

GIMs - Genesis Ignited Minds Scholarship Test
10th Moving 11th (ICSE)

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:-
- Section A - Mental Ability
Each question in Section A carries 3 marks
- Objective Section (Section B to F)
Each Objective question from Section B to F carries +2 marks
No Negative marking for wrong answers.
- Subjective Section (Section B to E)
Each subjective question from section B to E carries 5 marks.



Genesis Branches

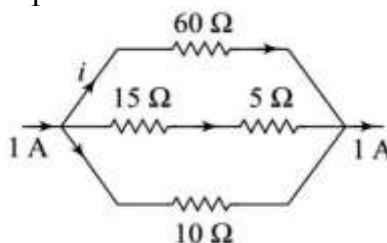
SCO -294, Sector-20, Panchkula
SCO -13, Sector-15, Panchkula
SCO - 17, VIP Road, Zirakpur (Near Nand Sweets)
Helpline No: 9041056405 & 7696016405

Section A [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, ?

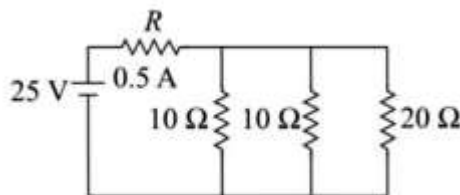
Section B [Physics]

1. The magnitude of I in ampere unit is

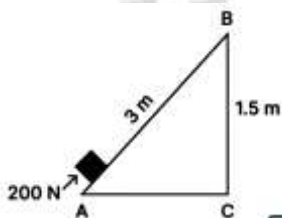


- (a) 0.1 (b) 0.3 (c) 0.6 (d) none of these

2. In the circuit as shown in figure if the current drawn through battery is 0.5A. Then

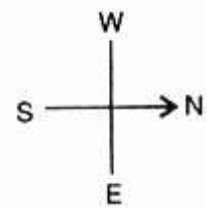
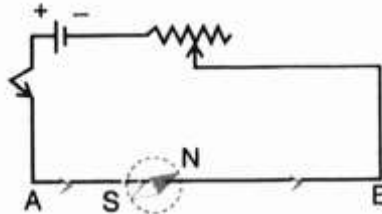


- (a) resistance $R = 46\Omega$
 (b) current through 20Ω resistance is $0.4A$
 (c) potential difference across the middle resistance is $5V$
 (d) potential difference across the 20Ω resistance is $4V$
3. A block of mass 20 kg is pulled up a slope as shown in the figure given below with a constant speed by applying a force of $200N$ parallel to the slope from the initial position A to the final position B. Work done in moving the block from A to B is:

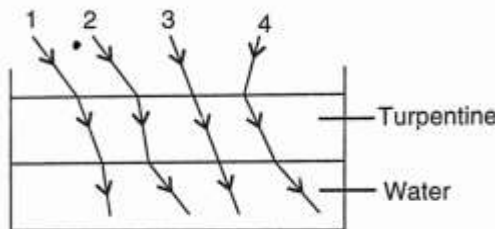


- (a) 600 J (b) 500 J (c) 60 J (d) 200 J
4. Out of the following which one is an example of dynamic equilibrium?
- (i) Moon revolving around the earth
 - (ii) A pebble fixed at the end of a string whirling in a circular path
 - (iii) An aeroplane moving at a constant height
 - (iv) A beam balanced in a horizontal position.
- (a) (iii) and (iv) (b) (i), (ii) and (iii)
 (c) (i) and (ii) (d) (i) and (iii)
5. A coolie A takes 1 minute to lift a load to the roof of a bus whereas coolie B takes 2 minutes to lift the same load to the roof of the same bus. The work done by B is:
- (a) equal to work done by A (b) greater than work done by A
 (c) less than work done by A (d) none of the above
6. The incorrect statement among the following is:
- (a) When a ray of light gets refracted from a denser to a rarer medium, the speed of light decreases.
 - (b) The frequency of light does not change on refraction.
 - (c) The speed of light V in medium is related to its wavelength λ and frequency f as $V = f \lambda$
 - (d) The incident ray, the refracted ray and the normal at the point of incidence all lie in one plane.

