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SRI LANKAN JUNIOR SCIENCE OLYMPIAD - 2016  
ஸ்ரீ லங்கன் ஜூனியர் சயின்ஸ் ஒல்யம்பிஅட் - 2016



Time : Two hours

### EXAMINATION INSTRUCTIONS

1. Write your index number in the place provided in the answer sheet.
2. Select the correct answer from the answers A, B, C, D given for each question and indicate your answer on the answer sheet using a cross (×) as shown below. There is only one correct answer for each question.

*Example: If A is your answer for question No. 1,*

1	<del>A</del>	B	C	D
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3. If you want to change your answer, circle your first answer and then indicate your new answer using a cross (×) as shown below. You can only make ONE correction per question.

*Example: If A is not your answer for question No. 1, but D,*

1	<del>A</del>	B	C	<del>D</del>
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4. The total number of questions is 50.

01. Which of the following statements regarding the functions of the xylem tissue is true? The xylem;
- (A) protects the phloem tissue from being damaged.
  - (B) increases the girth of the plant by way of cell division.
  - (C) transports water and mineral salts from roots to the leaves.
  - (D) transports food to various parts of the plant.
02. Which of the following organelle is responsible for the transmission of hereditary characteristics from one generation to the other?
- (A) Golgi bodies
  - (B) Nucleus
  - (C) Lysosome
  - (D) Ribosome
03. Which of the following performs an important function during clotting of blood?
- (A) Red blood cells
  - (B) Lymphocytes
  - (C) Platelets
  - (D) Haemoglobin
04. What is represented by the third tropic level of an environmental number pyramid is,
- (A) the number of herbivorous animals only.
  - (B) the number of producer organisms only
  - (C) the number of carnivorous animals only.
  - (D) the number of omnivorous or carnivorous animals.
05. Which one of the following endocrine glands produce digestive enzymes?
- (A) Thyroid
  - (B) Pituitary
  - (C) Pancreas
  - (D) Adrenal gland

06. The fore limbs of all vertebrates show an almost similar plan. Which of the following is explained by this statement?
- (A) The survival of the fittest of animals.
  - (B) The natural selection of animals.
  - (C) The animals have evolved from a common ancestor.
  - (D) The evolution of all the animals has taken place in a similar manner.
07. Which one of the following blood cell in man does not contain a nucleus?
- (A) Monocytes
  - (B) Lymphocytes
  - (C) Red blood cells
  - (D) Eosinophile
08. Which of the following helps in maintaining equilibrium in human body?
- (A) Cochlea
  - (B) Semicircular canals
  - (C) Tympanic membrane
  - (D) Eustachian tube
09. Which of the following is a hereditary disease in man?
- (A) Goitre
  - (B) Malaria
  - (C) Colour blindness
  - (D) Chronic Kidney Disease in unknown etiology
10. In which type of environment the plants with leaves having sunken stomata be seen?
- (A) Plants immersed in water
  - (B) Plants floating in water
  - (C) Plants in arid climates
  - (D) Plants in rain forests

11. Plant growth substances can be used effectively in agriculture. What is the function that cannot be performed by a plant growth substance?
- (A) To induce fruit fall
  - (B) To produce parthenocarpic fruits
  - (C) To induce flowering and fruiting in off season
  - (D) To function as a pesticide
12. A function performed by a motor nerve is to;
- (A) participate in reflex arcs only.
  - (B) carry impulses from brain to spinal cord only
  - (C) carry impulses from central nervous system to muscles and glands.
  - (D) carry impulses from sensory organs to central nervous system.
13. Which answer given below indicates correctly the characteristics of cardiac muscles?
- (A) Striated, voluntary
  - (B) Striated, involuntary
  - (C) Unstriated, voluntary
  - (D) Unstriated, involuntary
14. What is the most abundant type of white blood corpuscles in the human blood?
- (A) Basophil
  - (B) Lymphocytes
  - (C) Neutrophil
  - (D) Eosinophyl
15. Which of the following animal is endemic to Sri Lanka?.
- (A) Elephant
  - (B) Red faced malkoha
  - (C) Spotted deer
  - (D) Asian koel

