

**GIMs - Genesis Ignited Minds Scholarship Test
9th Moving 10th (CBSE)**

Time: 2 Hours 30 Minutes.

M.M.: 201

General Instructions for the Paper

- Answers have to be marked on the OMR sheet provided.
- Blank Papers, Cell phones & Calculators are not allowed inside the hall.
- Marking Scheme:-
Objective Section (Section A to E)
Each Objective question from Section A to E carries +2 marks
No Negative marking for wrong answers.
Subjective Section (Section A to D)
Each subjective question from section A to D carries 5 marks.
Section F - Mental Ability
Each question in Section F carries 3 marks



Genesis Branches

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Section A [Physics]

1. Two bodies of masses m_1 and m_2 have same momentum. The ratio of their kinetic energy is
(a) $\sqrt{\frac{m_2}{m_1}}$ (b) $\sqrt{\frac{m_1}{m_2}}$ (c) $\frac{m_1}{m_2}$ (d) $\frac{m_2}{m_1}$
2. A body sliding on a smooth inclined plane requires 6 s to reach the bottom, starting from rest at the top. How much time does it take to cover one-ninth ($1/9$) the distance starting from rest at the top?
(a) $(1/54)$ s (b) 2 s (c) $(9/6)$ s (d) 4 s
3. A bullet of mass 0.04 kg moving with a speed of 90m/sec enters a heavy wooden block and stopped after 3s. What is the average resistive force exerted by the block on the bullet?
(a) 1 N (b) 1.2 N (c) 2 N (d) 3 N
4. Twelve one-rupee coins are put on top of each other on a table, where mass of each coin is 20g. The reaction of the 7th coin (counted from bottom) on the 8th coin is [take, $g = 10 \text{ m/s}^2$]
(a) 2N (b) 1N (c) 3 N (d) 4N
5. Suppose the earth suddenly stops attracting objects placed near surface. A person standing on the surface of the earth will
(a) remain standing (b) fly up (c) sink into earth (d) Either (b) or (c)
6. Ongoing from one planet to other planet, the value of G (gravitational constant)
(a) increases (b) decreases (c) remains same (d) None of these
7. The height at which the weight of a body becomes $(1/16)$ th of its weight on the surface of the earth (radius R), is
(a) $5R$ (b) $15 R$ (c) $3 R$ (d) $4 R$
8. If the mass of the sun is ten times smaller and gravitational constant G is ten times larger in magnitude. Then, for earth,
(a) walking on ground would become more easy
(b) acceleration due to gravity on the earth will not change
(c) raindrops will fall much slower
(d) airplanes will have to travel much faster
9. A ball bounces to 80% of its original height. What fraction of its mechanical energy is lost in each bounce?
(a) 20% (b) 25% (c) 26% (d) 30%

10. When a man increases his speed by 2 ms^{-1} , he finds that his kinetic energy is doubled, the original speed of the man is
 (a) $2(\sqrt{2} - 1) \text{ ms}^{-1}$ (b) $2(\sqrt{2} + 1) \text{ ms}^{-1}$ (c) 4.5 ms^{-1} (d) None of these

Subjective Questions (5 mark Each)

1. (a) A farmer has to go 500m due north, 400m due east and 200m due south to reach his field. If he takes 20 min to reach the field, (3)
 (i) what is the displacement from his house to the field ?
 (ii) what is the average speed of farmer during the walk ?
 (iii) what is the average velocity of farmer during the walk ?
 (b) A ball hits a wall horizontally at 6.0 m s^{-1} . It rebounds horizontally at 4.4 m s^{-1} . The ball is in contact with the wall for 0.040 s. What is the acceleration of the ball? (2)
2. A block of mass 200 kg rests on a smooth horizontal surface. A boy of mass 20kg pushes the block with a force of 20N.
 Answer the following:
 (i) How many forces act on the boy? Draw a labelled diagram to show all forces.
 (ii) How many forces act on the block? Draw a labelled diagram to show all forces.
 (iii) will the boy move? Give a reason for your answer.
 (iv) What will be the acceleration of the boy the block take the force exerted as the only horizontal force in the system.
3. A ball of mass 2 grams is thrown vertically upward in a vacuum from point a such that the ball possesses 40 J of total mechanical energy.
 Answer the following:
 (i) To what maximum height will the ball rise? (Take $g = 10 \text{ m/s}^2$)
 (ii) What will be the velocity of the ball at the midpoint of its journey upward?
 (iii) After how much time will the ball return to the ground ?
 (iv) is the ball in free-fall motion during its upward motion? Explain with reason.
4. Using the velocity–time graph, derive the three equations of uniformly accelerated motion. Also why do we choose a velocity time graph for these derivations why not displacement -time or acceleration time graphs

