



# Young Scholars Foundation

**Prizes**

**SCIENCE**

**GRADE  
9**

<p><b>1st Rank</b> Trip to Dubai</p>  <p>+</p> <p>Gold Medal + Certificate of Excellence</p>	<p><b>2nd Rank</b> ₹ 25000</p> <p>+</p> <p>Silver Medal + Certificate of Excellence</p>	<p><b>3rd Rank</b> ₹ 10000</p> <p>+</p> <p>Bronze Medal + Certificate of Excellence</p>
<p><b>4<sup>th</sup> TO 10<sup>th</sup> Rank</b> Rs 1100</p> <p>+ Certificate of Excellence</p>		<p><b>11<sup>th</sup> TO 50<sup>th</sup> Rank</b> Wrist Watch</p>  <p>+ Certificate of Excellence</p>

## Instructions

Time : 1 hour

Maximum Marks : 100

- Maximum Time is 1 hour & You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
- Write your **Name, School Code, Class, Roll No.** and **Mobile Number** clearly on the **OMR Sheet** and do not forget to sign it.
- The Question Paper comprises four sections: **Scientific Reasoning** (25 Questions), **General Science** (15 Questions), **Logical Reasoning** (5 Questions) and **Wise Wizard** (5 Questions). Each question carries two marks.
- All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
- To mark your choice of answers by darkening the circles on the OMR Sheet, use **HB Pencil** or **Blue / Black ball point pen** only.

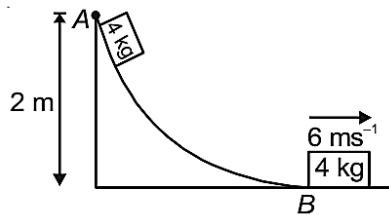
Roll No

Student Name

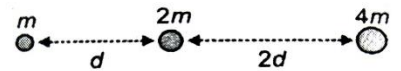
Father's Name

## SECTION - A (SCIENTIFIC REASONING)

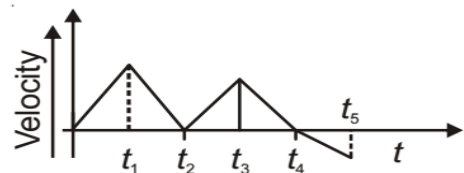
- Q1. Which one of the following is not the unit of work done?  
 (a) joule      (b) watt-second      (c)  $\frac{\text{watt}}{\text{second}}$       (d) newton-meter
- Q2. The weight of a person on the surface of moon is about  $\frac{1}{6}$  th of that on earth. He can jump upto a height of 0.6 m on surface of earth. He can jump upto height\_\_\_\_\_ on the surface of moon.  
 (a) 3.6 m      (b) 0.6 m      (c) 0.1 m      (d) 0.3 m
- Q3. Two balls having volumes as  $100 \text{ cm}^3$  and  $150 \text{ cm}^3$  are immersed completely in a liquid at a depth of 3 m and 2 m respectively. The ratio of buoyancy acting on them is  
 (a) 1: 1      (b) 9:4      (c) 4:9      (d) 2:3
- Q4. A raft of wood of mass 120 kg and density  $600 \text{ kg/m}^3$  floats in water. How much mass can be put on the raft to make it just sink?  
 (a) 120 kg      (b) 200 kg      (c) 80 kg      (d) 40 kg
- Q5. A block of mass 4 kg slides down from rest from the top of the fixed curve as shown. If the velocity at bottom is  $6 \text{ ms}^{-1}$ , then work done by friction is [Take  $g = 10 \text{ m/s}^2$ ]