16. Which of the following species has the same electron structure as a  $\text{Cl}^-$  ion ?
- (A)  $\text{Ca}^{2+}$
  - (B)  $\text{Cl}$
  - (C)  $\text{Na}^+$
  - (D)  $\text{K}$
17. If X, represents an element of Group III of the periodic table, the general formula for its oxide is,
- (A)  $\text{X}_3\text{O}_4$
  - (B)  $\text{X}_3\text{O}_2$
  - (C)  $\text{XO}$
  - (D)  $\text{X}_2\text{O}_3$
18. In moving down a group on the periodic table, the number of electrons in the outermost energy level,
- (A) increases regularly
  - (B) remains constant
  - (C) decreases regularly
  - (D) changes in an unpredictable manner
19. Sodium is a very active metal because,
- (A) it has a low ionization energy
  - (B) it has only one outermost electron
  - (C) it has a relatively small atomic mass
  - (D) all of the above
20. Which of the following molecules has bonding that is ionic?
- (A)  $\text{F}_2$
  - (B)  $\text{MgF}_2$
  - (C)  $\text{H}_2\text{O}$
  - (D)  $\text{CH}_4$
21. Which of the following molecules is a dipole?
- (A)  $\text{HBr}$
  - (B)  $\text{CH}_4$
  - (C)  $\text{H}_2$
  - (D)  $\text{CO}_2$
22. Cow's Milk is an example of,
- (A) an element
  - (B) a compound
  - (C) a homogeneous mixture
  - (D) a heterogeneous mixture

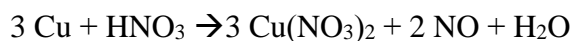
23. Which of these pairs will not react each other, in aqueous solution?

- (A) Zn, CuSO<sub>4</sub>
- (B) Fe, AgNO<sub>3</sub>
- (C) Cu, Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>
- (D) Mg, Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>

24. Which procedure is unlikely to increase the solubility of most solids in liquids?

- (A) Stirring
- (B) pulverizing the solid
- (C) heating the solution
- (D) increasing the pressure

25. Shown below is a incompletely balanced, redox equation.



The stoichiometric coefficient needed to balance H<sub>2</sub>O is,

- (A) 8
- (B) 6
- (C) 4
- (D) 3

26. In the reaction,  $\text{H}_2\text{S} + 4 \text{ Br}_2 + 4 \text{ H}_2\text{O} \rightarrow \text{H}_2\text{SO}_4 + 8 \text{ HBr}$ , the oxidizing agent is,

- (A) H<sub>2</sub>S
- (B) Br<sub>2</sub>
- (C) H<sub>2</sub>O
- (D) H<sub>2</sub>SO<sub>4</sub>

27. The volume of a gas is 300 ml at 740 Pa and 25°C. If the pressure remains constant and the temperature is raised to 100°C, the new volume will be,

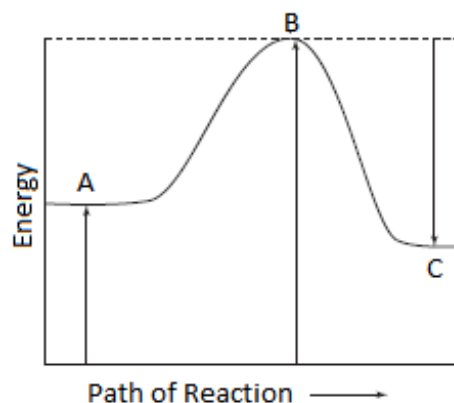
- (A) 240 ml
- (B) 1200 ml
- (C) 376 ml
- (D) 75.0 ml

28. Which of these anions will not form a precipitate with Ag<sup>+</sup> ions ?

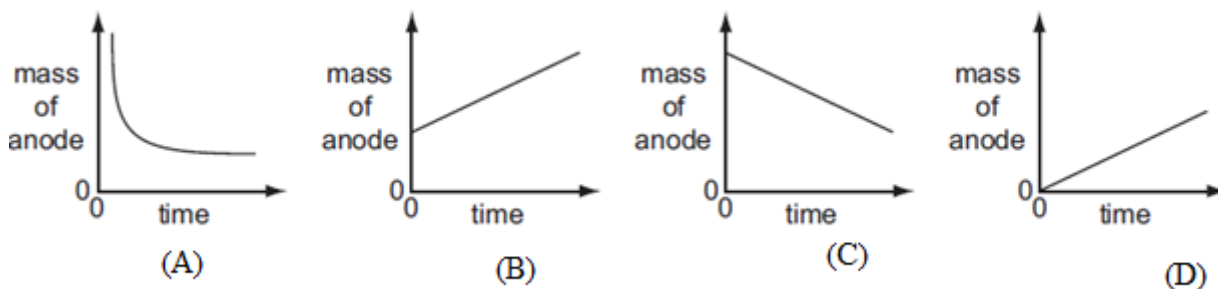
- (A) Cl<sup>-</sup>
- (B) NO<sub>3</sub><sup>-</sup>
- (C) Br<sup>-</sup>
- (D) CO<sub>3</sub><sup>2-</sup>