7. Identify the incorrect statement:
- If the medium on both sides of a lens is same, its first and second focal lengths are equal, i.e. $f_1 = f_2$ (numerically)
 - when we say focal length of a lens, we mean the first focal length of the lens.
 - a convex lens has a real focus.
 - a concave lens has a virtual focus.
8. If the length l of wire is increased to $3l$ by stretching, its resistance R increases to.....
- $3R$
 - $4R$
 - $6R$
 - $9R$
9. In the figure given below, when the key is pressed, a current passes in the wire in the direction from A to B (i.e., from south to north). The north pole of the compass needle will deflect towards:
- East
 - North
 - South
 - West



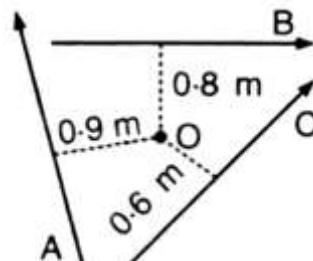
10. The optical density of turpentine is higher than that of water, while its mass density is lower than water. The figure given below shows a layer of turpentine floating over water taken in a container. For which one of the four rays incident on turpentine in the path shown in the figure is correct?



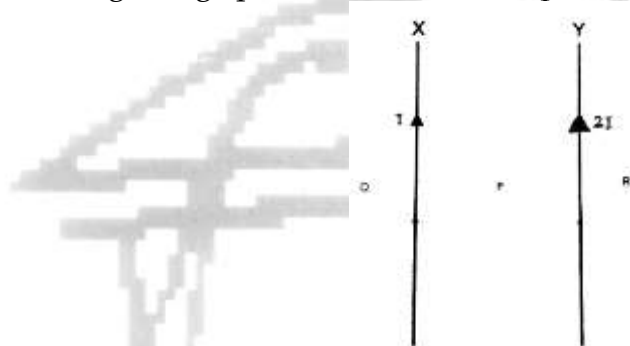
- Ray 1
- Ray 2
- Ray 3
- Ray 4

Subjective Questions

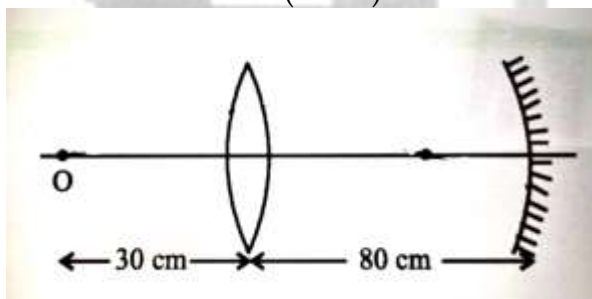
1. A, B and C are the three forces each of magnitude 4 N acting in the plane of the paper as shown in Figure. The point O lies in the same plane.



- (i) Which force has the least moment about O? Give a reason.
 (ii) Which force has the greatest moment about O? Give a reason.
2. 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.
3. If P is the midpoint of 2 conductor x & y then in which direction will be the following charge particle deflect when placed at points P, Q and R.



- (a) a proton moving vertically upwards from point P
 (b) an electron moving towards south from point Q
 (c) a neutron towards west from point R
 (d) an α particle parallel to the direction of current from point P.
4. A convex lens of focal length 20 cm and a concave mirror, having their principal axes align the same lines, are kept 80 cm apart from each other. The concave mirror is to the right of the convex lens. When an object is kept at a distance of 30 cm to the left of the convex lens, the image is formed at the object itself. Find the focal length of concave mirror (in cm)



SECTION - C [Chemistry]

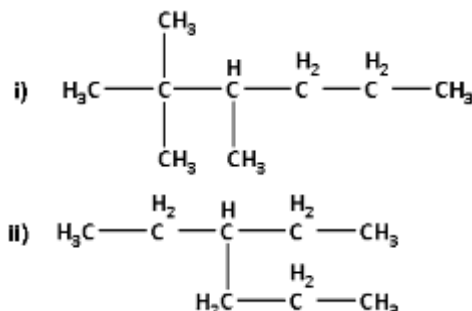
1. During the electrolysis of acidified water using platinum electrodes, the volume of gas collected at the cathode is found to be twice that at the anode. Which of the following statements correctly explains this observation?