- (a) -8 J      (b) 8 J      (c) 4 J      (d) -4 J
- Q6. The unit of  $\frac{G}{g}$  is [symbols have their usual meanings]  
 (a) kg/m      (b)  $\text{kg/m}^2$       (c)  $\text{m}^2/\text{kg}$       (d) mkg
- Q7. Three masses  $m$ ,  $2m$  and  $4m$  are placed along the x-axis as shown below. The magnitude of net gravitational force on mass  $2m$  will be  
 (a) Zero      (b)  $\frac{4Gm^2}{d^2}$       (c)  $\frac{Gm^2}{d^2}$       (d)  $\frac{2Gm^2}{d^2}$

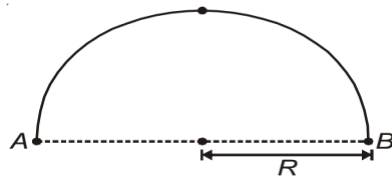


- Q8. The velocity –time graph of a particle starting from the origin from rest is shown below. The displacement of the particle is maximum at time instant.

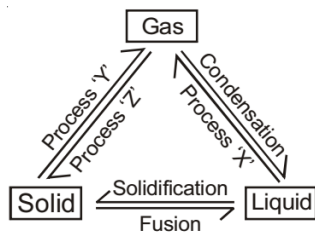


- (a)  $t_1$       (B)  $t_2$       (c)  $t_4$       (d)  $t_5$

- Q9. A particle is moving along a semicircular path of radius  $R$  from  $A$  to  $B$  with constant speed  $v$ . The average velocity of the particle from  $A$  to  $B$  is



- (a)  $\frac{v}{\pi}$       (b)  $\frac{2v}{\pi}$       (c)  $\frac{v}{2\pi}$       (d)  $\frac{v\pi}{2}$
- Q10. All of the following poultry diseases are caused by the microorganisms other than protozoa, except
- (a) Fowl cholera      (b) Coccidiosis      (c) Aspergillosis      (d) Ranikhet
- Q11. The chemical that makes cork impervious to gases and water is
- (a) Lignin      (b) Suberin      (c) Pectin      (d) Cutin
- Q12. When we change a low pitch sound to a high pitch sound we must increase its
- (a) Amplitude      (b) Frequency      (c) Velocity      (d) Wavelength
- Q13. Boiling of a liquid takes place when
- (a) Vapour pressure of liquid becomes greater than the atmospheric pressure
- (b) Vapour pressure of liquid becomes equal to the atmospheric pressure
- (c) Atmospheric pressure is more than the vapour pressure of liquid
- (c) Vapour pressure of liquid becomes 100 atm
- Q14. Consider the following:-



Process 'X' and 'Y' respectively are

- (a) Sublimation and vaporisation
- (b) Evaporation and vaporisation
- (c) Desublimation and vaporisation
- (d) Vaporisation and sublimation

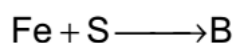
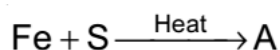
Q15. Which of the following is equal to 0 Kelvin ?

- (a) 373 °C                      (b) -273 °C                      (c) 273 °C                      (d) 0 °C

Q16. Find the incorrect match.

- (a) Volume = m<sup>3</sup>                      (b) Pressure = Pa                      (c) Length = metre                      (d) Mass = kg/ m<sup>3</sup>

Q17. Consider the following :



A and B respectively are

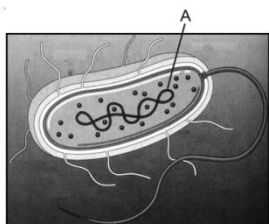
- (a) Compound and alloy  
(b) Mixture and compound  
(c) Compound and element  
(d) Compound and mixture

Q18. Statement I : Making anti-viral drugs is harder than making anti-bacterial drugs.

Statement II : Viruses lack cellular structure and do not have their own metabolic machinery.