29. The activation energy for the reaction,  $A \rightarrow C$  is represented by,

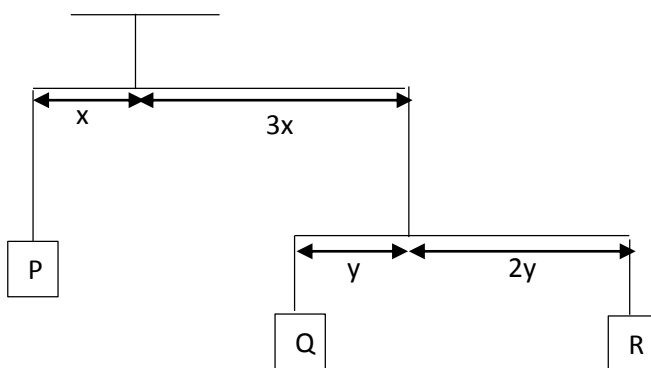
- (A)  $A - C$
- (B)  $B$
- (C)  $B - C$
- (D)  $B - A$



30. Aqueous copper (II) sulfate is electrolysed using copper electrodes. The current is constant and the anode (positive electrode) is weighed at regular intervals. Which graph is obtained when the mass of the anode is plotted against time?

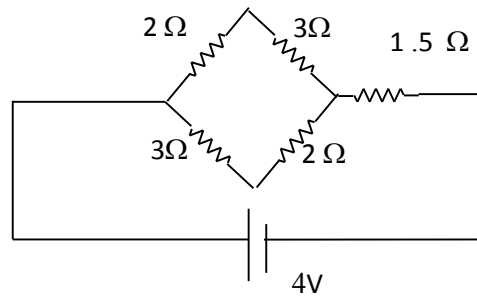


31. P, Q and R three masses are hung by using light rods and strings as shown in the figure. If the mass of P is 9 kg what is the mass of Q?



- (A) 1.5 kg
- (B) 2 kg
- (C) 4 kg
- (D) 5 kg

32. The battery shown in the circuit has a negligible internal resistance. What is the current passing through the  $1.5 \Omega$  resistor?



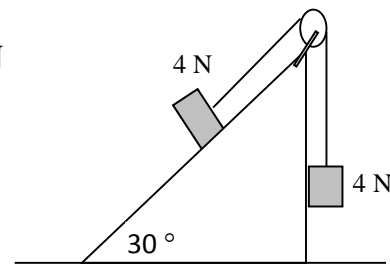
- (A) 4 A      (B) 2.25 A      (C) 3 A      (D) 1 A

33. A vehicle of mass 1000 kg moves with a velocity  $20 \text{ m.s}^{-1}$ . When applied the break, it stops after moving 200 s. What is the work done to stop the vehicle?

- (A) 10 kJ      (B) 40 kJ      (C) 50 kJ      (D) 200 kJ

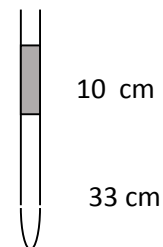
34. Two masses are connected by a light string running over a pulley. One mass is on an inclined plane and the other is hanging vertically. The system is at rest. What is the tension of the string?

- (A) 4 N      (B) 2.5 N      (C) 2 N      (D) 7.5 N



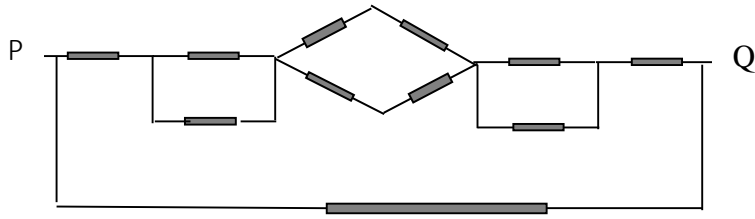
35. A uniform tube which is closed at one end is used to confine an air volume at a certain temperature. When the tube is vertically upright, 10 cm long Hg column is used to confine the air as shown in the figure. Atmospheric pressure is 76 Hg cm. What is length of air volume when the tube is turned upside down?