SECTION - B Chemistry

1. The boiling points of diethyl ether, acetone and n-butyl alcohol are 35°C , 56°C and 118°C respectively. Which one of the following correctly represents their boiling points in kelvin scale?
 (a) 306k, 329k, 391k (b) 308k, 329k, 392k
 (c) 308k, 329k, 391k (d) 329k, 392k, 308k

2. When heat is constantly supplied by a gas burner with small flame to melt ice, then the temperature of ice during melting:
(a) increases very slowly (b) does not increase at all
(c) first remains constant and then increases (d) increases to form liquid water
3. The solubility of ammonium chloride in water is 41 g at 40° C. What mass of ammonium chloride would be needed to make a saturated solution of ammonium chloride in 50 g of water at 40°C?
(a) 82 g (b) 20.5 g (c) 164 g (d) 50 g
4. An element has 19 protons and 20 neutrons. It forms a stable cation by losing one electron. Which of the following correctly represents the species formed?
(a) Mass no = 39, atomic no = 19, charge = -1
(b) Mass no = 39, atomic no = 18, charge = +1
(c) Mass no = 39, atomic no = 19, charge = +1
(d) Mass no = 20, atomic no = 19, charge = +1
5. The atomic numbers of four elements A, B, C, and D are 12, 13, 15 and 3 respectively. The element which cannot form a cation is :
(a) A (b) B (c) C (d) D
6. In which of the following conditions, the distance between the molecules of hydrogen gas would increase?
(i) increasing pressure on hydrogen contained in a closed container
(ii) some hydrogen gas leaking out of the container
(iii) increasing the volume of the container of hydrogen gas
(iv) adding more hydrogen gas to the container without increasing the volume of the container
(a) (i) and (ii) (b) (i) and (iv) (c) (ii) and (iii) (d) (ii) and (iv)
7. When a gas jar containing colourless air is kept upside down over a gas jar full of brown-coloured bromine vapour, then after sometime, the brown colour of bromine vapour spreads into the upper gas jar making both the gas jars appear brown in colour. Which of the following conclusion obtained from these observations is incorrect?
(a) Bromine vapour is made of tiny particles which are moving
(b) Air is made up of tiny particles which are moving
(c) The particles of bromine are moving but those of air are not moving
(d) Even though bromine vapour is heavier than air, it can move up against gravity
8. Element M has 19 protons and element N has 8 protons. Both combine using their most common valencies what is the correct molecular formula of the compound formed.
(a) MN (b) M₂N (c) MN₂ (d) M₂N₃

9. On heating calcium carbonate, it decomposes completely to form calcium oxide and carbon dioxide. If 1.4g of calcium oxide is formed, then the amount of calcium carbonate taken and the amount of carbon dioxide formed will be respectively-
 - (a) 2.2g calcium carbonate and 1.1g carbon dioxide
 - (b) 1.1g calcium carbonate and 2.5g carbon dioxide
 - (c) 2.5g calcium carbonate and 1.1g carbon dioxide
 - (d) 5.0g calcium carbonate and 1.1g carbon dioxide
10. Which of the following information is not given by Rutherford's alpha particles scattering experiment.
 - (a) Nucleus of an atom is positively charged
 - (b) electrons do not radiate energy while revolving in an energy level
 - (c) There is a lot of empty space in atom
 - (d) Nucleus of an atom is very hard and dense

