EHF

LEARNING FOR LIFE

EDUHEAL FOUNDATION

CLASS 9

LEVEL – 1

Set A1

EHF OLYMPIADS

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NATIONAL IIT-PMT OLYMPIAD (NIPO)

EHF NATIONAL IIT-PMT OLYMPIAD

Name : .....

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Class : .....

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BSE international finance olympiad (BIFO)

NATIONAL IIT-PMT OLYMPIAD (NIPO)

Level - 1 : All Level-1 successful* participants will get certificate, apititude report and online subscription, and school toppers will be eligible for school hero medals.

Level - 2 : School toppers* will be selected for level-2-National level - online computer based interactive test held at exam centres all over India. Besides selection for level-3, winner will get merit certificate, medals, educational CDs, laptop, scholarship and other prizes. There is no level-2 in Art and Cricket.

Level - 3 : Toppers will qualify# for level-3-International level-where you will compete with students globally. Get selected for EHFs International Olympiad training camp. Only Indian organization giving students exposure to global competitions. Represent India & win laurels. Guidance by top scientists. Prizes ranges from cash (millions of $), gadgets, foreign trips, publicity, fame, scholarships, Internships, conference participation and more.

* # See prospectus/website for details

Instructions for the Candidate

1. You are allowed additional 10 minutes to fill the required details in the RESPONSE SHEET (OMR).
2. The question paper is made as per syllabus guidelines & pattern given in the information Booklet. The Question Paper for Classes 1 to 6 contains 25 Questions each to be answered in 40 minutes. The Question paper for classes 7 to 12 contains 50 Questions each to be answered in 60 minutes. All questions are compulsory. Further instructions are given in the instruction letter to the teacher.
3. Use the response sheet to mark your responses by darkening the required circle. The response sheet has to be returned to the foundation, duly filled in. THE STUDENT CAN RETAIN THE QUESTION PAPER.

WEBSITE : WWW.EDUHEALFOUNDATION.ORG
E-MAIL : INFO@EDUHEALFOUNDATION.ORG

ROUGH WORK

PHYSICS

1. A bullet of mass 50 g is fired horizontally with a speed of 540 km/h from a gun of mass 5 kg. The recoil speed of the gun is

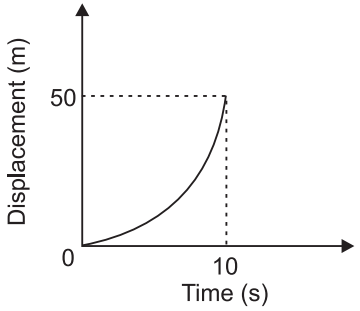
(1) 5.4 m/s

(2) 1.5 m/s

(3) 1.5 km/h

(4) 5400 km/h

2. The displacement-time graph of a uniformly accelerating body of mass 2 kg, initially at rest, is shown below:



The magnitude of force acting on the body is

(1) 0.5 N

(2) 1 N

(3) 2 N

(4) 4 N

3. A resultant force of 20 N gives a body of mass m an acceleration of 8 m/s^2 and a body of mass m' an acceleration of 24 m/s^2. What acceleration will this force cause the two masses to acquire if fastened together?

(1) 6 m/s^2

(2) 12 m/s^2

(3) 18 m/s^2

(4) 24 m/s^2

4. A planet is in circular orbit around the Sun. Its distance from the Sun is four times the average distance of Earth from the Sun. The period of this planet, in Earth years, is:

(1) 4

(2) 8

(3) 16

(4) 64

5. A ball of mass m is dropped from height h. The time taken by the ball to reach the ground is [Take g as acceleration due to gravity]

(1) $\sqrt{\frac{2h}{g}}$

(2) $\sqrt{\frac{h}{2g}}$

(3) $2\sqrt{\frac{h}{g}}$

(4) $\sqrt{\frac{mh}{g}}$

6. A boy spots a ball that goes up past an open window. The ball, which passes very close to the window, is in view of the boy for 0.25 s while going up, and the top-to-bottom height of the window is 2.0 m. What is the ball's upward velocity at the bottom of the window? (Take g = 10 m/s^2)

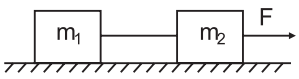
(1) 8.00 m/s

(2) 8.575 m/s

(3) 9.25 m/s

(4) 18.5 m/s

7. In the given figure, F = 20 N, $m_1 = m_2 = 3$ kg and the acceleration is 0.5 m/s^2. If the friction forces on the two blocks are equal, what is the magnitude of frictional force on either block?



