AMITY INSTITUTE
FOR COMPETITIVE EXAMINATIONS
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NATIONAL TALENT SEARCH EXAMINATION (STAGE-II) 2017-18

PAPER – 2 (SAT) KEY/SOLUTION

(13.05.2018)

Time: 120 Minutes   *Max. Marks : 100*

INSTRUCTIONS TO CANDIDATES
Read the following instructions carefully before you answer the questions open the Test booklet.
1.   Answers are to be given on a **separate OMR sheet**.
2.   There are 100 questions in this test. All are compulsory. The question numbers 1 to 40 belong to Sciences, 41 to 60 pertain to Mathematics and 61 to 100 are on Social Science subjects.
3.   Please **follow the instructions** given on the OMR sheet for marking the answers.
4.   Write you **eight – digit Roll Number** as allotted to you in admission card very clearly on the **test-booklet** and darken the appropriate circles on the OMR sheet as per **instructions given**.
5.   Write down and darken **Test Booklet Number** in the appropriate circles on the answer sheet as per instructions given.
6.   Since the time allotted for this question paper is very limited and all questions carry equal marks, you should make the best use of it by not spending too much time on any one question.
7.   **Rough work** can be done **anywhere in the booklet** but not on the answer sheet / loose paper.
8.   Each correct answer will be awarded one mark.
9.   **THERE WILL BE NO NEGATIVE MARKING**.
10.   Please return only the OMR sheet to the invigilator after the test.
11.   English version of the question paper will be considered as final in case of any dispute arising out of variation in translation. .

1. Under which condition stated below, the six-carbon glucose molecule is broken down into three-carbon molecules pyruvate and lactic acid?

    (1) aerobic condition is muscle cells

    (2) anaerobic condition in yeast cells

    (3) aerobic condition in mitochondria

    (4) anaerobic condition in muscle cells

Ans. **(4)**

Under anaerobic condition, the glucose is broken down in to pyruvate and lactic acid inside the muscle cells.

2. Which among the following is the correct sequence regarding the flow of impulse in a neuron.

    (1) Dendrite → Axon → Cell body   (2) Axon → Cell body → Dendrite

    (3) Axon → Dendrite → Cell body   (4) Cell body → Axon → Nerve Terminal

Ans. **(4)**

The correct sequence is as follows

Cell body → Axon → Nerve terminal. The impulses pass on this sequence along a neuron.

3. In a hypertensive patient the systolic pressure increased to 150 mm of Hg. Which part of the brain would be involved in the regulation of blood pressure ?

    (1) Medulla   (2) Cerebrum   (3) Cerebellum   (4) Hypothalamus

Ans. **(1)**

Medulla is the lower half of brainstem. It deals with regulation of heart rate as well as blood pressure.

4. Edward Jenner's contribution for the eradication of small pox is

    (1) his proposition that small pox had possibly spread throughout the world from India and China

    (2) his discovery of transformation procedure

    (3) his finding that rubbing the skin crust of small pox victims on the arm of a healthy person, would develop resistance against small pox.
    (4) his finding that the cow pox infection protects the person from subsequent infection from small pox.

Ans. **(4)**

Edward Jenners in 1796 did a study "*Inquiry into Variolae Vaccinae*" known as the cowpox, in which he described the protective effect of cowpox against small pox.

5. Four important events given below may have led to the origin of life on the earth.

    I. Formation of amino acids and nucleotides

    II. Availability of water

    III. Organization of cells

    IV. Formation of complex molecules

    Select the correct sequence of events.

    (1) I, II, III and IV   (2) II, I, IV and III   (3) I, IV, II and III   (4) II, III, I and IV

Ans. **(2)**

The events which led to origin of life on earth are as follows:

Availability of water → formation of amino acids and nucleotides → formation of complex molecules → organization of cells.

6. Read the following statements carefully.
    I. Energy transfer in the biotic world always proceeds from the autotrophs.
    II. Energy flow is unidirectional
    III. Energy availability is maximum at the tertiary level.
    IV. There is loss of energy from one trophic level to the other.

    Select the relevant statements for the forest ecosystem

    (1) I, II and IV   (2) I, II and III   (3) I, III and IV   (4) II, III and IV

Ans. **(1)**

    The relevant statements for a forest ecosystem should be that the energy flow is always unidirectional, energy transfer always proceeds from autotrophs and energy is lost from one trophic level to other.

7. In a highly pesticide polluted pond, which of the following aquatic organisms will have the maximum amount of pesticide per gram of body mass?

    (1) Lotus   (2) Fishes   (3) Spirogyra   (4) Zooplanktons

Ans. **(2)**
    Fishes tend to occupy higher trophic levels so they would accumulate more pesticide per gram of body mass. This phenomenon is known as Bio-magnification.

8. A farmer made an observation in a backwater paddy field of coastal Kerala that the paddy plants wilt during noon onwards everyday but appear normal next morning. What would be the possible reason for wilting?
    (1) The rate of water absorption is less than the rate of transpiration in the afternoon.
    (2) The rate of water absorption is more than the rate of transpiration in the afternoon.
    (3) The changes in the rate of water absorption and transpiration are not associated with wilting.
    (4) The rate of water absorption is not related to the rate of transpiration.

Ans. **(1)**

    When rate of transpiration exceeds, the rate of water absorption during afternoon, than the cell become flaccid leading to wilting of leaves in the noon.

9. Observe the experimental sets [A] & [B].
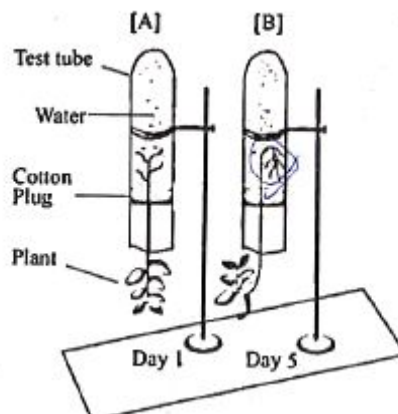
Observe the test tube A & B. From the list given below, choose the combination of responses of shoot and root that are observed in B.

(1) Positive phototropism and positive geotropism

(2) Negative phototropism and positive geotropism

(3) Positive phototropism and negative geotropism

(4) Only negative phototropism

Ans. **(1)**

The stem is always positively phototropic while roots are always positively geotropic.

10. Raw banana has bitter taste, while ripe banana has sweet taste. It happens because of the conservation of

(1) starch to sugar   (2) sucrose to fructose

(3) amino acids to sugar   (4) amino acids to protein

Ans. **(1)**

Raw banana has starch as stored food which gets converted into sugar while ripening, making it sweet in taste.

11. In the flowering plants sexual reproduction involve several events beginning with the bud and ending in a fruit. These events are arranged in four different combinations. Select the combination that has the correct sequence of events.

(1) Embryo, zygote, gametes, fertilization

(2) Gametes, fertilization, zygote, embryo

(3) Fertilization, zygote, gametes, embryo

(4) Gametes, zygote, embryo, fertilization

Ans. **(2)**

The correct sequence of events of sexual reproduction in flowering plants are

Gametes →fertilization → zygote → embryo

12. In pea plants, Round (R) and Yellow (Y) features of seeds are dominant over wrinkled (r) and green (y) features. In a cross between two plants having the same genotypes (RrYy), the following genotypic combinations of offspring are noticed.

A-RrYY

B-Rryy

C-rrYy

D-rryy

The phenotypic features of A, B, C and D are given below in an order in four combinations. Select the correct combination of character that corresponds to the genotypes.