Subjective Type Questions (3+2 = 5 Marks for each question)

1.
 - (a) Magnesium and oxygen combine in the ratio of 3 : 2 by mass to form magnesium oxide. What mass of Oxygen gas would be required to react completely with 24 g of magnesium?
(Given Atomic mass of Magnesium is 24 u, Atomic mass of Oxygen is 16 u)
 - (b) If 110 g of copper sulphate is present in 550 g of solution, the concentration of solution is $z \times 10$. Calculate the value of z.
2. Limestone contains metal M that forms a dipositive ion by losing electrons.
 - (a) Write the electronic configuration and shell structure of M and M^{2+} ,
 - (b) A 40g limestone sample is 75% pure in the compound calculate the mass of metal present in the sample.
3.
 - (a) When 5 g of calcium is burnt in 2 g of oxygen then 7 g of calcium oxide is produced. What mass of calcium oxide will be produced when 5 g of calcium is burnt in 20 g of oxygen? Which law of chemical combination will govern your answer.
 - (b) State one drawback of Rutherford's model of the atom?
Which model more accurately describes the structure of an atom?
4.
 - (a) The atom of an element X contains 17 protons, 17 electrons and 18 neutrons whereas the atoms of an element Y contains 11 protons 11 electrons and 12 neutrons.
 - (i) What could be element X and Y?
 - (ii) Write the symbol of ions formed by X and Y.
 - (iii) What will be the formula of the compound formed by X and Y?
 - (b) Which observation of Rutherford's alpha particles scattering experiment shows that the nucleus of an atom is very hard and dense?

1. Which of the following does not lose their nucleus at maturity?
(a) Companion cells (b) Red blood cells (c) Vessel (d) Sieve tube cells
2. Sclerenchyma is not present in
(a) Veins of leaves (b) Husk of coconut
(c) Stalk of leaves (d) Hard coverings of nuts
3. Find out the incorrect statement
(a) Chromatin is an entangled mass of threads
(b) Chromosomes are composed of DNA and proteins
(c) Functional segments of DNA are called chromosomes
(d) Chromosomes are only visible during cell division
4. In which tissue do we find Haversian canals?
(a) Cartilage (b) Spongy Bone (c) Compact Bone (d) Areolar tissue
5. When green capsicum turns red
(a) Chromoplast change to chloroplast (b) Chloroplast change to chromoplast
(c) New chromoplast are synthesised (d) New chloroplast are synthesised
6. Read the following statements regarding osmosis carefully and select the correct statement:
(a) Movement of solvent molecules from a region of higher concentration of solute to a region of lower concentration of solute through a semipermeable membrane
(b) Movement of solvent molecules from a region of lower concentration of solute to higher concentration of solute through a semipermeable membrane
(c) Movement of solute molecules from higher concentration to lower concentration of solution through a semipermeable membrane
(d) Movement of solute molecules from lower concentration to higher concentration of solution through a semipermeable membrane
7. Viruses lack any membranes and hence do not show characteristics of life until they enter a living body, viruses cause diseases in living cells by:
(a) Destroying the host cell (b) Manipulating the DNA of host cell
(c) Feeding on host cell (d) Injecting harmful proteins in host cell
8. Living cells were first discovered by Antonie van Leeuwenhoek in pond water, he saw the cells using:
(a) Magnifying glass (b) Compound double lens microscope
(c) Simple single lens microscope (d) Light microscope

9. Enzymes present in lysosomes are made in
 (a) Smooth endoplasmic reticulum (b) Golgi apparatus
 (c) Rough endoplasmic reticulum (d) Nucleus
10. DNA of bacteria is
 (a) Linear (b) Circular (c) Entangled (d) Helical

Subjective Questions (5 marks Each)

Answer the following question:

1. Answer the following questions (2+1+2)
 - (a) If a plant stem is dipped in blue coloured water for 2-3 days and then the stem is cut from the middle, in the cross-section a certain tissue appears to be of blue colour. What is the name of that tissue, give reason for your answer.
 - (b) Name the structure of the cell that is chemically made up of proteins and lipids, allowing movement of only selective substances.
 - (c) The number of mitochondria can increase or decrease in a cell irrespective of cell division. Explain how this can happen and on what basis this number varies in the cells?