(1) 10 N

(2) 17 N

(3) 8.5 N

(4) 0

8. A particle moves along the x axis from x_i to x_f. For which of the following values of the initial and final coordinates, the displacement will have the largest magnitude?

(1) $x_i = 4\text{m}, x_f = 6\text{m}$

(2) $x_i = -4\text{m}, x_f = -8\text{m}$

(3) $x_i = -4\text{m}, x_f = 2\text{m}$

(4) $x_i = -4\text{m}, x_f = 4\text{m}$

9. An elevator starts from rest with a constant upward acceleration. It moves 2 m in the first 0.6 s. A passenger in the elevator is holding a 3 kg packet by a vertical string. The tension in the string during acceleration is (Take g = 9.8 m/s^2)

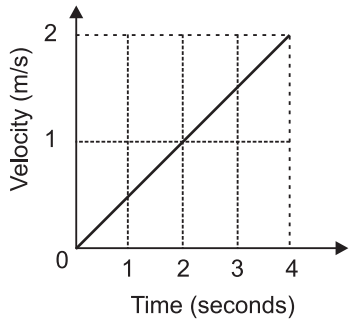
(1) 60.7 N

(2) 61.7 N

(3) 62.7 N

(4) 63.0 N

10. The velocity-time graph of a particle of mass 50 g moving in a fixed direction is shown in figure. The force on the particle is



(1) 25 N

(2) 25×10^{-1} N

(3) 25×10^{2} N

(4) 25×10^{-3} N

11. A closed compartment containing a gas is moving with some acceleration in horizontal direction. Neglect effect of gravity. Then the pressure in the compartment is

(1) same everywhere

(2) lower in the front side

(3) lower in the rear side

(4) higher in the upper side

12. Which of the following measures the distance travelled by a uniformly accelerated body in time t? [Symbols have their usual meaning]

(1) $\dfrac{(v-u)t}{a}$

(2) $\left(\dfrac{v+u}{2}\right)t$

(3) $\dfrac{2v}{a^2}$

(4) $2(v^2 - u^2)t$

13. The force of attraction between two bodies (each having mass of 1kg) are kept at a distance of 1m w.r.t. each other is:

(1) 9.8 N

(2) 6.7 N

(3) 980 N

(4) 6.7×10^{-11} N

14. When a car moves on a road with uniform speed of 30 km/hr, then the resultant force on the car is

(1) 10 N

(2) 40 N

(3) zero

(4) 80 N

15. When a horse pulls a wagon, the force that causes the horse to move forward is the force

(1) that ground exerts on it

(2) it exerts on the ground

(3) that wagon exerts on it

(4) it exerts on the wagon

CHEMISTRY

16. Sodium sulphate and barium sulphate mixture can be separated by

(1) Crystallization

(2) Chromatography

(3) Fractional distillation

(4) Filtration and crystallization

17. Consider the following quantities:

(P) Mass number

(Q) Average mass of a carbon atom in amu

(R) The charge of nucleus in coulomb

(S) Atomic mass of a carbon – 12 in grams

Now choose the correct option:

(1) Only (P) is whole number

(2) Only (P) and (R) are whole numbers

(3) Only (P) and (S) are whole numbers

(4) Only (R) and (S) are whole numbers

18. The compressibility of *Z* is less than that of *Y* and higher than that of *X*. If *X*, *Y* and *Z* are the different states of the same substance, then the kinetic energy in the increasing order will be

(1) $Y > X > Z$ (2) $Z < Y < X$

(3) $Y < Z < X$ (4) $X < Z < Y$

19. P, Q, R, S are four gases, If the order of their critical temperature is as follows: S < Q < R < P, which of the following gas has the highest boiling point?