- (a) Hydrogen gas is liberated at the cathode as each water molecule provides two hydrogen atoms, while oxygen forms from pairs of oxide ions at the anode.
- (b) The efficiency of hydrogen evolution is higher due to lower over potential compared to oxygen evolution.
- (c) The reduction at the cathode involves gain of electrons by H^+ ions, forming H_2 gas, while oxidation at the anode involves loss of electrons by OH^- ions, forming O_2 ; hence the stoichiometric ratio of gases is 2:1.
- (d) Both (a) and (c) are correct explanations.
2. **Assertion (A):** During the electrolysis of molten lead(II) bromide, metallic lead is deposited at the cathode and brown vapours of bromine are evolved at the anode.
- Reason (R):** During electrolysis, positive ions are discharged at the anode because the anode attracts cations.
- (a) Both A and R are true, and R is the correct explanation of A.
- (b) Both A and R are true, but R is not the correct explanation of A.
- (c) A is true, but R is false.
- (d) A is false, but R is true.
3. An element Y belongs to Group 15 and Period 3 of the periodic table. When it combines with hydrogen and oxygen, it forms a covalent hydride and an acidic oxide. Which of the following correctly represents the empirical formula of its hydride and oxide, and the type of bonding present in both?
- (a) YH_2 and YO_2 ; both are ionic compounds
- (b) YH_3 and Y_2O_3 ; both are Ionic compounds
- (c) YH_3 and Y_2O_5 ; both show covalent bonding
- (d) Y_2H_3 and YO ; hydride covalent, oxide ionic
4. Which of the following pairs does not exhibit functional isomerism?
- (a) $C_2H_6O \rightarrow CH_3CH_2OH$ and CH_3OCH_3
- (b) $C_3H_6O \rightarrow CH_3CH_2CHO$ and CH_3COCH_3
- (c) $C_4H_8O_2 \rightarrow CH_3CH_2CH_2COOH$ and $CH_3CH_2COOCH_3$
- (d) $C_4H_{10} \rightarrow CH_3CH_2CH_2CH_3$ and $CH_3CH(CH_3)CH_3$
5. When dry ammonia gas is passed over heated copper(II) oxide, a redox reaction occurs. The correct is :
- (a) Cu and N_2 , copper is oxidised and nitrogen is reduced.
- (b) Cu, H_2O and N_2 , copper is reduced and nitrogen is oxidised.
- (c) Cu and H_2O , both copper and nitrogen are reduced.
- (d) $Cu(NO_3)_2$ and H_2 , copper is oxidized and hydrogen is reduced.
6. Which of the following molecules has a linear molecular geometry?
- (a) Carbon dioxide (b) Water (c) Ammonia (d) Ethane

7. A gas cylinder filled with hydrogen holds 50 g of the gas. The same cylinder holds 200 g of a gas A and 500 g of gas B. Under identical conditions of temperature and pressure in the cylinder, if the relative molecular masses of gases A and B are X and Y respectively. Find X+Y :
 (a) 8 (b) 20 (c) 160 (d) 28
8. The third member of the homologous series of saturated monocarboxylic acids is a compound that on decarboxylation gives ethane. If one molecule of this acid is completely represented structurally, how many covalent bonds are present in it?
 (a) 9 (b) 10 (c) 11 (d) 12
9. Nessler's reagent, an alkaline solution of potassium tetraiodomercurate(II), is used to detect the presence of which ion in a solution?
 (a) NH_4^+ , gives brown coloration, forms basic mercuric amido-iodide
 (b) NO_3^- , gives reddish-brown gas, forms nitrogen dioxide
 (c) Cl^- , gives white curdy ppt., forms silver chloride
 (d) SO_4^{2-} , gives white ppt., forms barium sulphate
10. Complete combustion of 3 g of ethane gives $X \times 10^{22}$ molecules of water. The value of X is (Round off to the Nearest Integer).
 (a) 180 (b) 18 (c) 6 (d) 16

Subjective (5 marks Questions)

1. When a basic gas used as a fertilizer reacts with carbon dioxide under suitable conditions, a nitrogen-containing compound is formed which is one of the most important fertilizers in the world. Answer the following questions:
 (a) Name the basic gas used and the compound formed .
 (b) Calculate the mass percentage of each element in the compound.
2. (a) Define term isomerism. Find the number and type of structural isomerism is shown by C_6H_{14} and C_5H_{12} .
 (b) Write down IUPAC name of the following compound:

