38. A spherical ball of mass 20 kg is stationary at the top of a hill of height 100 m. It slides down a smooth surface to the ground, then climbs up another hill of height 30 m and finally slides down to a horizontal base at a height of 20 m above the ground. The velocity attained by the ball is

    A) 10 m/s
    B) $10\sqrt{30}\frac{m}{s}$
    C) 40 m/s
    D) 20 m/s

39. Two solid rubber balls A and B having masses 200 and 400 gm respectively are moving in opposite directions with velocity of A equal to 0.3 m/s. After collision the two balls come to rest, then the velocity of B is

    A) 0.15 m/sec
    B) 1.5 m/sec
    C) – 0.15 m/sec
    D) None of the above

40. A gun fires a bullet of mass 50 gm with a velocity of 30 m sec^{-1}. Because of this the gun is pushed back with a velocity of 1 m sec^{-1}. The mass of the gun is

    A) 15 kg
    B) 30 kg
    C) 1.5 kg
    D) 20 kg

41. A ball is projected vertically down with an initial velocity from a height of 20 m onto a horizontal floor. During the impact it loses 50% of its energy and rebounds to the same height. The initial velocity of its projection is

    A) 30 ms^{-1}
    B) 15 ms^{-1}
    C) 10 ms^{-1}
    D) 5 ms^{-1}

42. The pressure at the bottom of a tank containing a liquid does not depend on

    A) Acceleration due to gravity
    B) Height of the liquid column
    C) Area of the bottom surface
    D) Nature of the liquid

43. Frequency range of the audible sounds is

    A) 0 Hz – 30 Hz
    B) 20 Hz – 20 kHz
    C) 20 kHz – 20,000 kHz
    D) 20 kHz – 20 MHz

44. A log of wood of mass 120 Kg floats in water. The weight that can be put on the raft to make it just sink, should be (density of wood = 600 Kg/m³)

    A) 80 Kg
    B) 50 Kg
    C) 60 Kg
    D) 30 Kg

45. Two solids A and B float in water. It is observed that A floats with half its volume immersed and B floats with 2/3 of its volume immersed. Compare the densities of A and B

    A) 4 : 3
    B) 2 : 3
    C) 3 : 4
    D) 1 : 3

46. Cell theory was given by

    A) Leeuwenhoek
    B) Robert Brown
    C) Schleiden & Schwann
    D) Robert Hooke

47. Which of the following are storage sacs for solid or liquid contents of cells ?

    A) Lysoomes
    B) Vacuoles
    C) Golgi Apparatus
    D) mitochondria

48. Diatoms & protozoans are included in which kingdom ?

    A) Animalia
    B) Fungi
    C) Plantae
    D) Protista.

49. Which of the following belong to naked seed category?

    A) Pteridophyta
    B) Bryophyta
    C) Gymnosperms
    D) Angioperms

50. Which of the following nutrients are supplied to plants by air ?

    A) Carbon
    B) Phosphorus
    C) Nitrogen
    D) None of the above.

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