(1) Round & yellow; round & green; wrinkled & yellow; wrinkled & green

(2) Round & green; wrinkled & yellow; wrinkled & green; round & yellow

(3) Wrinkled & green; round & yellow; wrinkled & yellow; round & green

(4) Wrinkled & yellow; round & green; wrinkled & yellow; round & yellow

Ans. **(1)**

Gene responsible for seed colour are

Y – dominant (yellow colour)

y – recessive (green colour)
Gene responsible for seed shape are
R-dominant (round)
r – recessive (wrinkled)
Hence,
RrYY : Round and yellow; rrYy : green and yellow
Rryy : round and wrinkled; rryy : green and wrinkled

13. Eukaryotic organisms have different levels of organization. Select the combination where the levels are arranged in the descending order.
     (1) DNA, chromosome, cell, nucleus, tissue
     (2) Tissue, cell, nucleus, chromosome, DNA
     (3) Nucleus, cell, chromosome, tissue
     (4) Tissue cell, chromosome, nucleus, DNA

Ans. **(2)**

     The cellular level of organization for a eukaryotic cell is as follows in descending order:

     Tissue → Cell → Nucleus → Chromosome → DNA

14. The gaseous byproduct of a process in plants is essential for another vital process that releases energy. Given below are four combinations of processes and products.
     Choose the correct combination.
     (1) Photosynthesis and oxygen
     (2) Respiration and carbon dioxide
     (3) Transpiration and water vapour
     (4) Germination and carbon dioxide

Ans. **(1)**

     During the process of photosynthesis, O_2 is formed which is required by the cells to break glucose in order to release energy.

15. 100 grams of oxygen (O_2) gas and 100 grams of helium (He) gas are in separate containers of equal volume at 100^oC. Which one of the following statement is correct?
     (1) Both gases would have the same pressure.
     (2) The average kinetic energy of O_2 molecules is greater than that of He molecules
     (3) The pressure of He gas would be greater than that of the O_2 gas
     (4) The average kinetic energy of He and O_2 molecules is same

Ans. **(3)**

     Moles of O_2 are less than that of He. Hence at same temperature and volume, He will exert more pressure than O_2 as PV = nRT so $P \propto n$

16. At 298 K and 1 atm pressure, a gas mixture contains equal masses of He, H_2, O_2 and NH_3. Which of the following is correct for their average molecular velocities?
     (1) He > H_2 > NH_3 > O_2 (2) He < H_2 < O_2 < NH_3
   (3) H_2 < He < NH_3 < O_2 (4) O_2 < NH_3 < He < H_2

Ans. **(4)**

     $V_{avg} \propto \dfrac{1}{\sqrt{M}}$ higher the molecular mass lower is the average velocity

17. A test tube along with calcium carbonate in it initially weighed 30.08 g. A heating experiment was performed on this test tube till calcium carbonate completely decomposed with evolution of a gas. Loss of weight during this experiment was 4.40 g. What is the weight of the empty test tube in this experiment?

(1) 20.08 g   (2) 21.00 g   (3) 24.50 g   (4) 2.008 g

Ans. **(1)**

$CaCO_{3(s)} \xrightarrow{\Delta} CaO_{(s)} + CO_{2\ (g)}$
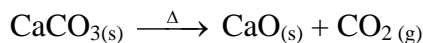
CO_2 evolved = 4.4 gram = 0.1 mole

According to stoichiometric ratio

i.e., 0.1 mole $CaCO_3$ was available, 10 g $CaCO_3$

Initial Mass = Mass of $CaCO_3$ + Mass of test tube

So 30.08 = 10 + Mass of empty test tube

Mass of empty test tube = 20.08 gm

18. Math List I (Mixture to be separated) with the List II (Methods used) and select the correct option using the codes given below:

List I (Mixture to be separated)	List II (Method used)
A. Petroleum products	I. Chromatography
B. Camphor and rock salt	II. Centrifugation
C. Cream from milk	III. Sublimation
D. Coloured components in a dye	IV. Fractional distillation

(1) A-I, B-II, C-III, D-IV   (2) A-II, B-IV, C-III, D-I
(3) A-IV, B-III, C-I, D-II   (4) A-IV, B-III, C-II, D-I

Ans. **(4)**

Conceptual
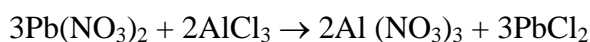
19. In a balanced chemical equation :

(a lead nitrate + b aluminium chloride → c aluminium nitrate + d lead chloride)

which of the following alternatives is correct?

(1) a = 1, b = 2, c = 2, d = 1   (2) a = 4, b = 3, c = 3, d = 4
(3) a = 2, b = 3, c = 2, d = 3   (4) a = 3, b = 2, c = 2, d = 3

Ans. **(4)**

$3Pb(NO_3)_2 + 2AlCl_3 \rightarrow 2Al\ (NO_3)_3 + 3PbCl_2$

20. The correct order of increasing number of alpha particles passing undeflected through the foils of Au, Ag, Cu and Al of 1000 atoms thickness each in a simulated alpha particle scattering experiment of Rutherford would be

(1) Au < Ag < Cu < Al   (2) Al < Cu < Ag < A u
(3) Au < Cu < Al < Ag   (4) Ag < Cu < Al < Au

Ans. **(1)**

Rutherford's scattering experiment depends on the density of nuclear charge. Lower the density of nuclear charge lesser will be deflection of α-particle.

21. The correct order of increasing pH values of the aqueous solutions of baking soda, rock salt, washing soda and slaked lime is

(1) Baking soda < Rock salt < Washing soda < Slaked lime
(2) Rock salt < Baking soda < Washing soda < Slaked lim e
(3) Slaked lime < Washing soda < Rock salt < Baking soda

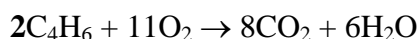(4) Washing soda < Baking soda < Rock salt < Slaked lime

Ans. **(2)**

	pH Value
Slaked lime	12
Washing soda	9
Baking soda	8.1
Rock salt	7

22. How many of oxygen gas will be needed for complete combustion of 2 moles of 3rd member of alkyne series ?

(1) 186 g   (2) 256 g   (3) 352 g   (4) 372 g

Ans. **(3)**

$2C_4H_6 + 11O_2 \rightarrow 8CO_2 + 6H_2O$

According to stoichiometric rule

2 mole of $C_4H_6 \rightarrow$ 11 mole of O_2

Mass of 11 mole of $O_2 = 11 \times 32 = 352$ g

23. Match List I (Position of the Metal in the Activity Series) with the List II (Related Reduction Process) and select the correct option using the codes given below:

List I	List II
(Position of the Metal in the Activity Series)	(Related Reduction Process)
A. The bottom of the series	I. Electrolysis
B. The top of the series	II. Reduction by heat alone
C. The lower regions of the series	III. Found in native state
D. The middle of the series	IV. Reduction using carbon or some other reducing agent

(1) A-II, B-III, C-IV, D-I   (2) A-II, B-I, C-IV, D-III
(3) A-III, B-I, C-II, D-IV   (4) A-III, B-I, C-IV, D-II

Ans. **(3)**

Conceptual

24. Which of the statements can help a chemistry student to predict chemical properties of an element?
I. Position of element in the periodic table
II. Atomic number of the element
III. Number of shells in the atom
IV. Number of electrons in the outer most shell

(1) I, II and III   (2) I, II and IV   (3) I, III and IV   (4) II, II and IV

Ans. **(2)**

Conceptual

25. Consider the elements A, B, C and D with atomic numbers 6, 7, 14 and 15 respectively. Which of the following statements are correct concerning these elements?
I. D will lose electron more easily than C.
II. B will gain electron more easily than C.
III. The element with highest electronegativity is D.
IV. The element with largest atomic size is C.

(1) I and II   (2) II and III   (3) II and IV   (4) III and IV
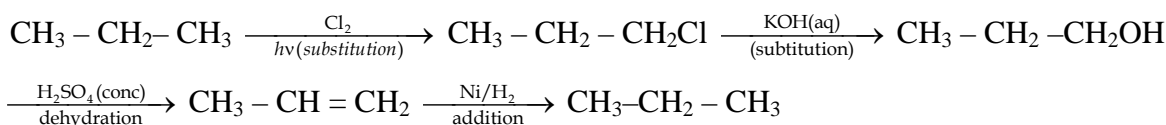
Ans. **(3)**

A $\Rightarrow$ Carbon (C) B $\Rightarrow$ Nitrogen (N)

C $\Rightarrow$ Silicon (Si) D $\Rightarrow$ Phosphorus (P)

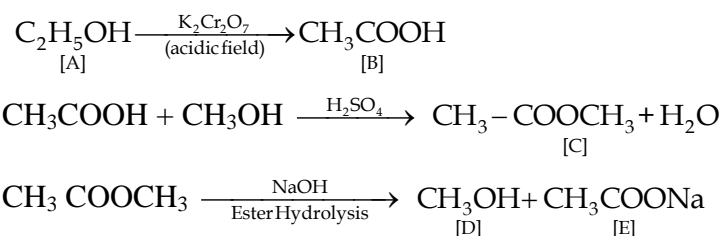B is the most EN among these and Atomic size of C(Si) is largest among these.