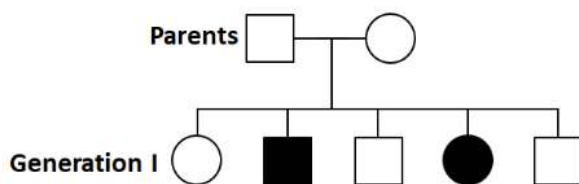


3. (a) State the process used for the industrial preparation of ammonia.
What is the approximate pH of a dilute solution of ammonia?
(b) What are the products formed when ammonia reacts with excess chlorine?
State one use of the product formed.
4. When orange potassium dichromate is treated with a diprotic acid, it forms an orange acidic solution (A). On reaction with a reducing agent, A changes to a green compound (B). When B is treated with sodium hydroxide, a green precipitate (C) is formed.
Answer the following:
(a) Name the diprotic acid used. Identify A, B and C.
(b) Write balanced chemical equations for each step (1) → (2) → (3).
State the colour change observed in each step.

SECTION - D [Biology]

1. Water is reabsorbed maximum in
(a) PCT and DCT (b) Collecting tubule
(c) PCT (d) None of the above
2. Which of the following hormones causes reduction in stem elongation and acceleration of senescence in plants?
(a) Absciscic acid (b) Ethylene (c) Cytokinin (d) Gibberellins
3. Which of the following is present in serum?
(a) Antigen (b) Antibodies (c) WBC (d) RBC
4. What is the specific function of light energy in photosynthesis?
(a) Reduction of CO₂ (b) Synthesis of glucose
(c) Activate chlorophyll (d) Splitting of water molecules
5. In which of the following cases is plasmolysis not involved?
(a) Addition of salt in pickle to kill bacteria
(b) Salting of meat to kills germs
(c) Killing of weeds by sprinkling salt
(d) Killing of insects in a field using insecticides
6. The image generated in the eye is
(a) Inverted and real
(b) Inverted and virtual
(c) Erect and real
(d) Erect and virtual

7. Study the given pedigree chart and choose the correct statement

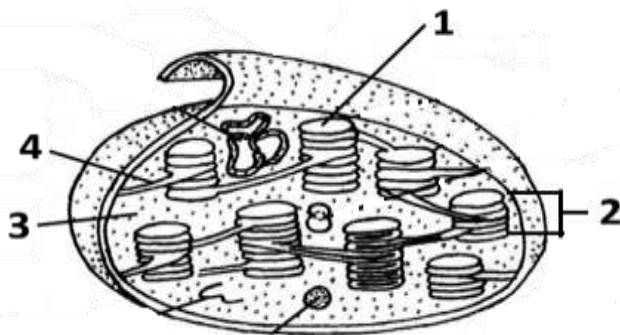


- (a) The trait under study is dominant
(b) Both parents are homozygous
(c) The trait can be X linked recessive disease haemophilia
(d) None of the above
8. A pea plant with green pods and smooth seeds with genotype Ggss will give rise to following gametes:
(a) Gg and ss (b) Gs and ss (c) Gs and gs (d) Gg and gs
9. Which of the following factors does not affect the rate of transpiration?
(a) CO₂ content of air (b) Water content of air
(c) Oxygen content of air (d) Atmospheric pressure
10. Which of the following statements is incorrect?
I. Cleavage furrow starts deepening during telophase in animal cells.
II. In the G₁ phase, the cell synthesises RNA and proteins necessary for cell division.
III. Mitochondria and Cytoplasm divide of their own by simple fission.
IV. During mitosis crossing over occurs between homologous chromosomes.
(a) I and II (b) III and IV (c) II and IV (d) I and II

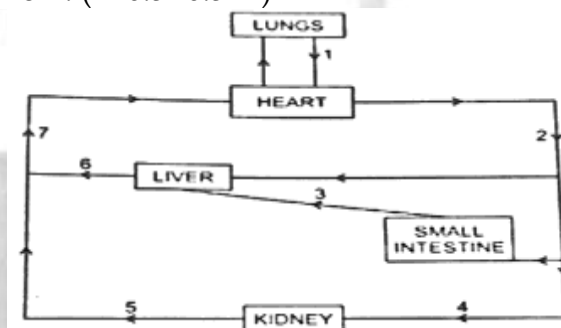
Subjective Questions

1. Answer the following questions: (2+1+2)
- (a) A patient's urine sample tested positive for glucose but negative for protein. Is this due to malfunctioning of the nephron or some other part of the body? Justify your answer.
- (b) A patient of cholera is suffering from prolonged diarrhea leading to loss of salts and water. How will this affect the excretory function and urine output?
- (c) In humans, free earlobes (E) are dominant over attached earlobes (e). A man with attached earlobes marries a woman heterozygous for the trait. Predict the phenotypes and their ratios in their children using a Punnett square.