- (a) Only statement I is correct  
(b) Both the statements are incorrect  
(c) Both the statements are correct and statement II is the correct explanation of statement I  
(d) Both the statements are correct but statement II is not the correct explanation of statement I

Q19. Function of the component which is labelled as 'A' in the figure depicted below is



- (a) Biosynthesis of cholesterol  
(b) To control all the metabolic activities  
(c) To synthesize adenosine triphosphate  
(d) To manufacture glucose

Q20. The mass by mass concentration of a solution prepared by dissolving 40 g of sugar in 150 g of water is

- (a) 21.05 %                      (b) 42.05 %                      (c) 26.66%                      (d) 13.46%

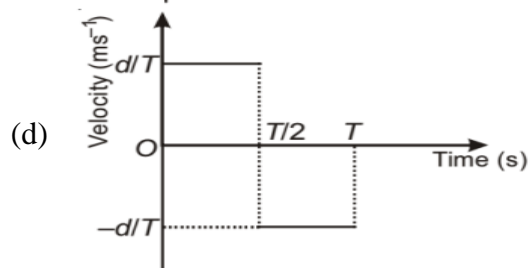
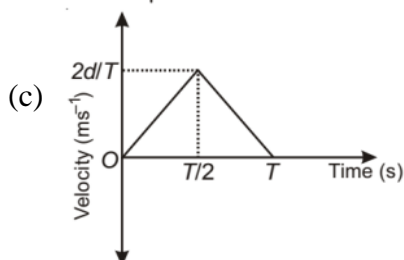
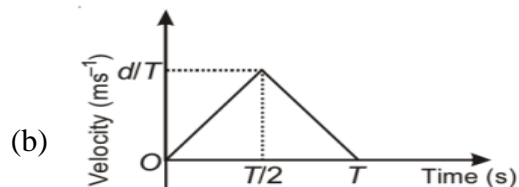
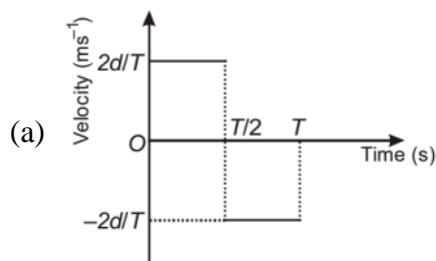
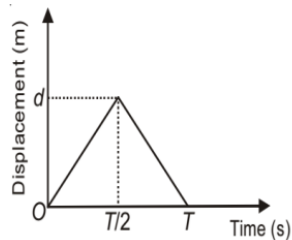
- Q21. In which of the following plants, seeds have only one cotyledon?
- (a) *Pisum sativum* (b) *Solanum tuberosum*  
 (c) *Ficus benghalensis* (d) *Cocos nucifera*
- Q22. Amongst following, the factor that influence soil erosion is
- (a) Wind breaks (b) Monitored grazing  
 (c) Terracing (d) Scraping
- Q23. If the electronic configuration of an element is  $x, x^3, x^2$  then its atomic number is
- (a) 12 (b) 10 (c) 11 (d) 14
- Q24. How many of the following insect pests are borer insects?

Locust, Grasshopper, Sugarcane borer, Grain weevil, Aphid, Leaf hopper
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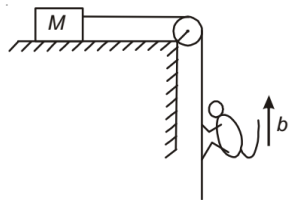
- (a) Three (b) Four (c) Two (d) Five
- Q25. Blue –green algae are capable of converting.
- (a) Ammonia into atmospheric nitrogen  
 (b) Amino acids into atmospheric nitrogen  
 (c) Nitrates into ammonium ions  
 (d) Atmospheric nitrogen into ammonia

### SECTION - B (GENERAL SCIENCE)

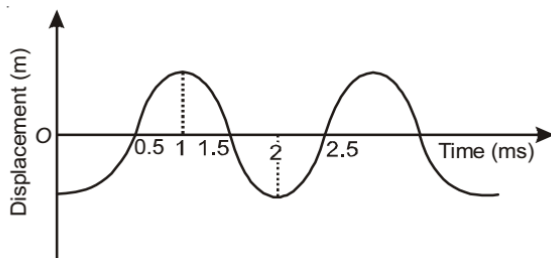
- Q26. The displacement –time of a particle moving in a straight line is given below. Choose the correct velocity – time graph corresponding to the given displacement –time graph.