26. A hydrocarbon 'A' (C_3H_8) on treatment with chlorine in presence of sunlight yielded compound 'B' as major product. Reaction of 'B' with aqueous KOH gave 'C' which on treatment with concentrated H_2SO_4 yielded 'D'. Hydrogenation of 'D' gave back 'A'. The sequence of reactions involved in above conversion is :
    (1) Substitution, Substitution, Addition, Dehydration
    (2) Substitution, Substitution, Dehydration, Addition
    (3) Substitution, Dehydration, Addition, Addition
    (4) Addition, Substitution, Dehydration, Substitution

Ans. **(2)**

$$CH_3 - CH_2 - CH_3 \xrightarrow[h\nu\,(substitution)]{Cl_2} CH_3 - CH_2 - CH_2Cl \xrightarrow[(subtitution)]{KOH(aq)} CH_3 - CH_2 - CH_2OH$$

$$\xrightarrow[dehydration]{H_2SO_4\,(conc)} CH_3 - CH = CH_2 \xrightarrow[addition]{Ni/H_2} CH_3 - CH_2 - CH_3$$

27. An organic liquid 'A' with acidified potassium dichromate gave product 'B'. The compound 'B' on heating with methanol in presence of concentrated sulphuric acid formed compound 'C' which on subsequent treatment with sodium hydroxide formed two products 'D' and 'E'. The product 'D' is known to affect the optic nerve causing blindness. Intake of 'D' in very small quantities can cause death. What are compounds 'A', 'B', 'C', 'D' and 'E'?
    (1) A = Ethanol, B = Ethanoic acid, C = Methanol, D = Sodium acetate, E = Methyl ethanoate
    (2) A = Ethanol, B = Ethanoic acid, C = Methyl ethanoate, D = Methanol, E = Sodium acetate
    (3) A = Sodium acetate, B = Ethanoic acid, C = Methyl ethanoate, D = Methanol, E = Ethanol
    (4) A = Ethanol, B = Ethanoic acid, C = Methyl ethanoate, D = Sodium acetate, E = Methanol

Ans. **(2)**

$$\underset{[A]}{C_2H_5OH} \xrightarrow[(acidic\,field)]{K_2Cr_2O_7} \underset{[B]}{CH_3COOH}$$

$$CH_3COOH + CH_3OH \xrightarrow{H_2SO_4} \underset{[C]}{CH_3 - COOCH_3} + H_2O$$

$$CH_3COOCH_3 \xrightarrow[Ester\,Hydrolysis]{NaOH} \underset{[D]}{CH_3OH} + \underset{[E]}{CH_3COONa}$$

28. Two nichrome wires A and B, each of length 5 cm and of radius 1 m and 3 cm respectively are connected to each other in series. If a current of 5 A flows through the combination of wires, the ratio of potential difference across wire A to that across wire B will be :
    (1) 1 : 3   (2) 3 : 1   (3) 9 : 1   (4) 1 : 9

Ans. **(3)**

$$R = \rho \frac{l}{A}$$

29. Two convex lenses A and B, each of focal length 30 cm are separated by 30 cm, as shown in the figure. An object O is placed at a distance of 40 cm to the left of lens A.

$$\underset{\substack{\longleftrightarrow\\ 40\text{ cm}}}{}\quad\underset{\substack{\longleftrightarrow\\ 30\text{ cm}}}{}$$
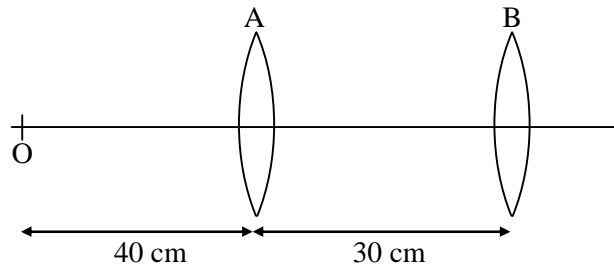
What is distance of the final image formed by this lens system?

(1) 129 cm to right of lens A   (2) 90 cm to right of lens A

(3) 22.5 cm to right of lens B   (4) 45 cm to right of lens B

Ans.   **(3)**

$$\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$$

$$V_1=+120\text{cm}$$

$$V_2=22.5\text{ cm from Lens 2}$$

30.   A cart of mass M moves at a speed u on a frictionless surface. At regular intervals of length L, blocks of mass m = M/2 drops vertically into the cart. How much time is taken to cover a distance of (9/2)L?

(1) $\dfrac{9L}{2u}$ (2) $\dfrac{5L}{2u}$ (3) $\dfrac{19L}{2u}$ (4) $\dfrac{17L}{2u}$

Ans.   **(4)**

$$t=\frac{L}{u}+\frac{L}{2/3\,u}+\frac{L}{u/2}+\frac{L}{2/3u}+\frac{L/2}{u/3}$$

$$t=\frac{17}{2}\frac{L}{u}$$

31.   A ball is thrown vertically up from the point A (See figure). A person, standing at a height H on the roof atop a building, tries to catch it. He misses the catch, the ball overshoots and simultaneously the person starts a stop-watch. The ball reaches its highest point and he manages to catch it upon its return. By this time, a time interval T has elapsed as recorded by the stop-watch. If g is the acceleration due to gravity at this place, the speed with which the ball was thrown from point A will be:
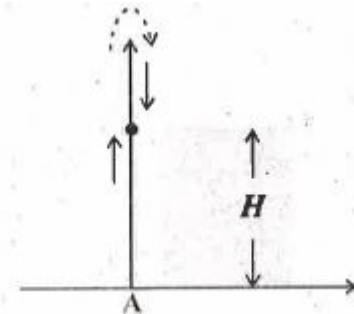
(1) $\sqrt{gH}+gT$ (2) $\left(\sqrt{g^2T^2+4gH}\right)/2$ (3) $\left(\sqrt{g^2T^2+8gH}\right)/2$ (4) $\left(\sqrt{g^2T^2+2gH}\right)$

**Ans.**   **(3)** $S=ut+\dfrac{1}{2}at^2$

$$t^2-\frac{2u}{g}t+\frac{2H}{g}=0$$

$$t_2-t_1=T$$

$$u=\frac{\sqrt{T^2g^2+8gH}}{2}$$

32. A ray of light of pure single colour is incident on the face of a prism having angle of the prism 30° at an angle of incidence 45°. The refracted ray does not change its direction as it crosses the other face and emerges out of the prism. The refractive index of the material of the prism is:

