MEGA

Reso*FAST* 2025

Resonance Future Achievers Scholarship Test

TEST PAPER

Duration
1 Hour

Currently Studying in
Class - IX

Max. Marks
160

Important Instructions to the Students

1. The question paper contains a total of **40 Multiple Choice Questions**, numbered from **Q1 to Q40**.

2. **Pattern & Marking Scheme of each section:**

Parts	Subject	No. of questions	Questions Range	Marks
Part-A	Physics	07	Q1 to Q7	28 M
Part-B	Chemistry	07	Q8 to Q14	28 M
Part-C	Biology	07	Q15 to Q21	28 M
Part-D	Mathematics	14	Q22 to Q35	56 M
Part-E	Mental Ability	05	Q36 to Q40	20 M
	Total	**40**	**Q1 to Q40**	**160 M**

3. Attempt all questions, each having only one correct answer.

4. Each question carries **4 marks**.

5. Candidates must ensure that the **OMR Sheet is not folded or damaged** in any way. Avoid making any **stray marks** on the OMR sheet. **Do not** write your **Roll Number** anywhere except in the designated space provided in the OMR Sheet.

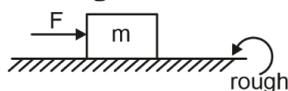6. The use of **white correction fluid** is **strictly prohibited** on the OMR Sheet.

7. The use of **blank papers, clipboards, log tables, slide rules, calculators, mobile phones**, or **any other electronic gadgets** is **strictly not permitted** inside the examination hall.

8. There is an empty page left at the end of this question paper for **rough work.**

1. **The Block That Won't Budge**

    A block of mass m is resting on a rough surface as shown in figure. A variable force F is applied on block. Which of the following is incorrect?

    (A) Object will not move till the variable force F applied crosses the maximum value of static friction.

    (B) Till object does not move the slope of graph between applied force F and friction force generated will be 1.

    (C) At applied force F = 0, friction force developed will also be zero

    (D) Friction force generated is independent of applied force till it is not moving

2. **Who Accelerates How Much?**

    When a force F is applied on an object of mass m_1, then acceleration produced in it is a_1. When the same force F is applied on an object of mass m_2, then acceleration produced in it is a_2. So, what will be the acceleration produced in an object of mass $(m_1 + m_2)$, if same force F is applied on it.

    (A) $a_1 + a_2$ (B) $a_1 - a_2$ (C) $\frac{a_1 a_2}{a_1 + a_2}$ (D) $\frac{a_1 a_2}{a_1 - a_2}$

3. **The Endless Reflection Riddle**

    Read the given statements and mark the correct option.

    Statement 1: When an object is placed between two plane parallel mirrors, the first image appears brightest and the intensity of images decreases afterwards.

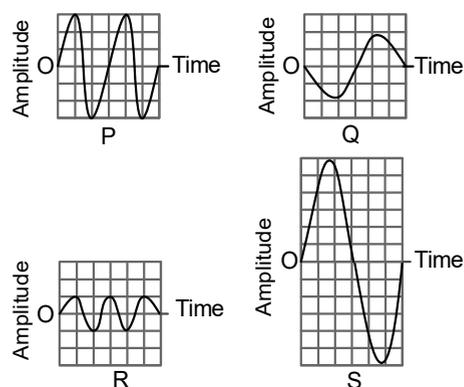   **Statement 2:** Image formed by a plane mirror is virtual and erect.

    (A) Both statement 1 and statement 2 are true and statement 2 is the correct explanation of statement 1.

    (B) Both statement 1 and statement 2 are true but statement 2 is not the correct explanation of statement 1.

    (C) Statement 1 is true and statement 2 is false.

    (D) Statement 1 is false and statement 2 is true.

4. **Sound Waves Under the Microscope**

    Consider the following amplitude-time graphs for different sound waves.

    Which of the following given statements is/are correct for these sound waves?

    (i) Sound wave **R** is the loudest.

    (ii) Sound wave **S** has the highest pitch.

    (iii) Sound wave **R** has highest pitch but is soft in nature.

(iv) Sound wave **S** is the loudest.