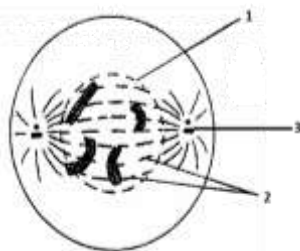
2. Examine the given figure (2+1+1+1)



- Label the parts 1, 2, 3 and 4.
 - Name the metabolic processes taking place in 1 and 3.
 - Represent the whole metabolic process in the form of a well balanced equation.
 - What are the main events taking place during the metabolic process in part 1.
3. The diagram below represents circulation in the human body. Answers the questions that follow: (2+0.5+0.5+2)



- Name the blood vessels labelled 1,3,6 and 7.
 - Name the blood vessel that supplies the walls of the heart with oxygen.
 - Mention one structural difference between blood vessels numbered 4 and 5.
 - Draw a neat labelled diagram of the blood vessel numbered '2' as seen in a cross section.
4. Study the given image and answer the following questions: (2+0.5+1.5+1)



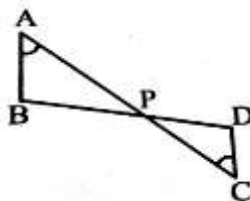
- Identify the stage of cell division and give reason for your answer.
- Which cell type is shown in the above diagram.
- Label the parts 1, 2 and 3.
- Name the stage which occurs after this stage and describe its key event.

SECTION - E [Mathematics]

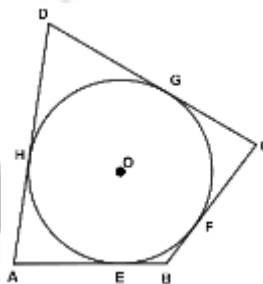
1. A die is rolled, the ratio of the probability of getting a composite number to the probability of getting a prime number is
(a) $\frac{5}{6}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$

2. $\operatorname{cosec}^2 \theta + \sec^2 \theta$ is equal to
(a) $\tan^2 \theta + \cot^2 \theta$ (b) $\cot \theta + \tan \theta$ (c) $(\cot \theta + \tan \theta)^2$
(d) 1

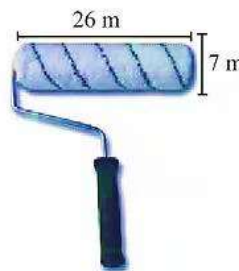
3. In the adjoining figure, $\angle A = \angle C$, $AB = 6$ cm, $BP = 15$ cm, $AP = 12$ cm and $CP = 4$ cm then $PD + CD$ is
(a) 5 cm
(b) 2 cm
(c) 7 cm
(d) None of these



4. In the given figure, O is the centre of the circle. ABCD is a quadrilateral where sides AB, BC, CD and DA touch the circle at E, F, G and H respectively. If $AB = 15$ cm, $BC = 18$ cm and $AD = 24$ cm, then the length of CD is
(a) 27 cm
(b) 18 cm
(c) 24 cm
(d) None of these



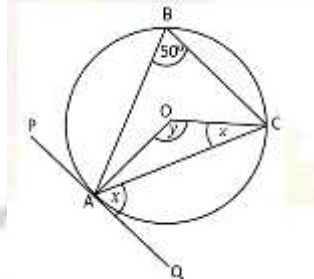
5. A paint roller is a paint application tool (as shown) used for painting large flat surfaces rapidly and efficiently. Its length is 26 cm long with an outer diameter of 7 cm. Then, the maximum area of the surface that gets painted when the roller makes 6 complete rotations vertically, is
(a) 1092 cm^2 .
(b) 1000 cm^2 .
(c) 1292 cm^2 .
(d) None of these



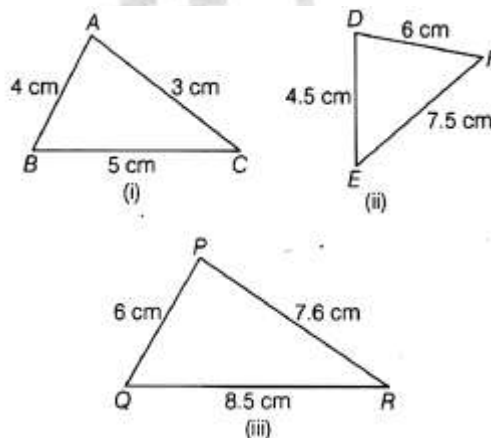
6. The roots of the quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ are
(a) non real roots (b) real and equal (c) real and distinct (d) None of these