2. Answer the following questions (2+2+1)
 - (a) When a plant cell is placed in a hypertonic solution, although it gets plasmolysed (cell membrane and cell content shrinks leaving the cell wall) but the cell retains its shape. If this plasmolysed cell is placed in a Hypotonic solution it will regain its shape. Why does this happen and is the same possible with animal cells? Justify your answer.
 - (b) How Meiosis differs from Mitosis? Why does meiosis contribute more to create genetic diversity compared to mitosis?
 - (c) Companion cells and phloem parenchyma are both parenchymatous tissues of phloem, so why are they named differently?

3. Answer the following (1+2+1+1)
 - (a) Explain why phloem tissue has more number of living cells than xylem tissue?
 - (b) Does having more dead cells possess any advantage to the plant? Name any two tissues in plants with dead cells.
 - (c) Why do desert plants have a thick waxy cutin?
 - (d) What is the difference between epidermis of leaf and epidermis of roots?

4. Explain what will happen if, and justify your answer. (2+2+1)
 - (a) A green plant is kept in dark away from sun
 - (b) Golgi apparatus is removed from the cell
 - (d) All the ligaments are removed from the body

SECTION - D Mathematics

1. Vikas has ₹($x^3 + 2ax + b$), with this money he can buy exactly $(x - 1)$ jeans or $(x + 1)$ shirts with no money left. How much money Vikas has, if $x = 4$?
(a) ₹80 (b) ₹120 (c) ₹ 30 (d) ₹60

2. If $2^x = 4^y = 8^z$ and $\left(\frac{1}{2x} + \frac{1}{4y} + \frac{1}{6z}\right) = \frac{24}{7}$, then find the value of z .

(a) $7/16$ (b) $7/32$ (c) $7/48$ (d) $7/64$

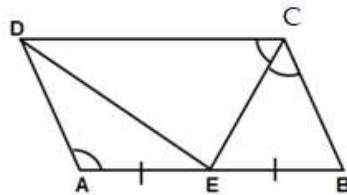
3. A company uses two profit models for financial analysis:
Model A: Profit is given by $[P_1(x) = ax^3 + 3x^2 - 3]$
Model B: Profit is given by $[P_2(x) = 2x^3 - 5x + a]$
At the end of each year, when sales equal 4 units, the company calculates the leftover profit for each model by dividing the polynomial by $[(x - 4)]$, leaving remainders $[R_1]$ and $[R_2]$ for models A and B, respectively. If the CEO wants the weighted leftover profit (specifically, $[2R_1 - R_2]$) to be zero, what should the value of $[a]$ be?
(a) $-18/127$ (b) $18/31$ (c) $17/127$ (d) $-17/31$

4. Which of the following equations satisfies the data in the given table?

x	-1	0	1	2
y	-3	-1	1	3

- (a) $y = x - 2$ (b) $y = 2x - 1$ (c) $y = 3x - 3$ (d) $y = x + 1$
5. If a school calculates students' performance using two equations: $[ax^2 + ax + 3]$ for science and $[x^2 + x + b]$ for math, and if scoring 1 in both subjects gives zero in both methods, what is $[ab]$?
(a) 3 (b) 3.5 (c) 2 (d) -3

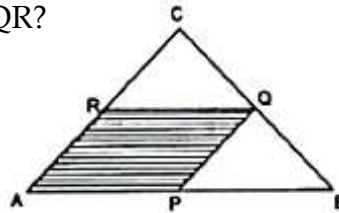
6. ABCD is a parallelogram, E is the mid-point of AB and CE bisects angle BCD. The value of angle DEC is:



- (a) 60° (b) 90° (c) 100° (d) 120°
7. A conical tent is to accommodate 11 persons. Each person must have 4 sq. metres of the space on the ground and 20 cubic metres of air to breath. Find the height of the cone.
(a) 11 m (b) 16 m (c) 14 m (d) 15 m

8. In the figure P, Q and R are the mid-point of the sides AB, BC and AC respectively, which of the following is the area of APQR?