   (1) $2/\sqrt{3}$ (2) 2   (3) $2/\sqrt{3}$ (4) $\sqrt{3}$

Ans. **(3)** $\mu = \dfrac{\sin i}{\sin r} = \sqrt{2}$

33. A metallic cubical solid block of side L is slowly lowered continuously in a large vessel, filled with water. Let d be the depth of the lower surface of the block, measured from the surface of the water, at some instant. The graph which represents correctly the variation of the buoyant force F with depth is:
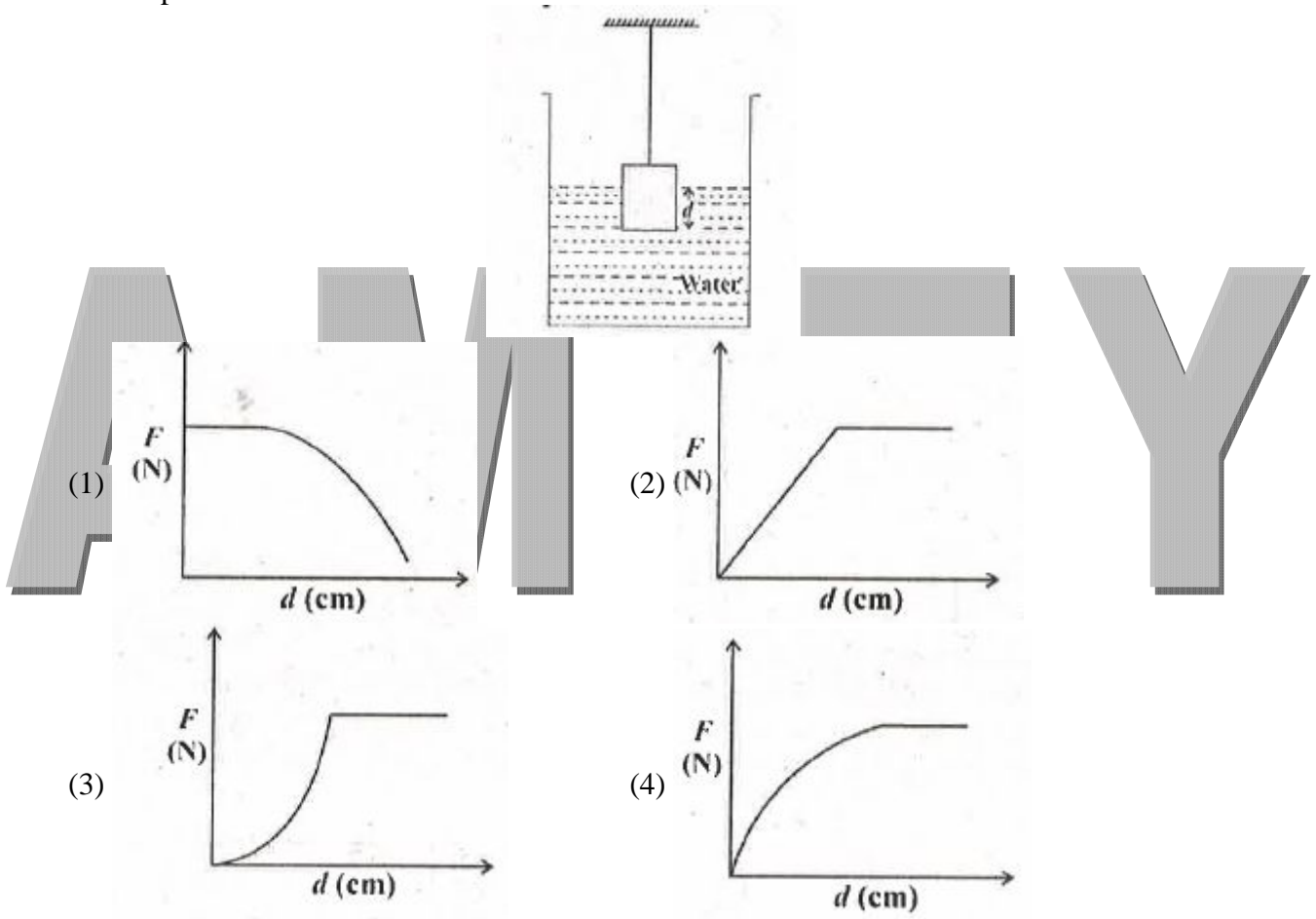

Ans. **(3)** $F = L^2 d\rho g$

34. Three balls A, B and C of same size but of different masses, are thrown with the same speed from the roof of a building, as shown in figure. Let v_A, v_B and v_C be the respective speeds with which the balls A, B, and C hit the ground. Neglecting air resistance, which one of the following relations is correct?
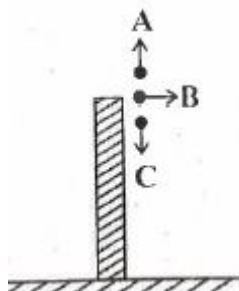
    (1) $v_A > v_C > v_B$ (2) $v_C > v_A > v_B$ (3) $v_A > v_B > v_c$ (4) $v_A = v_B = v_c$

Ans. **(4)** $PE + KE = KE$

35. Four blocks of different masses (m_1 = 1 kg, m_2 = 2 kg, m_3 = 1 kg and m_4 = 5 kg) are connected with light, inextensible strings, as shown in figure. This system is pulled along a frictionless surface by a horizontal force of 36 N. The force pulling the block of mass m_1 will be:
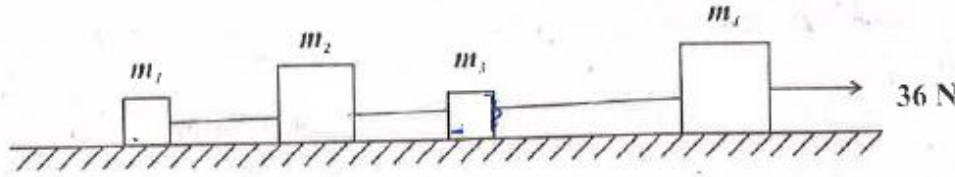
(1) 2 N   (2) 4 N   (3) 12 N   (4) 36 N

Ans. **(2)** $F_{net} = Ma$
$$\Rightarrow T = 4N$$

36. The velocity - time graph of motion of two cars A and B is shown in the figure
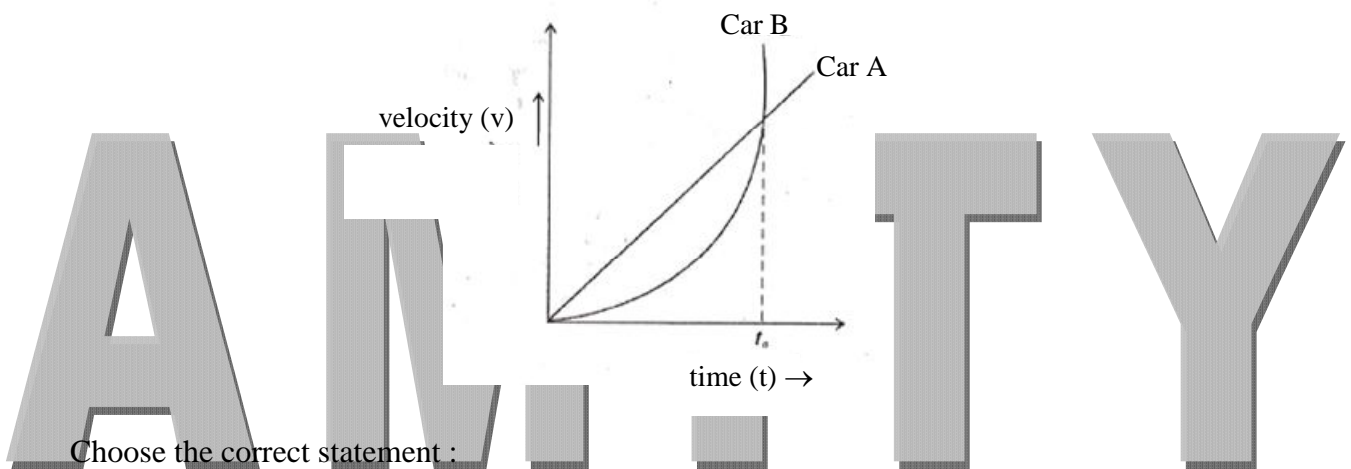
Choose the correct statement :
(1) Accelerations of two cars are equal to each other at time $t = t_o$
(2) Accelerations of two cars are equal to each other at an instant greater than t_o
(3) Accelerations of two cars are equal to each other at an instant earlier than t_o
(4) At no instant in the interval $0 \leq t \leq t_o$, the two accelerations are equal

Ans. **(3)** Slope of two curves are equal at $t < t_0$

37. Three electric bulbs of rating 40 W - 200 V; 50 W - 200 V and 100 W - 200 V are connected in series to a 600 V supply. What is likely to happen as the supply is switched on?
(1) Only 50 W bulb will fuse
(2) Both 40 W and 50 W bulbs will fuse
(3) All the three bulbs will emit light with their rated powers
(4) 100 W bulb will emit light of maximum intensity