(A) (i) and (iv) only

(B) (ii) only

(C) (iii) and (iv) only

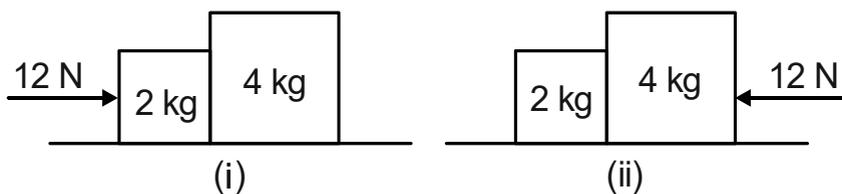(D) (ii) and (iv) only

5. **Gravity Gets Stronger!**

Fill in the blanks by selecting an appropriate option. Whenever a body falls towards the earth under gravity, the acceleration produced in the body due to gravity is called acceleration due to gravity (g). For a body at the surface of earth, acceleration due to gravity is $\dfrac{GM_e}{R_e^2}$ where M_e and R_e denotes mass and radius of earth respectively. If the universal gravitational constant becomes ten times larger in magnitude, raindrops will fall __(i)__ , walking on the ground will become __(ii)__, time period of a simple pendulum on the earth will __(iii)__. All this is because acceleration due to gravity on surface of the earth will __(iv)__ .

	(i)	(ii)	(iii)	(iv)
A.	Slower	More difficult	Increase	Decrease
B.	Faster	More difficult	Decrease	Increase
C.	Slower	Easier	Remain unchanged	Increase
D.	Faster	Easier	Remain unchanged	Decrease

6. **2 kg vs 4 kg: Who Wins?**

Two blocks of masses 2 kg and 4 kg are placed together in touch on a smooth horizontal surface. A horizontal force of 12 N is applied on 2 kg block in case (i) and on 4 kg block in case (ii), as shown in the given figures.

Which of the following statement(s) is/are correct about both the cases?

(i) The force of interaction on 4 kg block is equal in both the cases.

(ii) The acceleration of the blocks will be greater in case (i) compared to case (ii).

(iii) The value of force of interaction on the 4 kg block in case (i) will be 8 N.
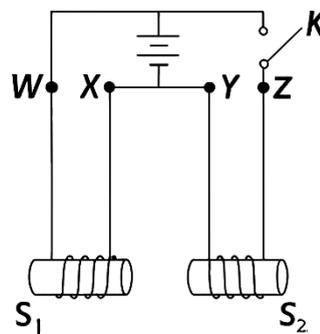
(A) (iii) only   (B) (i) only   (C) (ii) only   (D) (i) and (ii) only

7. When Currents Make Coils Move

The given figure shows two solenoids S_1 and S_2, hanging through conducting wires from contact points W and X, and contact points Y and Z respectively, so that each can swing left and right. After the key K is closed for a long time.

(A) S_1 and S_2 move towards each other

(B) Both S_1 and S_2 move towards right

(C) S_1 and S_2 move away from each other

(D) Both S_1 and S_2 remain in their original positions.

PART B – CHEMISTRY

8. Unravel the Polymer Mystery!

Nylon and PET are polymers. Identify the correct statements.

I. Nylon is formed by addition polymerisation and PET is formed by condensation.

II. Both have different monomers.

III. Nylon and PET form different products on combustion.

(A) I & II   (B) II & III   (C) I & III   (D) I, II & III

9. Shells and Spins

There are two electrons X and Y in an atom. X is in 'N' shell and Y is in 'L' shell. Identify the correct ratio of angular momentum of X and Y respectively.

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

10. The Fossil Fuel Showdown

A researcher collects data about four different fossil fuels and their properties, as shown in the table below:

	Fuel Type	Carbon %	Hydrogen %	Energy Released (kJ/kg)	Sulphur Content (%)
I	Coal	72	5	25,000	3.0
II	Petrol	84	14	47,500	0.6
III	Kerosene	86	13	46,000	0.4
IV	Diesel	88	12	45,000	1.8

Based on the table, which fuel will produce the highest amount of SO_2 pollution per kg during burning?

(A) Fuel **I**   (B) Fuel **II**   (C) Fuel **III**   (D) Fuel **IV**

11. Who Displaces Whom?

To study the decreasing order of reactivity of metals an experiment is done by adding different metals to the aqueous solution of various salts.