- (a) ar (ΔABC) (b) $\frac{1}{2}$ ar (ΔABC)
 (c) $\frac{1}{4}$ ar (ΔABC) (d) $\frac{1}{3}$ ar (ΔQPB)

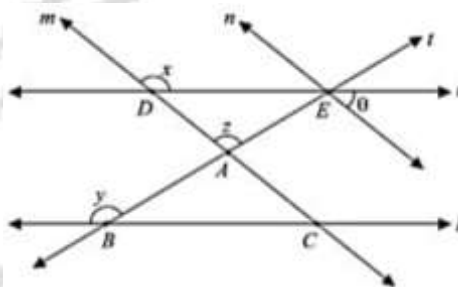


9. The surface area of a sphere of radius 30 cm is six times the area of the curved surface of a cone of radius 24 cm. Find the volume of the cone. (Take $\pi = \frac{22}{7}$)

- (a) 4224 cm³ (b) 3884 cm³ (c) 4114 cm³ (d) 3804 cm³

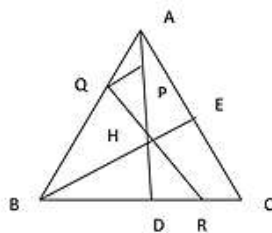
10. In the figure given below, $l \parallel u$ and $m \parallel n$. If $\angle ACB = 55^\circ$ and $\angle AED = 30^\circ$, find x, y, z and q respectively.

- (a) 95°, 125°, 150°, 55°
 (b) 150°, 95°, 125°, 55°
 (c) 125°, 150°, 95°, 55°
 (d) 55°, 95°, 150°, 125°

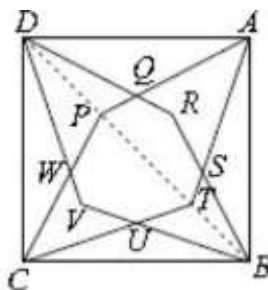


Subjective (5 Marks each)

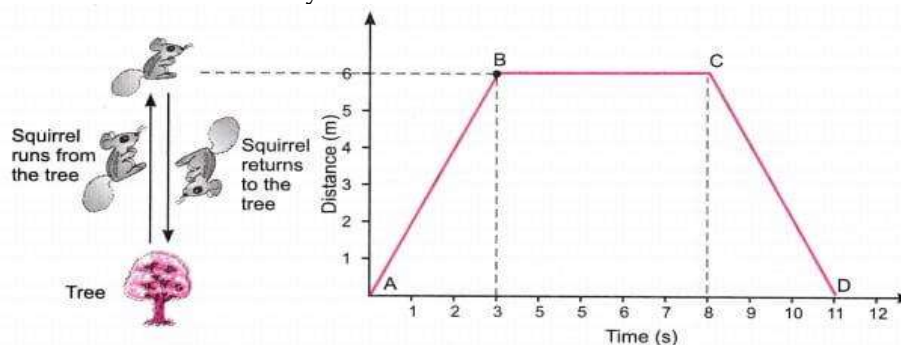
1. A hemispherical tank is emptied by a pipe at the rate of 5 litres per minute. How long will it take to half empty the tank if it is 1 1/2 metre in diameter?
2. In the figure, $BE \perp AC$. AD is any line from A to BC intersecting BE in H. P, Q and R are respectively the mid-points of AH, AB and BC. Prove that $\angle PQR = 90^\circ$.



3. The figure below is made up of a square ABCD and two similar rhombuses, ATCP and DRBV. Given that $\angle BVD = 135^\circ$, then find $\angle PCT$ and $\angle ABD$ respectively



4. Suppose a squirrel is moving at a steady speed from the base of a tree towards some nuts. It then stays in the same position for a while, eating the nuts, before returning to the tree at the same speed. A graph can be plotted with distance on the x-axis and the time on y-axis.