**Ans.** **(2)** $R = \dfrac{V^2}{P}$

38. A sound wave is sent simultaneously through a long hollow pipe AB and a solid pipe CD of same length and having same cross-sectional area. A person standing at point P as shown in the figure will hear the sound
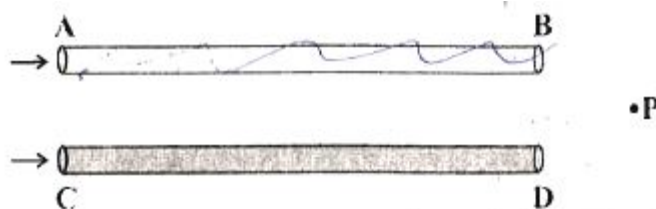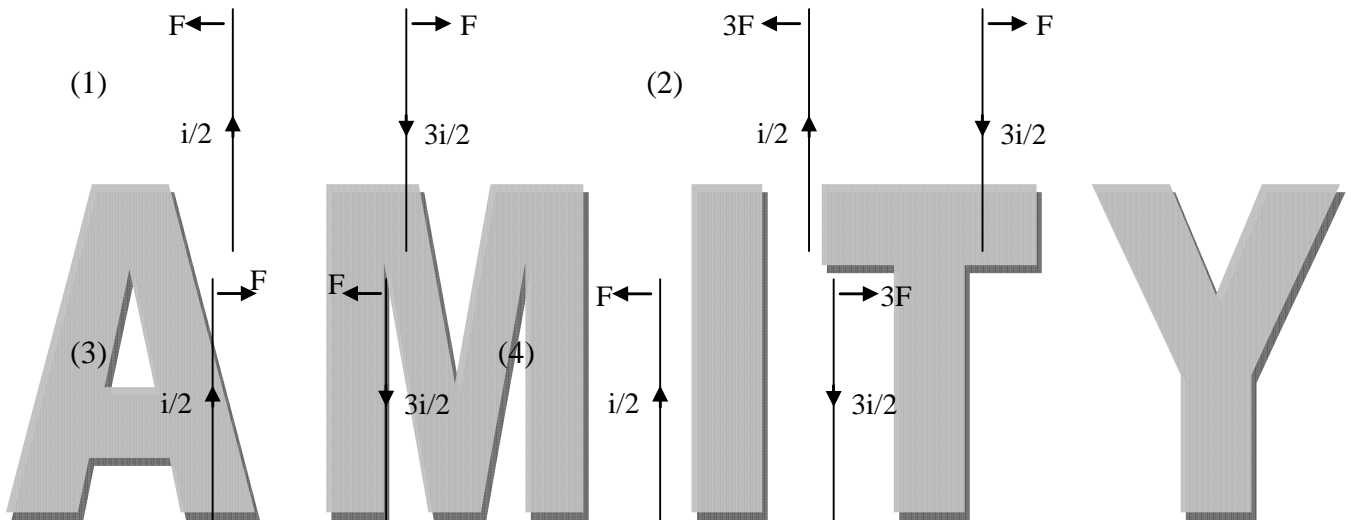
(1) at the same time from pipes, AB and CD
(2) first from pipe CD and then from pipe AB
(3) first from pipe AB and then from pipe CD
(4) from pipe AB only and not from pipe CD

Ans. **(2)** Conceptual

39. Two long current-carrying parallel wires are placed as shown.
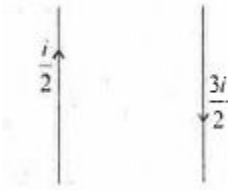
Which of the following figures will represent the magnitude and direction of the forces exerted on the wires?

(1)

(2)

(3)

(4)

Ans. **(1)** Conceptual

40. An electrical circuit, shown below, consists of a battery, an ammeter, three resistors and two keys. Consider two cases:
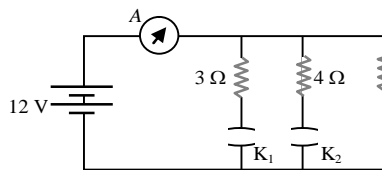
(i) The key K_1 is closed and the key K_2 is open,
(ii) The key K_2 is closed and the key K_1 is open. The ratio of respective currents in these two cases will be:

(1) 3 :4   (2) 4 : 3   (3) 4 : 5   (4) 5 : 4

Ans. **(4)** $I_1 = \dfrac{V}{R_{eq}} = 5$

$I_2 = \dfrac{V}{R_{eq}} = 4$

$\dfrac{I_1}{I_2} = \dfrac{5}{4}$

41. Given that $\frac{1}{2} = 0.\overline{142857}$, which is a repeating decimal having six different digits. If x is the sum of such first three positive integers n such that $\frac{1}{n} = 0.\overline{abcdef}$, where *a, b, c, d, e* and f are different digits, then the value of x is
    (1) 20   (2) 21   (3) 41   (4) 42

Ans. **(3)** Such numbers are 7, 13 and 21
    $\therefore x = 7 + 13 + 21$
    $= 41$

42. Which of the following digits is ruled out in the units place of $12^n + 1$ for every positive integer *n*?
    (1) 1   (2) 3   (3) 5   (4) 7

Ans. **(1)** $\therefore 12^n + 1$ will have unit digit as 3, 5, 6, 7 and 9 only
    $\therefore$ '1' will be ruled out

43. The rational roots of the cubic equation $x^3 + 14kx^2 + 56\,kx - 64k^3 = 0$ are in the ratio 1 : 2 : 4. The possible values of k are
    (1) 0 only   (2) 1 only   (3) 2.0   (4) –2, –1

Ans. **(Bonus)**

No Option is correct.

44. The odd natural numbers have been divided in groups as (1,3); (5, 7, 9, 11); (13, 15, 17, 19, 21, 23); Then the sum of numbers in the 10th group is
    (1) 4000   (2) 4003   (3) 4007   (4) 4008

Ans. **(1)** 10th group will be (181, 183, ...,219)
    $$S_n = \frac{n}{2}(a + l)$$
    $$= \frac{20}{2}(181 + 219)$$
    $$= 10 \times 4000 = 4000$$

45. If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$, the remainder comes out to be $x + a$, then the value of a is
    (1) –1   (2) –5   (3) 1   (4) 5

Ans. **(2)** Remainder will be of the form $(2k - 9)x + (k^2 - 8k + 10) = x + a$
    So $2k - 9 = 1$
    $k = 5$
    and $a = k^2 - 8k + 10$
    $= 25 - 40 + 10 = -5$

46. The values of *k*, so that the equation $2x^2 + kx - 5 = 0$ and $x^2 - 3x - 4 = 0$ have one root in common, are
    (1) $3, \frac{27}{2}$ (2) $9, \frac{27}{4}$ (3) $-3, \frac{-27}{4}$ (4) $-3, \frac{4}{27}$

Ans. **(3)** $x^2 - 3x - 4 = 0$ has roots 4, – 1
    If '4' is a common root, $2(4)^2 + k(4) - 5 = 0$

$27 + 4k = 0$

$k = -\dfrac{27}{4}$

If '−1' is a common root then $k = -3$

47. The value of $\cos x° - \sin x°$ $(0 \le x < 45)$ is
    (1) 0
    (2) positive
    (3) negative
    (4) sometimes negative and sometimes positive

Ans. **(2)** $\cos x > \sin x$ for $0° \le x < 45°$

48. A vertical pole of height 10 metres stands at one corner of a rectangular field. The angle of elevation of its top from the farthest corner is 30°, while that from another corner is 60°. The area (in m^2) of rectangular field is

    (1) $\dfrac{200\sqrt{2}}{3}$
    (2) $\dfrac{400}{\sqrt{3}}$
    (3) $\dfrac{200\sqrt{2}}{\sqrt{3}}$
    (4) $\dfrac{400\sqrt{2}}{\sqrt{3}}$

Ans. **(1)** Sides of rectangular field will be $\dfrac{20\sqrt{2}}{\sqrt{3}}$ m and $\dfrac{10}{\sqrt{3}}$ m

So area will be $\dfrac{10}{\sqrt{3}} \times \dfrac{20\sqrt{2}}{\sqrt{3}} = \dfrac{200\sqrt{2}}{3}$ m

49. A circle is inscribed in a square and the square is circumscribed by another circle. What is the ratio of the areas of the inner circle to the outer circle ?
    (1) $1 : 2$
    (2) $1 : \sqrt{2}$
    (3) $\sqrt{2} : 4$
    (4) $1 : \sqrt{3}$

Ans. **(1)** $r = \dfrac{a}{2}$ where 'a' is the side of the square

$R = \dfrac{a}{\sqrt{2}}$

$\dfrac{\text{Area of inner circle}}{\text{Area of outer circle}} = \dfrac{\pi r^2}{\pi R^2}$

$= \left(\dfrac{\frac{a}{2}}{\frac{a}{\sqrt{2}}} \right)^2 = \dfrac{a^2}{4} \times \dfrac{2}{a^2} = \dfrac{1}{2} = 1 : 2$