From the data observed, the decreasing order of reactivity of metals is

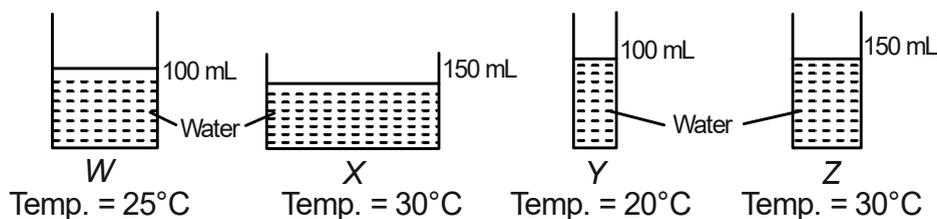| Metal	$ZnSO_{4(aq)}$	$FeSO_{4(aq)}$	$CuSO_{4(aq)}$	$Al_2(SO_4)_{3(aq)}$
Zn	—	Displaced	Displaced	No reaction
Fe	No reaction	—	Displaced	No reaction
Cu	No reaction	No reaction	—	No reaction
Al	Displaced	Displaced	Displaced	—

(A) Al > Cu > Fe > Zn

(B) Al > Zn > Fe > Cu

(C) Al > Zn > Cu > Fe

(D) Al > Fe > Cu > Zn

12. Which Set-Up Dries Fastest?

Which of the following set-ups are best suited to study the effect of exposed surface area on the rate of evaporation?

(A) W and X only

(B) X and Y only

(C) X and Z only

(D) W and Y only

13. Mixture Masters Challenge

Class 9 students were provided with the following four mixtures:

I. Sugar + Water

II. Iron filings + Sand

III. Oil + Water

IV. Sand + Water

Students were asked to suggest various methods for the separation of components of these mixtures. Out of the given options, select the correct one.

(A) Jaya suggested filtration for mixture I while Priya suggested using separating funnel for mixture III.

(B) Naina suggested magnetic separation for mixture II while Ajay suggested churning for mixture IV.

(C) Amaira suggested magnetic separation for mixture II and Niya suggested filtration for mixture III.

(D) Ankit suggested evaporation for mixture I and Advik suggested filtration for mixture IV.

14. **Truth About Its Atomic Secrets**

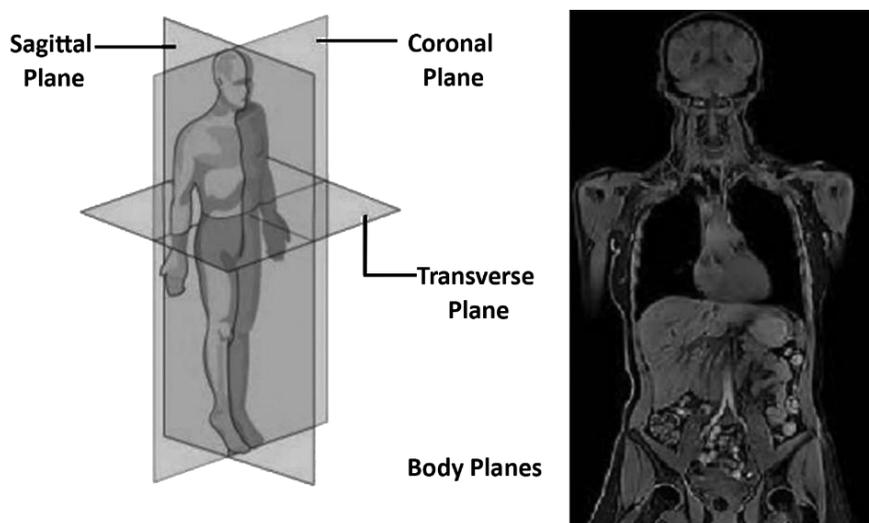An element 'E' has atomic number 18. Which of the following statements are **incorrect**?

I.   It has electrons 3 shells.

II.   It is a non-reactive and exists as [E_2]

III. The number of electrons in E are double that of magnesium.

IV.   'E' exhibits the valency of 2.

(A) I, II & III   (B) II, III & IV   (C) III & IV   (D) I, III & IV

PART C – BIOLOGY

15. **Anatomy's Invisible Dividers**

The diagram on the left illustrates the different body planes anatomists and radiologists use when talking about structures within the human body.

Which plane is depicted on the radiographic image on the right?