Observe the graph carefully and answer the following questions.

- Which part of the graph shows the squirrel moving away from the tree?
- Name the point on the graph which is 6 m away from the base of the tree.
- Which part of the graph shows that the squirrel is not moving?
- Which part of the graph shows that the squirrel is returning to the tree?
- Calculate the speed of the squirrel from the graph during its journey.

SECTION - E English

- He hasn't bought _____ new clothes for months.
a) much b) any c) few d) some
- Choose the correctly punctuated sentence:
a) However, he decided to go. b) However he decided to go.
c) However; he decided to go. d) However he, decided to go.
- Choose the correct form: "No sooner _____ the bell rang than the students rushed out."
a) did b) has c) had d) was
- Choose the sentence without any grammatical error:
a) She prefers tea than coffee. b) She prefers tea to coffee.
c) She prefers tea over than coffee. d) She prefers tea instead coffee.
- Select the sentence with correct punctuation:
a) She said, "I can't believe it!" b) She said, "I can't believe it!"
c) She said "I can't believe it!" d) She said, "I cant believe it!"

Questions 6 & 7 are paragraph based.

The manager said, "We will review your report tomorrow."

The employees were informed that their work would be evaluated soon.

Later, the HR department circulated an email announcing that rewards might be distributed.

Finally, the staff was congratulated for their dedication.

6. The first sentence in indirect speech would read:
 - a) The manager said that they will review the report tomorrow.
 - b) The manager said that they would review the report the next day.
 - c) The manager told that the report would be reviewed tomorrow.
 - d) The manager said they had reviewed the report.
7. In the passage, "were informed" is an example of:
 - a) Active voice, past tense
 - b) Passive voice, past tense
 - c) Active voice, perfect tense
 - d) Passive voice, perfect tense
8. If he _____ harder, he might have topped the class.
 - a) studied
 - b) studies
 - c) had studied
 - d) was studying
9. You _____ smoke in this area; it's a restricted zone.
 - a) must not
 - b) needn't
 - c) should
 - d) could
10. Find the part that contains an error:
 - (a) He insisted
 - (b) to go
 - (c) on the trip
 - (d) No error

Section - F [Mental Ability]

1. The Colored Switches (Logical Deduction)
You have three identical, unlabeled boxes. One contains two Red marbles (RR), one contains two Blue marbles (BB), and one contains one of each (RB). All three boxes are labeled, but every single label is guaranteed to be incorrect. If you are only allowed to take out one marble from one box, how can you correctly label all three boxes? EXPLAIN
2. The Mysterious Mirror Clock
A watch shows 4:15. In a mirror, what time will it appear as?
3. The Light Race
You switch on a torch inside a moving train. To someone outside watching through the window, does the light move faster, slower, or the same?
4. The Number That Wanted to Vanish
You can write me in words, but if you remove one letter, I become even. What number am I?

5. The Family Photo Trick
In a photo, Ravi says, "I have as many sisters as brothers." His sister Rina says, "I have twice as many brothers as sisters." How many brothers and sisters are there?
6. The Numeric Code
You have a code where each letter corresponds to its position in the alphabet (A=1, B=2,... Z=26). The message "20 8 9 19 9 19 5 1 19 25" is given. Decode it.
7. The Letter Sequence (Number Pattern)
What is the next letter in the following logical sequence?
O, T, T, F, F, S, S, E, ?



Physics

1.D	2.B	3.B	4.B	5.B	6.C	7.C	8.B	9.A	10.D
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Chemistry

1.C	2.B	3.B	4.C	5.C	6.C	7.C	8.B	9.C	10.B
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Biology

1.A	2.C	3.C	4.C	5.B	6.B	7.B	8.C	9.C	10.B
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Maths

1.B	2.C	3.A	4.B	5.A	6.B	7.D	8.C	9.A	10.C
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English

1.B	2.A	3.C	4.B	5.B	6.B	7.B	8.C	9.A	10.B
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