(1) P (2) Q

(3) R (4) S

20. The molecular weight of a compound whose atomicity is five is 160, then it is

(1) Ca_3P_2(At. Wt. of Ca = 40, P = 31)

(2) Fe_2O_3(At. Wt. of Fe = 56, O = 16)

(3) Al_2O_3(At. Wt. of Al = 27, O = 16)

(4) Mg_3N_2(At. Wt. of Mg = 24, N = 14)

21. On adding '*x*' g of the solute to 100 g aqueous solution, the concentration in terms of mass by mass percentage changes from 50% to 60%. Amount of solute '*x*' is

(1) 20 g (2) 10 g

(3) 35 g (4) 25 g

22. Which one of the following is a correct statement?

(P) Ice provides more cooling effect than water at 273 K

(Q) Evaporation of a liquid causes cooling

(R) Increase of pressure decreases the separation between the particles of matter

(1) P and Q

(2) P and R

(3) Q and R

(4) P, Q and R

23. Addition of potassium nitrate to ice results in

(1) Increase in melting point

(2) Decrease in melting point

(3) Change in colour of ice

(4) Both (1) and (3)

24. The number of molecules in 4.25 g of ammonia is approximately

(1) 1.0×10^{23}

(2) 1.5×10^{23}

(3) 2.0×10^{23}

(4) 3.5×10^{23}

25. An element has 18 electrons, and 20 neutrons. Its charge is –2. What is its mass number?

(1) 38 (2) 39

(3) 40 (4) 32

26. Empirical formula of a compound of molecular mass 120 is CH_2O. The molecular formula of the compound is

(1) CH_4O_2

(2) $C_4H_8O_4$

(3) $C_3H_6O_3$

(4) $C_5H_7O_4$

27. A student weighs 30 kg. Suppose his body is entirely made of electrons. How many electrons are there in his body? Mass of an electron = 9.1×10^{-31} kg

(1) 3.29×10^{31}

(2) 3.29×10^{23}

(3) 3.29×10^{30}

(4) 3.29×10^{32}

28. The mass of a single atom of an element X is 2.65×10^{-23}g. The atomic mass and name of the element is:

(1) 16u, Oxygen

(2) 32u, Oxygen

(3) 16u, Sulphur

(4) 32u, Sulphur

29. Potassium chlorate decomposes, on heating, to form potassium chloride and oxygen. When 24.5 g of potassium chlorate is decomposed completely, then 14.9 g of potassium chloride is formed. Calculate the mass of oxygen formed.

(1) 9.6 g

(2) 10.6 g

(3) 12.6 g

(4) 13.6 g

30. Compute the number of ions present in 5.85 g of sodium chloride. [Na = 23, Cl = 35.5]

(1) 4.2033×10^{23} ions

(2) 3.2044×10^{23} ions

(3) 5.2033×10^{23} ions

(4) 1.2044×10^{23} ions

MATHEMATICS

31. Highest common factor of $21m + 4$ and $14m + 3$ (where $m \in N$) can be

(1) 2

(2) 5

(3) 9

(4) 1

32. $a^2 + b^2 = 7$ and $a^3 + b^3 = 10$, then greatest value of $a + b$ can be

(1) 4

(2) 5

(3) 6

(4) 9/2

33. Three points of a triangle ABC are A(4, 1), B(5, –1) and C(7, 2), the triangle lies in

(1) 1st and 2nd quadrant

(2) 2nd and 3rd quadrant

(3) 1st and 4th quadrant

(4) 2nd quadrant

34. $x^3 - 3 = 0$ has

(1) one rational root

(2) one integral root

(3) one irrational root

(4) two rational roots

35. $x^2 - 4x = 0$ has a root α and $x^2 + 4x = 0$ has a root $(-\alpha)$, then α can be

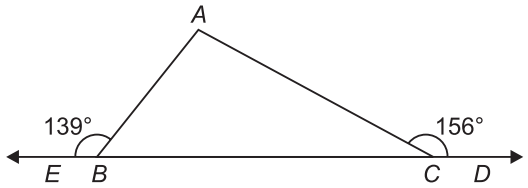
(1) 1

(2) 2

(3) 3

(4) 4

36. In the given figure, ED is a straight line such that $\angle ABE = 139°$ and $\angle ACD = 156°$. The measure of $\angle BAC$ is



(1) 110°

(2) 120°

(3) 115°

(4) 105°

37. If $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=0$, where a, b and c are non-zero real numbers, then $\frac{a^2+b^2+c^2-ab-bc-ca}{(a+b+c)^2}$ is equal to