- Q27. A monkey of mass  $m$  clings to light rope slung over a fixed smooth pulley. The opposite end of the rope is tied to weight of mass  $M$  lying on a smooth horizontal floor as shown in the figure below. The acceleration of mass  $M$  when the monkey moves upward with acceleration  $b$  is [Take  $g$  as acceleration due to gravity]



- (a)  $\frac{Mb+Mg}{m}$       (b)  $\frac{mb+mg}{M}$       (c)  $\frac{mb}{M}$       (d)  $\frac{Mg+mb}{M}$
- Q28. An object is placed one by one in three liquids of different densities. The object floats with  $\frac{2}{3}, \frac{1}{4}, \frac{4}{5}$  parts of its total volume outside the liquid surface in liquid densities of  $P_1, P_2, P_3$  respectively. Which of the following relation is correct?
- (a)  $P_1 > P_2 > P_3$       (b)  $P_3 > P_2 > P_1$       (c)  $P_2 < P_1 < P_3$       (d)  $P_3 < P_1 < P_2$
- Q29. A man of weight  $w$  is in an elevator of weight  $w$ . the elevator accelerates vertically up at a rate  $a$  and at a certain instant has a speed  $v$ . The rate of expenditure of energy of elevator at that instant is
- (a)  $2w\left(1 + \frac{a}{g}\right)v$       (b)  $w\left(1 + \frac{a}{g}\right)v$       (c)  $\frac{w}{2}\left(1 + \frac{a}{g}\right)v$       (d)  $2w\left(1 - \frac{a}{g}\right)v$
- Q30. The given graph shows the displacement –time relation for a disturbance travelling with a velocity of  $500 \text{ ms}^{-1}$ . The wavelength of the disturbance is



- (a)  $2\text{m}$       (b)  $\frac{1}{2}\text{m}$       (c)  $1\text{m}$       (d)  $4\text{m}$
- Q31. How many moles are there in 96 g of water?
- (a) 5.23 mol      (b) 5.33 mol      (c) 8.23 mol      (d) 16.23 mol
- Q32. 40 g of  $\text{CuSO}_4$  (Copper sulphate) is dissolved in 360 g of water. The concentration, in terms of mass by mass percentage, of the solution is
- (a) 11.1%      (b) 10.0%      (c) 12.5%      (d) 10.5%

Q33. Match the following and choose the correct option

**Column-I**

**Column-II**

a. Argon

(i) Octa-atomic

b. Sulphur

(ii) Tetra-atomic

c. Phosphorus

(iii) Monoatomic

d. Ozone

(iv) Triatomic

(1) a (i), b(iii), c(ii), d(iv)

(2) a (i), b(ii), c(iii), d(iv)

(3) a (iii), b(i), c(ii), d(iv)

(4) a (ii), b(i), c(iii), d(iv)

Q34. The electronic configuration of an atom  $z^X$  is  $x, x^3, x - 1$ , then the element whose symbol is  $z + 2^Y$ , is identified as

(a) P

(b) Mg

(c) Si

(d) Al

Q35. What will be the total number of molecules if 0.4 g of He and 2 g of Ne are mixed in a container? [Molar mass of He and Ne is 4 g/mol and 20 g/mol respectively]

(a)  $12.203 \times 10^{23}$

(b)  $6.214 \times 10^{23}$

(c)  $1.2046 \times 10^{23}$

(d)  $8.723 \times 10^{23}$

Q36. (i) \_\_\_\_\_ are cold blooded animals.

(ii) In sponges water exit through \_\_\_\_\_.

(iii) Coelenterates show \_\_\_\_\_ level of organisation.