50. The surface of water in a swimming pool, when it is full of water, is rectangular with length and breadth 36m and 10.5m respectively. The depth of water increases uniformly from 1 m at one end to 1.75 m at the other end. The water in the pool is emptied by a cylindrical pipe of radius 7cm at the rate of 5km/h. The time (in hours) to empty water in the pool is (take $\pi = \dfrac{22}{7}$)

    (1) $6\dfrac{1}{4}$
    (2) $6\dfrac{1}{2}$
    (3) $6\dfrac{3}{4}$
    (4) $6\dfrac{4}{5}$

Ans. **(3)** Volume of water available

$= \dfrac{1}{2}(d_1 + d_2) \times l \times b$

$= \dfrac{1}{2} \times 2.75 \times 36 \times \dfrac{21}{2} = V_1$

Volume of water drawn $= \pi r^2 \times V \times t$

$$= \frac{\pi \times 49 \times 5000 \times t}{10000} = V_2$$

$$V_1 = V_2$$

$$\Rightarrow t = 6\frac{3}{4} \text{ hr}$$

51. There is a right circular cone of height h and vertical angle 60°. A sphere when placed inside the cone, it touches the curved surface and the base of the cone. The volume of sphere is

(1) $\frac{4}{3}\pi h^2$ (2) $\frac{4}{9}\pi h^2$ (3) $\frac{4}{27}\pi h^2$ (4) $\frac{4}{81}\pi h^2$

**Ans.** **(4)** $DD = h - r$

$ON = r$

$\frac{ON}{OD} = \sin 30°$

$\frac{r}{h-r} = \frac{1}{2}$

$3r - h$

$r = \frac{h}{3}$

Volume of sphere $= \frac{4}{3}\pi\left(\frac{h}{3}\right)^3 = \frac{4\pi}{3} \times \frac{h^3}{27} = \frac{4}{81}\pi h^3$

52. A sealed bottle containing some water is made up of two cylinders A and B of radius 1.5 cm and 3 cm respectively, as shown in the figure. When the bottle is placed right up on a table, the height of water in it is 15 cm, but when placed upside down, the height of water is 24 cm. The height of the bottle is

15 cm   24 cm
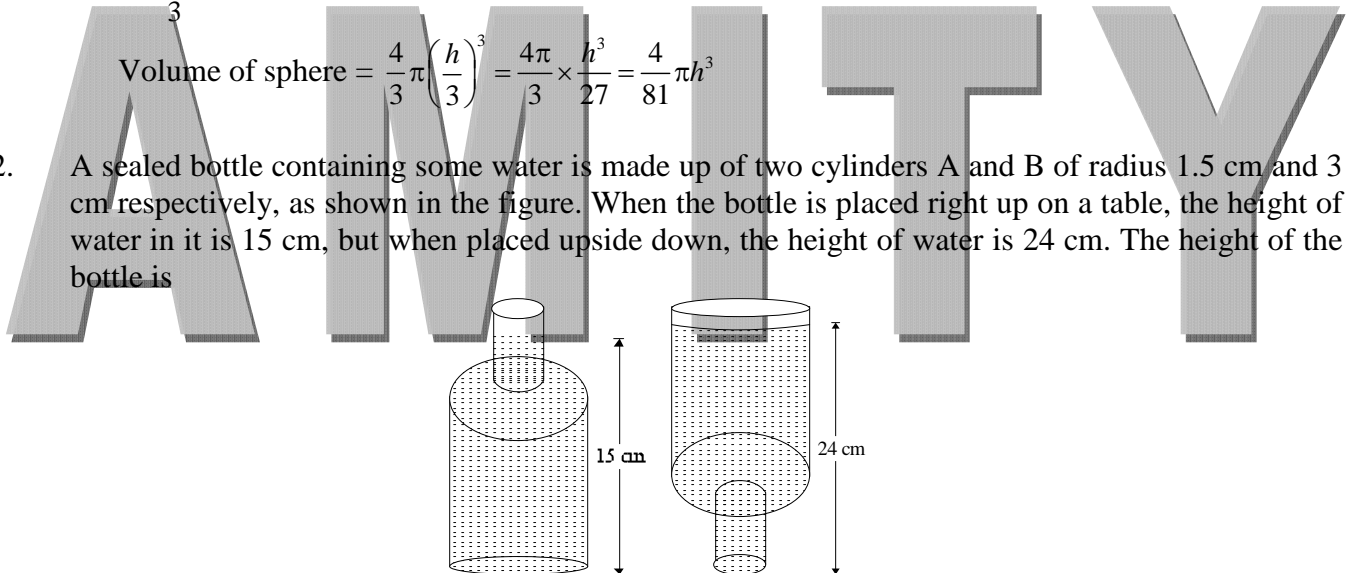
(1) 25 cm   (2) 26 cm   (3) 27 cm   (4) 28 cm

Ans. **(3)** $\pi(3)^2 \times h_1 + \pi\left(\frac{3}{2}\right)^2(15 - h_1) = \pi\left(\frac{3}{2}\right)^2 h_2 + \pi(3)^2(24 - h_2)$

$9h_1 + \frac{9}{4}(15 - h_1) = \frac{9}{4}h_2 + 9(24 - h_2)$

$4h_1 + 15 - h_1 = h_2 + 96 - 4h_2$

$3h_1 + 15 = 96 - 3h_2$

$3(h_1 + h_2) = 81$

$h_1 + h_2 = 27 \text{ cm}$

53. Let l be the length of each equal side of an isosceles triangle. If the length of each equal side is doubled, keeping its height unchanged, then the difference of the squares of bases of the new triangle and the given triangle is
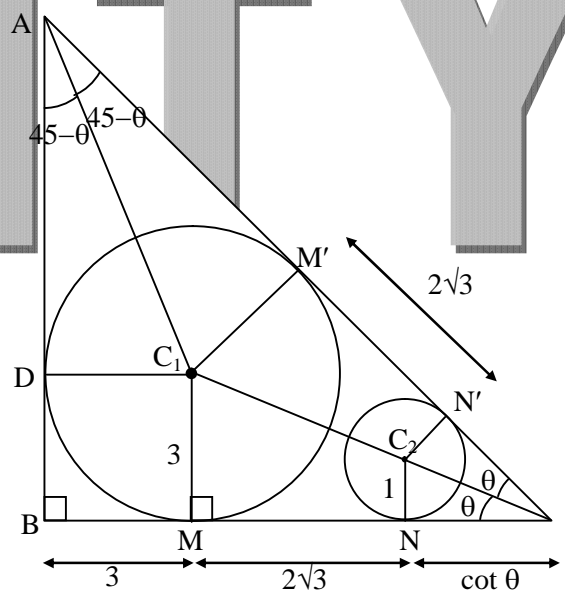
(1) 0   (2) $4l^2$ (3) $9l^2$ (4) $12l^2$

Ans. **(4)** $h^2 = l^2 - \dfrac{b_1^2}{4}$

$h^2 = 4l^2 - \dfrac{b_2^2}{4}$

$4l^2 - \dfrac{b_2^2}{4} = l^2 - \dfrac{b_1^2}{4}$

$3l^2 = \dfrac{b_2^2 - b_1^2}{4}$

$12l^2 = b_2^2 - b_1^2$

54. In the adjoining figure, ABC is a triangle in which $\angle B = 90°$ and its incircle C_1 has radius 3. A circle C_2 of radius 1 touches sides AC, BC and the circle C_1. Then length AB is equal to
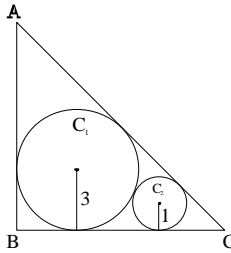
(1) $3 + 6\sqrt{3}$ (2) $10 + 3\sqrt{2}$ (3) $10 + 2\sqrt{3}$ (4) $9 + 3\sqrt{3}$

Ans. **(4)**

Let $\angle C_2CN = \angle C_2CN' = \theta$

$NC = \cot\theta$

$MN = 2\sqrt{3}$

$BM = 3$

$\angle C_1AD = \angle C_1AM' = 45 - \theta$

$AD = AM' = 3\cot(45 - \theta)$

$M'N' = 2\sqrt{3}$

$AB^2 + BC^2 = AC^2$

$\left[3\cot(45 - \theta)\right]^2 + \left(3 + 2\sqrt{3} + \cot\theta\right)^2 = \left[3\cot(45 - \theta) + 2\sqrt{3} + \cot\theta\right]^2$