7. If $P\left(\frac{a}{3}, 4\right)$ is the midpoint of the line segment joining the points $Q(-6, 5)$ and $R(-2, 3)$, then the value of a is
 (a) -4 (b) -6 (c) 12 (d) -12

8. In the given diagram, O is the center of the circle, and PQ is a tangent at A . If $\angle ABC = 50^\circ$, then $x + y + z$ equals
 (a) 190°
 (b) 230°
 (c) 210°
 (d) None of these



9. Which pairs of triangles in the given figure are similar?
 (a) (i) and (iii)
 (b) (ii) and (iii)
 (c) (i) and (ii)
 (d) None of these



10. A survey was conducted on 80 gamers to determine how many games they played in a day. The data is given below.
 Which of the following is the modal class?

Number of games	1-2	2-3	3-4	4-5	5-6	6-7	7-8
Number of gamers	20	24	10	12	8	4	2

- (a) 1-2 (b) 2-3 (c) 4-5 (d) 7-8

SUBJECTIVE (No Negative Marking)

1. The teacher asked the students to correctly complete the following sentence about the rhombus. "A rhombus has a side length of l units and one of its angles is equal to ϕ . The ratio of the lengths of the two diagonals is dependent on?
 Amayra: only l .
 Brinda: only ϕ .
 Cristie: both l and ϕ .
 Yukti: neither l nor ϕ .
 Who answered the question correctly? Show your work and give valid reasons.

2. Starting with a positive integer M written on the board, Sameer plays the following game: in each move, if x is the number on the board, he replaces it with $3x + 2$. Similarly, starting with a positive integer N written on the board, Harsh plays the following game: in each move, if x is the number on the board, he replaces it with $2x + 27$. Given that Sameer and Harsh reach the same number after playing 4 moves each, find the smallest value of $M + N$.
3. The curved surface area of a right circular cone is half of another right circular cone. If the ratio of their slant heights is 2:1 and that of their volumes is 3:1, find ratio of their:
 - (a) radii
 - (b) heights
4. The circle ω touches the circle μ internally at P . The centre O of μ is outside ω . Let XY be a diameter of μ which is also tangent to ω . Assume $PY > PX$. Let PY intersect ω at Z . If $YZ = 2PZ$, find the magnitude of angle PYX in degrees?

SECTION - F [English]

1. Antony's final tribute to Brutus – "This was the noblest Roman of them all" – reflects –
 - a) Genuine respect
 - b) Political sarcasm
 - c) Ambiguous praise
 - d) Forced diplomacy
2. Why does Brutus commit suicide?
 - a) To avoid capture and humiliation
 - b) Out of guilt for Caesar's death
 - c) Because Cassius orders him to
 - d) Because Antony mocks him
3. Why is the "last lesson" significant for Franz?
 - a) It marks the end of his schooling
 - b) He realizes the value of his language and identity
 - c) It makes him dislike the Germans
 - d) It helps him win a prize
4. The story The Last Lesson can best be described as –
 - a) A political allegory
 - b) A nostalgic reflection on loss of culture
 - c) A war story
 - d) A satire on education
5. Despite their irritation people agree that the song is
 - (a) harmful
 - (b) well-meant
 - (c) moralistic
 - (d) sensuous
6. The ship _____, Robinson arrived on the island.
 - a) had been broken
 - b) having been broken
 - c) having broken
 - d) has broken

7. One who exhibits courage or fearlessness
a) Loquacious b) Sycophant c) Intrepid d) Credulous
8. He looks upset, I think he took the criticism _____ heart.
a) to b) about c) in d) of
9. God has been distributing wisdom among people _____ many years.
a) For b) Since c) After d) Ever
10. Which part of the sentence contains an error?
No sooner (a)/ did I reached the station (b)/ than (c)/ the train departed. (d)
a) No sooner (a) b) did I reached the station (b)
c) than (c) d) the train departed (d)

Physics

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

Chemistry

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

Biology

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

Maths

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

English

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