(iv) \_\_\_\_\_ cells are responsible for excretion in flat worms.

Select the correct set of words from the following to fill the above blanks.

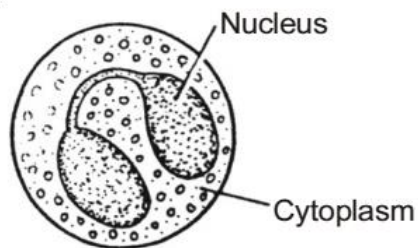
	(i)	(ii)	(iii)	(iv)
(a)	Fishes	Osculum	Cellular	Mast
(b)	Amphibians	Spongocoel	Tissue	Adipose
(c)	Birds	Ostia	Organ	Cnidoblast
(d)	Reptiles	Osculum	Tissue	Flame

Q37. Which of the following differences between smooth, skeletal and cardiac muscles are incorrect?

	Smooth Muscle	Skeletal Muscle	Cardiac Muscle
1	Fibres have blunt ends	Fibres have broad ends	Fibres have pointed ends
2	Striations are absent	Striations are absent	Faint striations are present
3	Uninucleated muscle fibre	Multinucleated muscle fibre	Uninucleated muscle fibre
4	Voluntary in nature	Involuntary in nature	Involuntary in nature
5	Cells are spindle shaped	Cells are cylindrical in shape	Cells are cylindrical in shape

- (a) 1,2,4 and 5      (b) 2 and 4 only      (c) 1,2 and 4 only      (d) 3 and 5

Q38. Select the correct information which is associated with the blood corpuscle depicted in the figure.



- (a) Count increases during worm infection  
 (b) Contains haemoglobin  
 (c) Releases histamine  
 (d) Releases chemicals responsible for blood coagulation

Q39. **Statement-1** : Nitrogen present in the air is a raw material for photosynthesis.

**Statement-2** : Air currents help in dispersal of spores and seeds.

- (a) Both the statements are correct  
 (b) Both the statements are incorrect  
 (c) Only statement-1 is correct  
 (d) Only statement-2 is correct

Q40. The vacuole which is responsible for the process of osmoregulation in Paramecium is

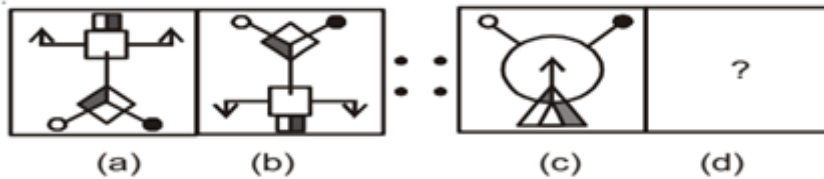
- (a) Sap vacuole      (b) Food vacuole      (c) Gas vacuole      (d) Contractile vacuole



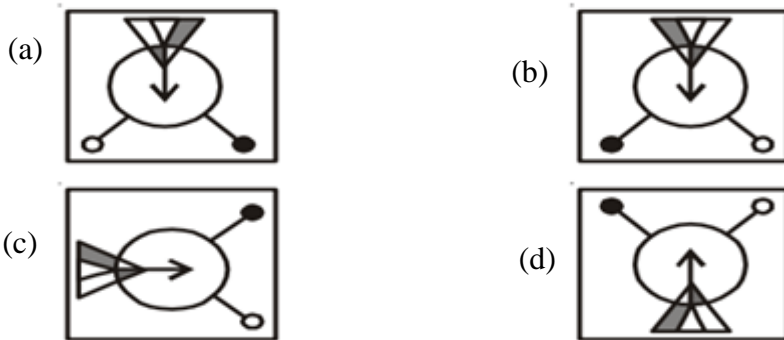
## SECTION - C (LOGICAL REASONING)

Q41. In the following question choose an answer figure which has same relation with figure (c) as figure (a) and (b) have in problem figures.