Solving above equation, $\theta = 30^o$

$\therefore$ $NC = \cot 30^o = \sqrt{3}$

$BC = 3 + 2\sqrt{3} + \sqrt{3} = \left(3 + 3\sqrt{3}\right)$

$AB = BC\tan\theta = \left(3 + 3\sqrt{3}\right)\tan 60^o = 3\sqrt{3} + 9$

55. In $\triangle ABC$, $AB = AC$, P and Q are points on AC and AB respectively such that $BC = BP = PQ = AQ$. Then $\angle AQP$ is equal to (use $\pi = 180°$)

(a) $\dfrac{2\pi}{7}$ (b) $\dfrac{3\pi}{7}$ (c) $\dfrac{4\pi}{7}$ (d) $\dfrac{5\pi}{7}$

Ans. **(4)** Let $\angle APQ = \theta°$

$QA = QP \Rightarrow \angle QAP = \angle QPA = \theta°$

$\therefore \angle AQP = 180 - 2\theta$

$\angle BQP = 2\theta$

$QP = PB \Rightarrow \angle PQB = \angle PBQ = 2\theta$

$\therefore \angle BPQ = 180 - 4\theta$

$\Rightarrow \angle BP = 3\theta$

$BP = BC \Rightarrow \angle BPC = \angle BCP = 3\theta$

$\therefore \angle PBC = \theta$

$\angle A + \angle B + \angle C = 180°$

$\theta + 3\theta + 3\theta = \pi$
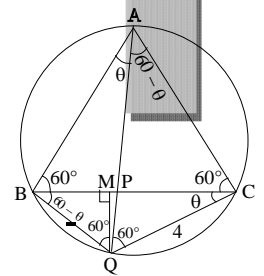
$7\theta = \pi$

$\theta = \dfrac{\pi}{7}$

$\angle AQP = 180 - 2\theta$

$= \pi - \dfrac{2\pi}{7} = \dfrac{5\pi}{7}$
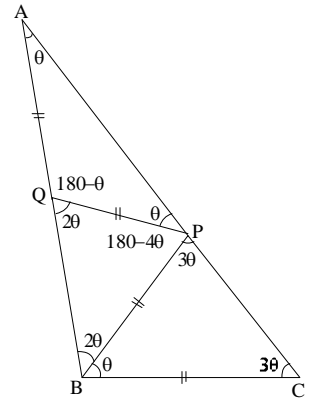
56. A line from one vertex A of an equilateral ΔABC meets the opposite side BC in P and the circumcircle of ΔABC in Q. If BQ = 4 and CQ = 3 cm, then PQ is equal to

(1) 7 cm   (2) $\dfrac{4}{3}$ cm   (3) $\dfrac{12}{7}$ cm   (4) 2 cm

Ans. **(3)** Draw $QM \perp BC$

$QM = 3\sin(60 - \theta) = 4\sin\theta$

$3\left(\dfrac{\sqrt{3}}{2}\cos\theta - \dfrac{1}{2}\sin\theta\right) = 4\sin\theta$

$3\sqrt{3}\cos\theta - 3\sin\theta = 8\sin\theta$

$\tan\theta = \dfrac{3\sqrt{3}}{11}$

Using sin Rule in ΔQPC

$\dfrac{\sin\theta}{PQ} = \dfrac{\sin(60 + \theta)}{4}$

$PQ = \dfrac{4\sin\theta}{\sin(60 + \theta)}$

$PQ = \dfrac{4\sin\theta}{\dfrac{\sqrt{3}}{4}\cos\theta + \dfrac{1}{2}\sin\theta}$

$PQ = \dfrac{4}{\dfrac{\sqrt{3}}{2}\cot\theta + \dfrac{1}{2}}$

$PQ = \dfrac{4}{\dfrac{\sqrt{3}}{2}\left(\dfrac{11}{3\sqrt{3}}\right) + \dfrac{1}{2}} = \dfrac{4}{\dfrac{11}{6} + \dfrac{3}{6}} = \dfrac{24}{14} = \dfrac{12}{7}$

57. How many points (x, y) with integral co-ordinates are there whose distance from (1, 2) is two units?

(1) one   (2) two   (3) three   (4) four

Ans. **(4)**

$(x - 1)^2 + (y - 2)^2 = (2)^2 = 4$

$x = 1, \ y = 4 \to \ 0 + 4 = 4$

$x = -1, \ y = 2 \to \ 4 + 0 = 4$

$x = 3, \ y = 2 \to \ 4 + 0 = 4$

$x = 1, \ y = 0 \to \ 0 + 4 = 4$

There are such 4 pairs

58. If the vertices of an equilateral triangle have integral co-ordinates, then
    (1) such a triangle is not possible.
    (2) the area of the triangle is irrational.
    (3) the area of the triangle is an integral.
    (4) the area of the triangle is rational but not an integral

Ans. **(1)**

The vertices of triangle are integral coordinates then this triangle cannot be equilateral.

59. A box contains four cards numbered as 1, 2 3 and 4 and another box contains four cards numbered as 1, 4, 9 and 16. One card is drawn at random from each both. What is the probability of getting the product of the two numbers so obtained, more than 16?

    (1) $\dfrac{5}{8}$ (2) $\dfrac{1}{2}$ (3) $\dfrac{3}{8}$ (4) $\dfrac{1}{4}$

Ans. **(3)**

Total cases $= 4 \times 4 = 16$

Favourable cases $= (2, 9), (2, 16), (3, 9), (3, 16), (4, 9), (4, 16)$

Required probability $= 6/16 = 3/8$

60. The mean of a group of eleven consecutive natural numbers in m. What will be the percentage change in the mean when next six consecutive natural numbers are included in the group?

    (1) $m\%$ (2) $\dfrac{m}{3}\%$ (3) $\dfrac{m}{300}\%$ (4) $\dfrac{300}{m}\%$

Ans. **(4)** Let 11 consecutive numbers are $x, x + 1, \ldots, x + 10$

Mean of 11 consecutive numbers $= \dfrac{11x + 55}{11} = x + 5$

New mean $= x + 8$

Difference $= 3$

Percentage change $= \dfrac{300}{m}\%$

61. The Swaraj flag designed by Mahatma Gandhi had the spinning wheel in it. What did it symbolize?
    (1) Ideal of self-help.
    (2) Symbol of defiance to the British rule.
    (3) Greatness of India in pre-colonial time.
    (4) Ahimsa (non-violence) in contemporary world.

Ans. **(1)**

62. Which of the following statements regarding the Silk Routes are correct?
    I. They also meant cultural links.
    II. They spread over land and by sea.
    III. They connected Asia with Europe and Africa.
    IV. Besides textiles, gold and silver got exported from Asia to Europe through these routes.
    (1) I, II and III   (2) I, II and IV   (3) II, III and IV   (4) I, II, III and IV

Ans. (1)

63. Which of the following statements regarding the impact of Depression of 1929 are correct?
    I. India's exports increased but imports decreased.
    II. India's export of gold increased.
    III. urban India suffered more than the rural India.
    IV. industrial investment grew in India.
    (1) I, II and III   (2) I, III and IV   (3) II, III and IV   (4) II and IV

Ans. (4)

64. Which of the following statements about the French in Vietnam are correct?
    I. The Vietnamese teachers generally twisted the school curriculum given by the French.
    II. The students protested the undue dominance by the colons.
    III. The *Annanese Student* was a French journal for enlisting the students support.
    IV. The French had to counter the Chinese influence.
    (1) I, II and III   (2) I, II and IV   (3) I, III and IV   (4) II, III and IV

Ans: (2)

65. Read the statements about the impact of forest rules on tribal communities in the 19th century. Which of the following statements are incorrect?
    I. Jhum cultivators could carry out their activities in village forests.
    II. Jhum cultivators took to plough cultivation with ease.
    III. Tribal people could collect wood and grazes cattle in the forests.
    IV. Tribal people had access to protected forests for collecting wood for fuel and house building.
    (1) I and II   (2) I and III   (3) II and III   (4) III and IV

Ans. (1)