- (A) 30 cm      (B) 25 cm      (C) 21 cm      (D) 43 cm



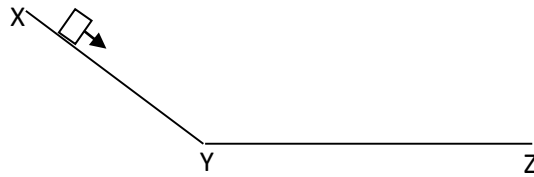


36. Each resistor of the circuit below has the resistance  $R$ . What is equivalent resistance between P and Q?

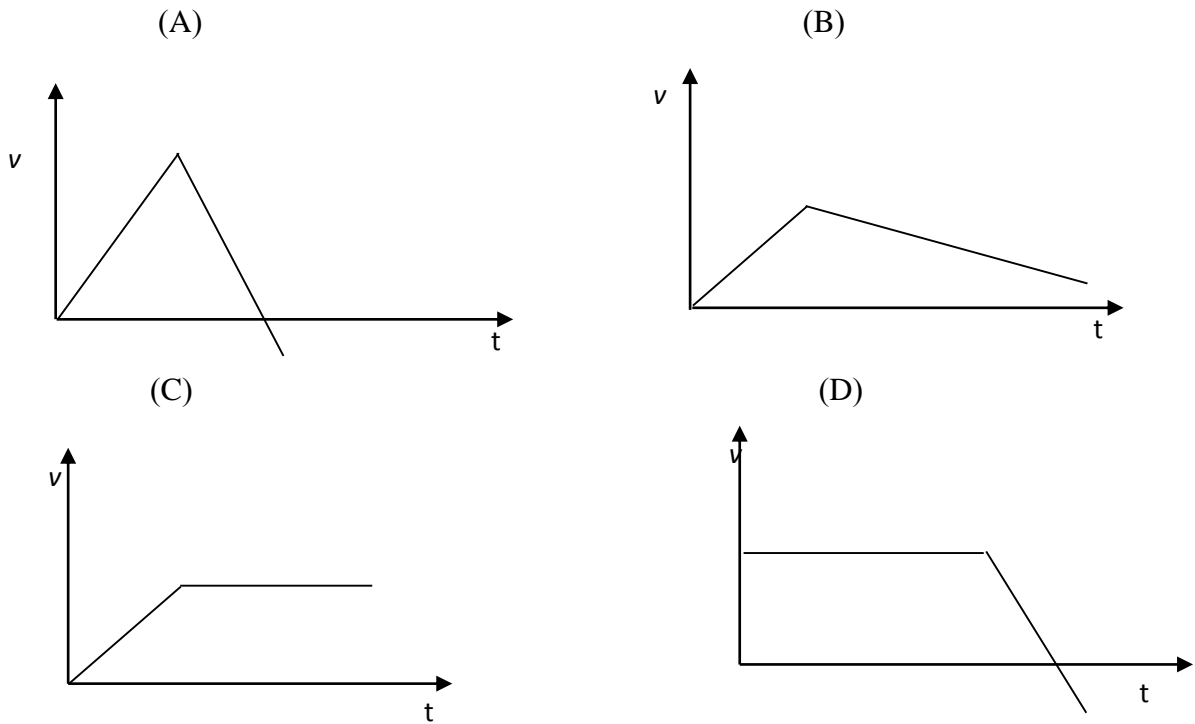


- (A)  $R$                       (B)  $2R$                       (C)  $3R$                       (D)  $0.8R$

37. An object moves from the rest on a frictionless plane XYZ as shown in the figure.

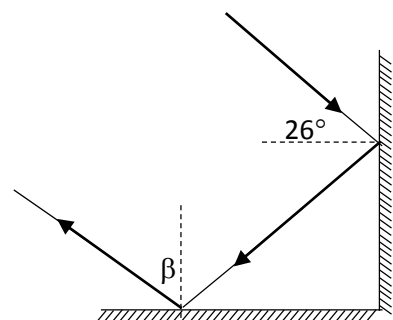


Which one is the best graph to illustrate the motion?

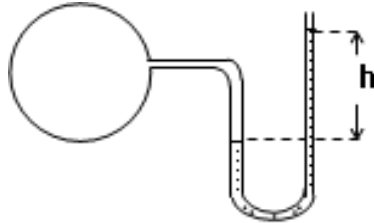


38. A ray of light is reflected from two plane mirrors as shown in the figure. What is the value of angle  $\beta$ .

- (A)  $26^\circ$                       (B)  $52^\circ$   
 (C)  $38^\circ$                       (D)  $64^\circ$



39. An air volume is confined in a vessel by a liquid as shown in the figure. The density of the liquid is  $\rho$  and Atmospheric pressure is  $P$ . What is pressure of the air in the vessel?



