EHF

LEARNING FOR LIFE

EDUHEAL FOUNDATION

CLASS 10

LEVEL – 1

Set A1

EHF OLYMPIADS

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NATIONAL IIT-PMT OLYMPIAD (NIPO)

EHF NATIONAL IIT-PMT OLYMPIAD

Name : .....

Roll No : .....

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
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ROUGH WORK

PHYSICS

1. A boy runs on a circular track of radius 20 m and stops after covering one sixth of the track. The magnitude of his displacement will be

(1) 20π m

(2) 20 m

(3) 40π m

(4) $\frac{20\pi}{3}$ m

2. The magnetic field inside an ideal solenoid carrying constant non-zero current is

(1) Radial (2) Non-uniform

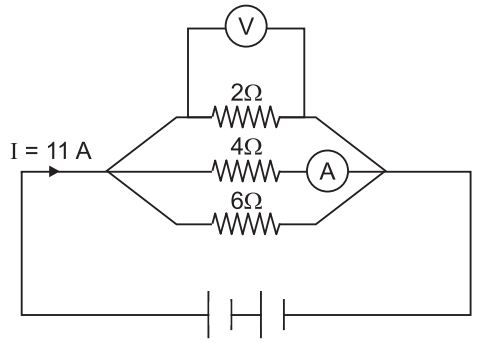
(3) Uniform (4) Zero

3. Same net force is applied on two different objects of masses m and $3m$. If x and y are the magnitudes of their acceleration respectively, then the ratio $\frac{x}{y}$ will be

(1) 1 : 3 (2) 1 : 1

(3) 3 : 1 (4) 9 : 1

4. In the circuit diagram shown above, the readings of voltmeter and ammeter respectively are



(1) 6 V, 3 A

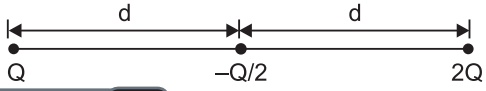
(2) 3 V, 6 A

(3) 12 V, 3 A

(4) 12 V, 12 A

Comprehension for (Q.No. 5 & Q.No. 6)

There are three charges placed as shown in figure. The distances between two nearby charges are d.



5. The force on 2Q will be

(1) $\frac{KQ^2}{2d^2}$ towards left

(2) $\frac{KQ^2}{2d^2}$ towards right

(3) $\frac{3KQ^2}{2d^2}$ towards right

(4) zero

6. The force on –Q/2 will be

(1) $\frac{KQ^2}{2d^2}$ towards left

(2) $\frac{KQ^2}{2d^2}$ towards right

(3) $\frac{3KQ^2}{2d^2}$ towards right

(4) zero

7. Superconductors are materials that appear to exhibit no resistance. Therefore, electrons passing through a superconductor will

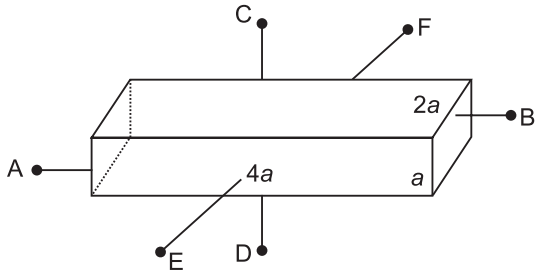
(1) generate no current

(2) generate no heat

(3) increase the current's power

(4) decrease the electrons' charge

8. A conductor with rectangular cross-section has dimensions ($a \times 2a \times 4a$) as shown in figure. Resistance across AB is x, across CD is y and across EF is z. Then



(1) $x = y = z$

(2) $x > y > z$

(3) $y > z > x$

(4) $x > z > y$

9. A charged particle moves through a region of magnetic field pointing in the direction perpendicular to its direction of velocity. Then during its subsequent motion,

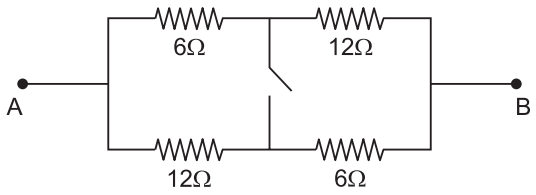
(1) Its momentum changes but the kinetic energy remains constant.