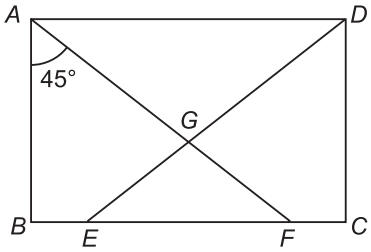
(1) 2

(2) –2

(3) 1

(4) –1

38. In the given figure, ABCD is a rectangle. If $\Delta ABF \cong \Delta DCE$, then the measure of $\angle AGD$ is equal to



(1) 45°

(2) 75°

(3) 80°

(4) 90°

39. If the lengths of the sides of a triangle are in the ratio 6 : 11 : 15 and its perimeter is 96 cm, then the height corresponding to the longest side is

(1) 8 cm

(2) $4\sqrt{2}$ cm

(3) $16\sqrt{2}$ cm

(4) $8\sqrt{2}$ cm

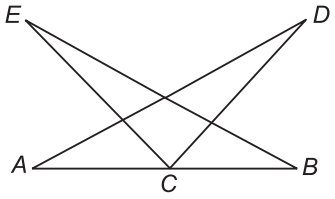
40. In the given figure, if $\Delta DAC \cong \Delta EBC$, $\angle CDA = 35°$ and $\angle EBC = 43°$, then the measure of $\angle BCD$ is

(1) 78°

(2) 35°

(3) 102°

(4) 43°



BIOLOGY

41. Match the following with correct combination:

Column–I	Column–II
(a) Sphaerosomes	(1) Store oils or fats
(b) Peroxisomes	(2) Stack of cisternae
(c) Elaioplasts	(3) Detoxification of drugs
(d) Dictyosomes	(4) Synthesis and storage of lipids

(1) $(a \to 1), (b \to 2), (c \to 4), (d \to 3)$

(2) $(a \to 4), (b \to 3), (c \to 2), (d \to 1)$

(3) $(a \to 4), (b \to 3), (c \to 1), (d \to 2)$

(4) $(a \to 4), (b \to 1), (c \to 3), (d \to 2)$

42. Which of the following gas is a CFC that is used in refrigerator?

(1) Methane (2) Ammonia

(3) Carbon dioxide (4) Freon

43. "Operation flood" is related to

(1) Green Revolution

(2) Brown Revolution

(3) White Revolution (Milk Production)

(4) Flood and disaster management

44. 'X' and 'Y' are the two types of connective tissues. 'X' contains Haversian canal and 'Y' contains chondrocytes and hyaline matrix. 'X' and 'Y' respectively are

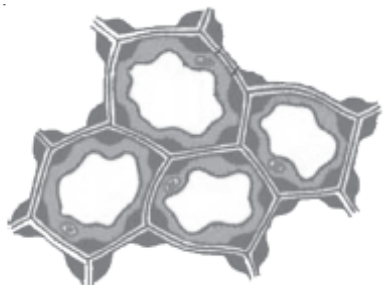
(1) Bone and cartilage

(2) Bone and adipose tissue

(3) Cartilage and bone

(4) Areolar tissue and cartilage

45. Identify the plant tissue depicted below:



(1) Collenchyma

(2) Parenchyma

(3) Sclerenchyma

(4) Chlorenchyma

46. Which of the following are common to both animal cells and plant cells?

(i) Cell wall (ii) Cell membrane

(iii) Ribosome (iv) Chloroplast

(v) Mitochondria

(1) (i), (iii) & (iv)

(2) (iii), (iv) & (v)

(3) (i), (ii) & (iii)

(4) (ii), (iii) & (v)

47. Amphibians of the plant kingdom are

(1) Bryophytes

(2) Pteridophytes

(3) Fungi

(4) Algae

48. Glands are composed of which of these tissue types?

(1) Epithelium

(2) Connective

(3) Muscle

(4) Nervous

49. In frog stratum corneum of skin contains _____.

(1) Living, nucleated, columnar cells

(2) Living, non-nucleated, flattened cells

(3) Dry, non-nucleated, flattened cells containing keratin

(4) Non-living, nucleated, columnar cells

50. Compare the statements A and B.

Statement A: Sclerenchyma cells do not have plasmodesmata.

Statement B : The cell walls of some permanent tissues are heavily lignified. Select the correct description:

(1) Both the statements A and B are wrong.

(2) Statement A is correct and B is wrong.

(3) Statement A is wrong and B is correct.

(4) Both the statements A and B are correct.

END OF THE EXAM