**Problem Figures**



**Answer Figures**



Q42. If MOR = 46 and PMTE = 54 , then DISK=?

- (a) 43                      (b) 53                      (c) 73                      (d) 63

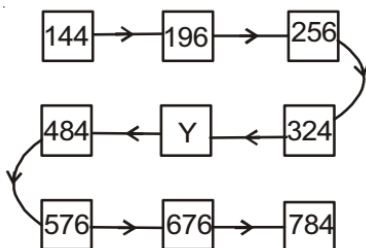
Q43. 49 :: 16 : 7 :: 33 : 216 :: 37 : ?

- (a) 100000                  (b) 10000                  (c) 100                      (d) 1000

Q44. Which of the following is odd one out of the given four options?

- (a) N52                      (b) 6JF                      (c) 7M3                      (d) 1IB

Q45. The value of 'Y' in the following pattern is



- (a) 441                      (b) 400                      (c) 469                      (d) 468

## SECTION - D (WISE WIZARD)

Q46. A wooden block of mass  $M$  kg lies on a rough horizontal wooden table. A bullet of mass  $m$  kg hits the block with velocity  $u$  after which the bullet and block moves a distance of  $S$  m across the table before stopping. The average retardation provided by the floor is

- (a)  $\frac{mu}{2(M+m)S} \text{ ms}^{-2}$       (b)  $\frac{(M+m)u}{2Sm} \text{ ms}^{-2}$
- (c)  $\frac{M^2u^2}{2S} \text{ ms}^{-2}$       (d)  $\frac{m^2u^2}{2(M+m)^2S} \text{ ms}^{-2}$

Q47. A spherical rubber ball with a mass  $m$  and a radius  $R$  is submerged into water to a depth  $h$  and released. The acceleration of the ball after the release is [Given that the density of water is  $\rho$  and neglecting the resistance of water and air]

- (a)  $mg \left[ \rho \cdot \frac{4}{3} \pi R^3 - 1 \right]$       (b)  $g \left[ \frac{\rho \cdot \frac{4}{3} \pi R^3}{g} - 1 \right]$
- (c)  $g \left[ \frac{\frac{4}{3} \pi R^3 \rho}{m} - 1 \right]$       (d)  $g \left[ \frac{\frac{4}{3} \pi R^3 \rho}{m} + 1 \right]$

Q48. Consider the following statements and choose the correct option.

**Statement I :** A molecule shows all the properties of the substance.

**Statement II :** Mass of 1 mole of a substance is called its molar mass.

- (a) Only statement I is correct  
 (b) Only statement II is correct  
 (c) Both the statements are correct  
 (d) Both the statements are incorrect

Q49. Some features regarding muscular tissue are given below.

- I. Voluntary in action.
- II. Striations are absent.
- III. Fibres have pointed ends.
- IV. Present in form of network.
- V. Uninucleated muscle fibre.
- VI. They are attached to bones.

Categories the given features w.r.t. smooth, skeletal and cardiac muscles and choose the correct option.

	Smooth Muscle	Skeletal Muscle	Cardiac Muscle
(a)	II,IV	I,III	V,VI
(b)	III,VI	II,IV	I,V
(c)	II,III,V	I,VI	IV,V
(d)	III,V	II,VI	I,IV,V

Q50. (i) are (ii) animals. Their skin is dry, rough and without (iii). Breathing occurs through (iv). Most of (i) have (v) heart.

Select the correct set of words to fill the blanks.

	(i)	(ii)	(iii)	(iv)	(v)
(a)	Reptiles	Cold-blooded	Glands	Lungs	Three-chambered
(b)	Birds	Warm blooded	Hairs	Lungs	Three-chambered
(c)	Mammals	Warm blooded	Feathers	Skin	Four-chambered
(d)	Amphibians	Warm blooded	Hairs	Gills	Two-chambered

**Space for rough work**

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