(A) Sagittal plane   (B) Coronal plane   (C) Transverse plane   (D) Oblique plane

16. **Spot the False Fact!**

Which of the following is not a characteristic of the plasma membrane?

(A) It is selectively permeable.

(B) Cholesterol helps to maintain membrane fluidity at low temperatures.

(C) It is composed of a phospholipid bilayer.

(D) Peripheral proteins enable facilitated diffusion.

17. **Nature's Cleanup Crew**

The removal of pollutants or toxic wastes from the environment with the help of living organisms is best described as:

(A) Defenestration   (B) Bioremediation

(C) Detoxification   (D) Disease control

18. **Fermentation's Hidden Weakness**

The usefulness of fermentation as a means of deriving energy is limited because:

(A) it cannot generate enough ATP

(B) it produces too much NH_2

(C) the end products are toxic to the producer

(D) it uses more energy than it produces

19. **Hormones on the Roller Coaster**

A teenager experiences rapid mood swings throughout the day. What is the most likely cause?

(A) Lack of exercise

(B) Increased hormone activity during puberty

(C) Low carbohydrate diet

(D) Excessive sleep

20. **Cells on a Mission!**

Embryonic development is a complex multi-step process that involves transition from single cellularism to multicellularism. In animals, all of the following are associated with embryonic development except:

(A) Migration of cells to specific areas   (B) Formation of germ layers

(C) Activation of all the genes in each cell   (D) Inductive tissue interactions

21. **Healing Skin Secrets**

A person meets with a minor road accident and gets a deep cut on the skin. Initially, the wound bleeds, but after some time, it forms a clot. A few days later, doctors observe that new skin is forming and slowly he is healing. Formation of new skin over a wound is possible because of which tissue?

(A) Adipose tissue   (B) Smooth muscle tissue

(C) Stratified squamous epithelial tissue   (D) Loose connective tissue

PART D – MATHEMATICS

22. **Three Variables, One Trick**

Given that m, x, y satisfy

(i) $\frac{2}{3}(x-5)^2 + 5m^2 = 0$;

(ii) $-2a^2b^{y+1}$ and $3a^2b^3$ are like terms, find the value of the expression

$\frac{3}{8}x^2y + 5m^2 - \left\{-\frac{7}{16}x^2y + \left[-\frac{1}{4}xy^2 - \frac{3}{16}x^2y - 3.475xy^2\right] - 6.275xy^2\right\}.$

(A) 200   (B) 225   (C) 250   (D) 300

23. **The Journey Speed Trap**

A car travels the first $\frac{1}{3}$ of a certain distance with a speed of 10 km/h, the next one third distance with a speed of 20 km/h and last $\frac{1}{3}$ distance with a speed of 60 km/h. The average speed of the car for the whole journey is

(A) 18 km/h   (B) 24 km/h   (C) 30 km/h   (D) 36 km/h

24. **Absolute Value Adventure**

If the absolute value of $(x + 3)$ is two and that of $(y + 8)$ is three, then find least value of $|xy|$

(A) 5   (B) –5   (C) 7   (D) 8

25. **Nested Roots Madness**

The value of $\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \frac{1}{\sqrt{4}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{6}} + \frac{1}{\sqrt{6}+\sqrt{7}} + \frac{1}{\sqrt{7}+\sqrt{8}} + \frac{1}{\sqrt{8}+\sqrt{9}}$ is :

(A) 0   (B) 1   (C) 2   (D) 4

26. **The Paper-to-Cuboid Puzzle**

From each corner of a square sheet of side 8 cm, a square of side y cm is cut. The remaining sheet is folded into a cuboid. The minimum possible volume of the cuboid formed is M cubic cm. If y is an integer, then find M.

(A) 32   (B) 18   (C) 36   (D) 12

27. **Even–Odd Logic Battle**

If $2x - 1$ is an odd number and $3y - 1$ is an even number, which of the following is/are necessarily even?