(2) Its momentum and kinetic energy both changes.

(3) Its momentum and kinetic energy both remains constant.

(4) Its kinetic energy changes but the momentum remains constant.

10. The ratio of equivalent resistance across A and B when switch is open to that when switch is closed is



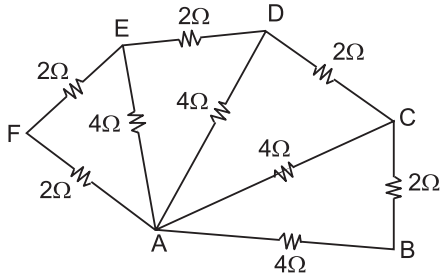
(1) $\frac{3}{8}$

(2) $\frac{5}{8}$

(3) $\frac{7}{8}$

(4) $\frac{9}{8}$

11. What is the total resistance, between A and B in the circuit shown in the given figure?



(1) 4Ω (2) 5Ω

(3) 2Ω (4) 9Ω

12. A wire is placed vertically between the poles of a horse-shoe magnet, such that the north pole is to your left and south pole is to your right. It carries a direct current flowing upwards then it will experience a force tending to deflect it

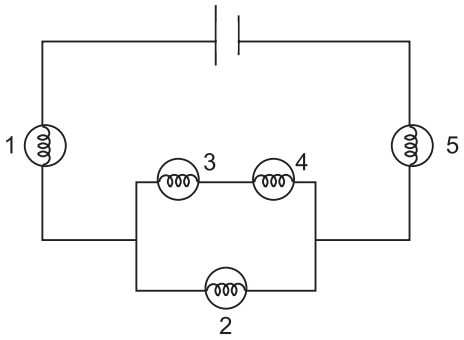
(1) to your left

(2) to your right

(3) away from you

(4) towards you

13. All the bulbs below are identical. Which bulb(s) light(s) most brightly?



(1) 1 only

(2) 2 only

(3) 3 and 4

(4) 1 and 5

14. Fleming's right hand rule gives

(1) The magnitude of induced current

(2) The magnitude of the magnetic field

(3) The direction of induced current

(4) Both magnitude and direction of the induced current

15. In SONAR, we use

(1) ultrasonic waves

(2) infrasonic waves

(3) radio waves

(4) audible sound waves

16. When ferric chloride reacts with aq. NaOH, a ..... coloured ppt is formed, whose chemical formula is :.....

(1) Brown, $Fe(OH)_2$
(2) Green, $Fe(OH)_2$
(3) Green, $Fe(OH)_3$
(4) Brown, $Fe(OH)_3$

17. Which of the following metals are refined by electrolytic refining?

(i) Au (ii) Cu
(iii) Zn (iv) K

(1) (i) and (ii) (2) (ii) and (iii)
(3) (i), (ii), (iii) (4) (ii), (iii) and (iv)

18. Bleaching powder has several uses, some of which are mentioned here. Pick the false one.

(1) For decolourising sugar
(2) For bleaching paper pulp
(3) For sterilizing water
(4) For making chloroform

19. Number of molecules in 500 ml of each H_2, O_2 and CO_2 at STP are in the order

(1) $H_2 < O_2 < CO_2$
(2) $H_2 > O_2 > CO_2$
(3) $H_2 = O_2 = CO_2$
(4) $H_2 > O_2 \neq CO_2$

20. Which of the following has arranged in order of increasing oxidation numbers of nitrogen?

(1) $NH_3 < N_2O_5 < NO < N_2$
(2) $NO_2^+ < NO_3^- < NO_2^- < N_3^-$
(3) $NH_4^+ < N_2H_4 < NH_2OH < N_2O$
(4) $NO_2 < NaN_3 < NH_4^+ < N_2O$

21. Which among the following statements about the reaction given below are correct?

$MnO_2 + 4\ HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

(I) Manganese oxide is oxidised
(II) Hydrogen chloride is reduced
(III) Manganese oxide is oxidising agent
(IV) Hydrogen chloride is reducing agent