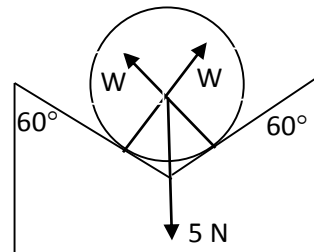
- (A)  $P - h\rho g$                       (B)  $h\rho g$                       (C)  $P + h\rho g$                       (D)  $P + 2h\rho g$

40. An object weighs 15 N in air while weighs 12 N when it immersed in water. What is the density of the object material? The density of water is  $1000 \text{ kg. m}^{-3}$ .

- (A)  $330 \text{ kg. m}^{-3}$                       (B)  $5000 \text{ kg. m}^{-3}$                       (C)  $1200 \text{ kg. m}^{-3}$                       (D)  $600 \text{ kg. m}^{-3}$

41. A sphere whose weight is 5 N is in equilibrium as shown in the figure. What is resultant of two  $W$  reactions?

- (A) 2.5 N                                      (B) 3 N  
(C) 4 N                                      (D) 5 N

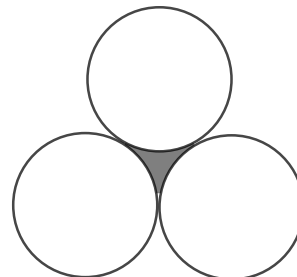


42. At which points  $y^2 = 4x$  curve  $y = 2x$  straight line intersects each other?

- (A) (0,0) and (1,0)                      (B) (0,0) and (2,0)                      (C) (1,1) and (2,1)                      (D) (0,0) and (1,2)

43. Figure shows three touching circles with radius 1 cm. What is the area of the shaded section?  
( $\sin 60^\circ = 0.9, \pi = 3$ )

- (A)  $1 \text{ cm}^2$                                       (B)  $1.5 \text{ cm}^2$   
(C)  $2 \text{ cm}^2$                                       (D)  $0.3 \text{ cm}^2$



44. Air in a cylinder is compressed to  $\frac{1}{3}$  of its initial volume. The initial temperature of the gas is 27 °C . Due to compression, its initial pressure is increases by 9 times. Temperature of compressed air is

- (A) 270 °C                      (B) 370 °C                      (C) 567 °C                      (D) 627 °C

45. When the length of each edge of a cube is tripled, the cube's volume

- (A) increases by a factor of 3.  
 (B) increases by a factor of 6.  
 (C) increases by a factor of 9.  
 (D) increases by a factor of 27.

46. Which line is parallel to the  $y = 4x$  .

- (A)  $y = 3x + 4$  (B)  $y = 2x + 4$                       (C)  $y = 4x + 1$                       (D)  $y = x + 4$

47. The buoyant force on a block of wood floating in water

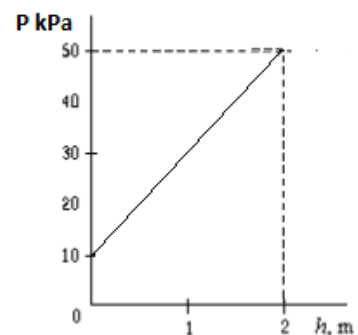
- (A) is equal to the weight of a volume of water displaced by the wood.  
 (B) is equal to the weight of the wood.  
 (C) is greater than the weight of the wood.  
 (D) is less than the weight of the wood.

48. The colors seen in a rainbow

- (A) are produced by raindrops of different colors.  
 (B) are produced by raindrops of different shapes.  
 (C) are produced when sunlight is reflected by raindrops  
 (D) are produced when sunlight is refracted by raindrops.

49. Pressure (P) as a function of depth (h) for a certain liquid is plotted on the graph. The density of the liquid is ( $g = 10 \text{ m.s}^{-2}$ )

- (A)  $500 \text{ kg m}^{-3}$   
 (B)  $800 \text{ kg m}^{-3}$   
 (C)  $1500 \text{ kg m}^{-3}$   
 (D)  $2000 \text{ kg m}^{-3}$



50. When air is removed from a metal can by a vacuum pump, the can shrinks. This occurs because

- (A) the air pressure inside the can is greater than that of the outside.  
 (B) the air pressure outside the can is greater than that inside the can.  
 (C) the air pressure inside and outside the can is not equal.  
 (D) the opposite sides of the empty can strongly attract each other.

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