(I) $x^2 - 2y + 2$

(II) $y^2 - 2x + 3$

(III) $4x^2 - y - 1$

(A) I only   (B) II only   (C) I and II   (D) II and III

28. **The Exponent Beast**

If $\dfrac{(125)^n \times 5^2 \times \left(5^{\frac{-n}{2}}\right)^3 - (5^n)^{3/2}}{5^{3m} \times 2^3 \times 3} = \dfrac{1}{125}$ then which of the following is true

(A) $2m - n + 2 = 0$ (B) $n - 2m - 2 = 0$ (C) $2m + n - 2 = 0$ (D) $n - 2m + 2 = 0$

29. **The Fraction Transformation Trick**

If $x = \dfrac{a}{b+c} = \dfrac{b}{a+c} = \dfrac{c}{a+b}$, then the value of x is

(A) $\frac{1}{2}$ (B) –1   (C) $\frac{1}{2}$ or -1 (D) $\frac{3}{2}$

30. **Factor the Monster!**

Factorise $(1 - 2x - x^2)(1 - 2x + 3x^2) + 4x^4$

(A) $(x - 1)^2$ (B) $(x - 1)^4$ (C) $(x + 1)^2$ (D) $(x + 1)^4$

31. The Radical Value Hunt

If $x = \sqrt[3]{2\frac{93}{125}}$ then the value of x is

(A) $2\frac{1}{5}$ (B) $1\frac{2}{5}$ (C) $\frac{4}{5}$ (D) $4\frac{4}{5}$

32. Cube Equation Countdown

Find number of possible pairs of positive integers (m, n) such that $m^3 + 11^3 = n^3$

(A) 1   (B) 0   (C) 2   (D) 4

33. The Brackets Within Brackets

Solve the equation $\frac{1}{5}\left\{\frac{1}{4}\left[\frac{1}{3}\left(\frac{1}{2}x - 3\right) - 2\right] - 1\right\} - 2 = 1$. If the solution of the equation is K, then find the sum of the squares of digits of K^2.

(A) 25   (B) 36   (C) 49   (D) None of these

34. Who Scored How Much?

The ratio of marks obtained by Vinod and Basu is 6:5. If the combined average of their percentage is 68.75 and their sum of marks is 275, find the total marks for which exam was conducted.

(A) 150   (B) 200   (C) 400   (D) None of these

35. The Big Factorization Finale

Factorise: $2\sqrt{2}x^3 + 3\sqrt{3}y^3 + \sqrt{5}(5 - 3\sqrt{6}xy)$

(A) $(\sqrt{2}x + \sqrt{3}y + \sqrt{5})(2x^2 + 3y^2 + 5 - \sqrt{6}xy - \sqrt{15}y - \sqrt{10}x)$

(B) $(\sqrt{2}x - \sqrt{3}y + \sqrt{5})(2x^2 + 3y^2 + 5 - \sqrt{6}xy - \sqrt{15}y - \sqrt{10}x)$

(C) $(\sqrt{2}x - \sqrt{3}y - \sqrt{5})(2x^2 + 3y^2 + 5 - \sqrt{6}xy - \sqrt{15}y - \sqrt{10}x)$

(D) None of these

PART E – MENTAL ABILITY

36. Decode LATE Before It's Late

If RAT =42 and CAT =57, then LATE =?

(A) 60   (B) 70   (C) 64   (D) 74

37. Hot Dogs, Cold Ciphers

Directions (37): Study the following information and answer the given questions.

In an artificial language,

'hot dog in pot' is written as 'F5 A2 H9 C3'

'rot pot of hog' is written as 'H9 G2 C7 F9'

'dog in sot rot' is written as 'F5 D6 C3 G2'

'god of hot dot' is written as 'B3 J5 C7 A2'

Find the code for 'pot'.

(A) F5   (B) A2   (C) H9   (D) C7

38. **Government in Disguise of Digits**

If the word **'EXAMINATION'** is coded as 56149512965, then the word **'GOVERNMENT'** is coded as:

(A) 7645954552   (B) 7654694562   (C) 7645965426   (D) 7654964526

39. **Can These Four Letters Speak?**

If it is possible to make a meaningful word with the first, sixth, seventh and ninth letters of the word REMONSTRANCE which of the given will be the third letter of that word? If more than one such word can be made give ' M ' as the answer. If no such word can be made give ' X ' as the answer.

(A) X   (B) M   (C) A   (D) T

40. **Mind the Gaps in the Word**

How many such pairs of letters are there in the word **TRANSPORT** which have as many letters between them in the word as in the English alphabetical series?

(A) One   (B) Two   (C) Three   (D) More than three