(1) I and II
(2) III and IV
(3) II and IV
(4) I, II, III and IV

22. The process that does not involve oxidation is

(1) Rancidity (2) Corrosion
(3) Combustion (4) Neutralisation

23. Which of the given metals liberate hydrogen gas on reaction with both acids and bases?

(1) Sodium
(2) Potassium
(3) Magnesium
(4) Zinc

24. Which of the following statement is wrong about sodium hydroxide?

(1) It is a deliquescent substance
(2) It is corrosive
(3) It dissolves ferric oxide
(4) It releases hydrogen gas with aluminium

25. The aqueous solution of aluminium sulphate is:

(1) Acidic
(2) Basic
(3) Amphoteric
(4) Both (1) and (3)

26. Among the following groups of oxides, the group that is not reduced by smelting is

(1) ZnO, Fe_2O_3
(2) SnO_2, PbO
(3) MnO_2, ZnO
(4) CaO, MgO

27. If your teeth start decaying, the dentist may advise you to have your teeth filled. Which of the following is not used as the dental filling?

(1) Gold

(2) Sorel's cement

(3) Zinc oxychloride

(4) Zinc

28. Which among the following statements is incorrect for magnesium metal?

(1) It burns in oxygen with a dazzling white flame.

(2) It reacts with cold water to form magnesium oxide and evolves hydrogen gas.

(3) It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas.

(4) It reacts with steam to form magnesium oxide and evolves hydrogen gas.

29. A volatile liquid has:

(1) low boiling point and weaker interparticle forces

(2) high boiling point and weaker interparticle forces.

(3) high boiling point and stronger interparticle forces.

(4) low boiling point and stronger interparticle forces.

30. Which of the following concepts was not considered in Rutherford's atomic model?

(1) The electrical neutrality of atom.

(2) The quantization of energy.

(3) Electrons revolve around nucleus at very high speeds.

(4) Existence of nuclear forces of attraction on the electrons.

MATHEMATICS

31. Sum of digits of a two-digit number is 7 and the number increases by 9 if the digits are interchanged, then the number is equal to

(1) 25 (2) 43

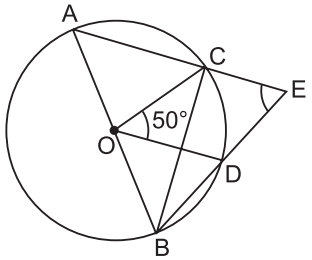
(3) 61 (4) 34

32. A boat can row 20 km downstream in 2 hours and return in two and half hours, then the speed of the stream is equal to

(1) 9 km/h (2) 8 km/h

(3) 2 km/h (4) 1 km/h

33. In the given figure, O is the centre and AB is a diameter of the circle. AC and BD when produced, meet at E. If $\angle COD = 50°$, then $\angle CED =$ _____



(1) 100°

(2) 65°

(3) 130°

(4) None of these

34. If $A + B = 225°$, then the value of $(1 + \tan A)(1 + \tan B)$ is

(1) 1

(2) 3

(3) 2

(4) 4

35. If 20 men take 30 days to complete a job, in how many days can 25 men complete the job?

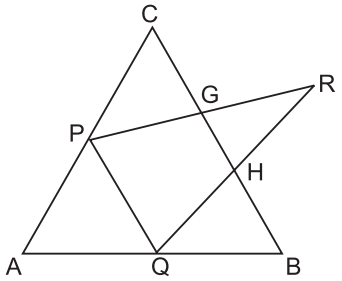
(1) 23

(2) 24

(3) 25

(4) 26

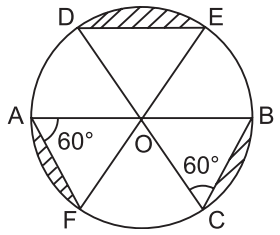
36. In the given figure, P and Q are the mid-points of AC and AB. Also PG = GR and HQ = HR. What is the ratio of area of ΔPQR to area of ΔABC ?



(1) $\frac{1}{2}$ (2) $\frac{2}{3}$

(3) $\frac{3}{5}$ (4) $\frac{5}{7}$

37. In the given figure O is the centre of the circle with radius r. AB, CD and EF are the diameters of the circle. ∠OAF = ∠OCB = 60º. What is the area of the shaded region?



(1) $\frac{r^2}{2}\left(\pi - \frac{3\sqrt{3}}{2}\right)$

(2) $\frac{r^2}{2}\left(\pi - \frac{3\sqrt{3}}{4}\right)$

(3) $\frac{r^2}{3}\left(\pi - \frac{2\sqrt{3}}{3}\right)$

(4) $\frac{r^2}{3}\left(\pi - \frac{3\sqrt{3}}{5}\right)$

38. Given that $2^x = 8^{y+1}$ and $9^y = 3^{x-9}$, the value of $x + y$ is

(1) 18 (2) 21

(3) 24 (4) 27

39. If $f(x) = \cos^2 x + \sec^2 x$, its value always is

(1) $f(x) < 1$

(2) $f(x) = 1$

(3) $2 > f(x) > 1$

(4) $f(x) \geq 2$

40. If $\tan\theta = -\frac{1}{\sqrt{5}}$ and θ lies in the II quadrant, then the value of cos θ is

(1) $\frac{\sqrt{5}}{\sqrt{6}}$

(2) $\frac{-\sqrt{5}}{\sqrt{6}}$

(3) $\frac{-1}{\sqrt{6}}$

(4) Both (1) and (2)

BIOLOGY

41. Arteries -

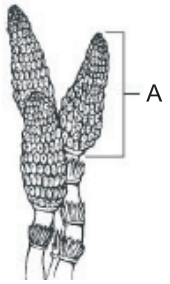
(1) Carry blood away from heart, are thick walled and contain valve

(2) Carry blood away from heart, are thick walled and lack valve

(3) Carry blood towards heart, are thin walled and contain valve

(4) Carry blood towards heart, are thin walled and lack valve

42. What is produced by the structure labelled A in the illustration?



(1) Rhizoids (2) Thallose leaves

(3) Spores (4) Rhizomes

43. Among mammals, which one plays a significant role in the digestion of milk proteins?

(1) Pepsin (2) Rennin

(3) Trypsin (4) Amylase

44. In humans, _____ provides a surface where exchange of gases can take place.

(1) Neuron (2) Villi

(3) Nephron (4) Alveolus

45. After an accident, Ram lost his memory, intelligence and ability to think and reason out. It also affected his ability to hear and see. Which part of the central nervous system was most likely affected in the accident?

(1) Spinal cord (2) Forebrain

(3) Midbrain (4) Hindbrain

46. While explaining the role of various plant hormones practically, a teacher observed many wilted leaves on a tree in the garden. Which of the following hormones is/are responsible for this?

(1) Auxins (2) Cytokinins

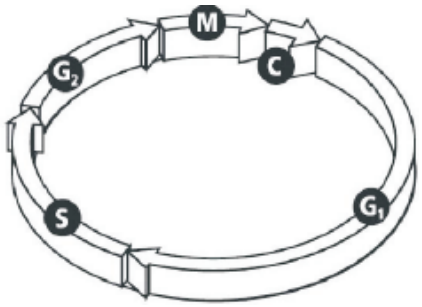
(3) Abscisic acid (4) Gibberellins

47. Which of the following bacterial component is made up of DNA?

(1) Ribosome (2) Plasmid

(3) Lysosomes (4) Protein

48. During which stage of the cell cycle does the cell duplicate its DNA?



(1) M stage (2) G_1 stage

(3) S stage (4) G_2 stage

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

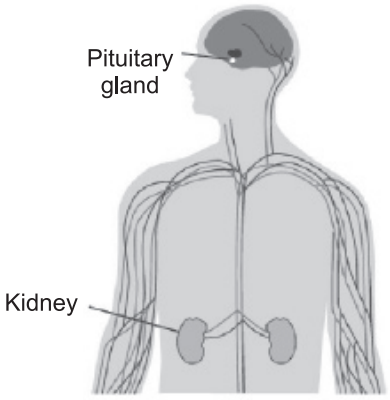
(1) The addition of undesirable substances in water bodies.

(2) The removal of desirable substances from water bodies.

(3) A change in pressure of the water bodies.

(4) A change in temperature of the water bodies.

50. The diagram below shows the locations of the pituitary gland and the kidneys in the human body.



The pituitary gland can release a substance into the bloodstream that signals target cells in the kidneys to reabsorb more water. The released substance is an example of

(1) An enzyme

(2) A hormone

(3) A neurotransmitter

(4) A vitamin

END OF THE EXAM