66. Which of the following statements about the Non-Cooperation Movement are correct?
    I. The Justice Party participated in the elections in Madras.
    II. The nationalist lawyers did not join back the courts.
    III. The taluqdars were targeted.
    IV. The import of foreign cloth declined and the export of India textiles increased manifold.
    (1) I and III   (2) I and IV   (3) I, II and III   (4) II, III and IV

Ans. (1)

67. Which of the following regarding the Constitution of 1791 and the status of women in French are correct?
    I. It made them active citizens.
    II. Provisions were made for schools for both boys and girls.
    III. Divorce rules were made stringent.
    IV. Provisions were made for training women for jobs.
    (1) I, II and III   (2) II and IV   (3) III and IV   (4) II, III and IV

Ans. (4)

68. Arrange the following historical developments in a chronological sequence
    I. Rowlatt Act
    II. Kheda Satyagraha
    III. Champaran Movement
    IV. Ahmedabad Mill Strike
    (1) I, II, III, IV   (2) II, I, III, IV   (3) III, I, IV, II   (4) III, II, IV, I

Ans. **(4)**

Direction (Question 69-74)
Read the statements and select the correct answer from the options given below.
1. Statement I is true, Statement II is false.
2. Statement I is false, Statement II is true.
3. Both Statements are true, and Statement II provides explanation to Statement I.
4. Both Statements are true, but Statement II does not provide explanation of Statement I.

69. **Statement I:** In the 19th century, London was a colossal city.
    Statement II: London had grown as an industrial city.

Ans. (1)

70. **Statement I:** Indians not taking off their turban before colonial officials was considered offending.
    Statement II: Turban was a sign of respectability in India.

Ans. (4)

71. **Statement I:** Louis Blanc built a cooperative community.
    Statement II: He believed the community could produce goods together and divide the profits among the members.

Ans. (2)

72. **Statement I:** Hand printing developed in China.
    Statement II: The Chinese state printed textbooks in vast numbers.

Ans. (3)

73. **Statement I:** Rainfall is low in the western parts of Deccan Plateau and East of Sahyadris.
    Statement II: Western Ghats causes convectional rainfall.

Ans. (1)

74. **Statement I:** A large part of the Deccan plateau is occupied by black soil.
    Statement II: Black soil in this part was formed by denudation of basaltic rocks overtime.

Ans. (3)

75. If the local time at Varanasi, located at 83°E longitude is 23:00 hour then that will be the local time at Kibithu located at 97°E longitude (Arunachal Pradesh) and Jodhpur, located at 73°E longitude?
    (1) 00:00 hour, 22:00 hour   (2) 22:20 hour, 25:56 hour
    (3) 23:56 hour, 22:20 hour   (4) 22:56 hour, 23:20 hour

Ans. (3)

76. Which one of the following statements are true about latitudes and longitudes
   I. All latitudes are angular distances measured towards the Pole from the Equator
   II. All longitudes do not join at poles
   III. All Parallels and Meridians are imaginary lines
   IV. Latitudes are used to determine the time of a place
   (1) I and II   (2) I and III   (3) I, II and II   (4) II, III and IV

Ans. (2)

77. If the current climatic condition of Srinagar (J&K) with average annual temperature of 13.5°C and annual average precipitation 710 mm get modified and become similar to that of Ranchi (Jharkhand) with annual average temperature 23.7°C and precipitation 1430 mm., which one of the following types of vegetation will become predominant in Srinagar?
   (1) Tropical Semi Evergreen   (2) Tropical Moist Deciduous
   (3) Tropical Dry Deciduous   (4) Tropical Dry Evergreen

Ans. (2)

78. One a school field trip, a student spotted tigers, turtles, gharials and snakes in their natural habitats. Name the ecological region (delta) where that student had gone.
   (1) Cauvery   (2) Mahanadi   (3) Godavari   (4) Ganga - Brahmaputra

Ans. (4)

79. A person travelling by road (shortest distance) from Mangaluru to Machilipatnam will be able to observe natural vegetation types in which of the following sequences?
   (1) Montane Forest Tropical Deciduous Forests – Tropical Evergreen Forests.
   (2) Tropical Evergreen Forests – Tropical Thorn Forests – Tropical Deciduous Forests.
   (3) Tropical Deciduous Forests – Tropical Evergreen Forests – Mangrove Forest
   (4) Tropical Evergreen Forests – Tropical Deciduous Forests – Mangrove Forests

Ans. (4)

80. Which of the following statement(s) is/are true with respect to monsoons in India?
   A. The Southwestern Monsoon takes longer duration as compared to retreating Monsoon in covering India.
   B. The Southwestern Monsoon has a shorter duration as compared to retreating Monsoon in covering India.
   C. Both the Monsoons take almost the same duration in covering India.
   D. The Southwestern Monsoon is propelled by the depressions while retreating Monsoon results from the movement of Air Masses.
   (1) A and D   (2) B only   (3) C only   (d) B and D

Ans. **(2)**

81. Which one of the following regions marked on the sketch is an ideal representation with the following characteristics.
   I. The approximate date for arrival of the Southwestern Monsoon is June 15th.
   II. Well developed in Thermal and Nuclear energy production.
   III. Rich in the production of oil and natural gas.
   IV. Well developed Textile Industry

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

Ans. **(3)**

82. With increasing urbanization, the main activity which leads to loss of bio-diversity is
    I. rural-urban migration
    II. rapid increase in built-up area
    III. increased vehicular pollution
    IV. development of big industrial complexes
    (1) I and III   (2) I and IV   (3) II and IV   (4) III and IV

Ans. **(3)**

83. Which one of the following statements is NOT correct about the shaded part on the given outline of India?

    (1) It has high potential for hydel-power generation.
    (2) It has the lowest degree of urbanization.
    (3) Ragi is an important millet grown here.
    (4) It is famous for religious tourism.

Ans. **(2)**

84. Chandimal, Jaysurya and Umesh left their respective villages in Sril Lanka for Chennai in India. Who among the following could be a refugee?
    I. Chandimal, who is an IT professional, could not find a job in Sri Lanka.
    II. jaysurya, who left his village due to ethnic conflicts.

III. Umesh, whose land and house were destroyed due to Tsunami.
(1) Only Jaysurya   (2) Only Chandimal
(3) Jaysurya and Umesh   (4) Chandimal and Jaysurya

Ans. **(3)**

85. Consider the following statements about the United Nations Security Council (UNSC):
    I.   UNSC consists of 15 members.
    II. US, Russia and Germany are among the permanent members.
    III. China is the only Asian nation among the permanent members.
    IV. All members of the UNSC have veto power.
    Which of the above statements are correct?
    (1) I and II   (2) I and III   (3) I and IV   (4) III and IV

Ans. **(2)**

86. Which of these statements about the Election Commission of India are true?
    I.   It conducts and controls the election process in the country.
    I.   It gets the voters list updated before the elections.
    III. It also conducts the Panchayat elections in the country.
    IV. It approves the election manifestoes of political parties.
    (1) I and II   (2) II and III   (3) II and IV   (4) III and IV

Ans. **(1)**

87. Consider the following statements about the Indian Parliament?
    I.   It is the ultimate authority to make laws in India.
    II. It consists of the President, the Lok Sabha and the Rajya Sabha.
    III. It consists of only the Lok Sabha and the Rajya Sabha.
    IV. Lok Sabha members are chosen by the people through elections.
    Which of the above statements are correct?
    (1) I only   (2) I and III   (3) II and III   (4) I, II and IV

Ans. **(4)**

88. Which of the following is the inspiring philosophy of the Constitution of India?
    I.   Secularism, Equality, Communism Democratic Republic
    II. Democratic Republic, Sovereignty, Fraternity
    III. Secularism, Equality, Justice
    IV. Equality, Fraternity, Communalism, Secularism
    (1) I and II   (2) I and III   (3) II and III   (4) II and IV

Ans. **(3)**

89. Which of the following features of the Indian Judiciary are true?
    I.   Integrated judicial system.
    II. The Supreme Court is the highest court of appeal.
    III. Only the Supreme Court can interpret the Constitution.
    IV. Public Interest Litigation (PIL) can be filed only in the Supreme Court and the High Courts.
    (1) I, II and III   (2) I, III and IV   (3) I, II and IV   (4) II, III and IV

Ans. **(3)**

90. Which of the following statements is **<u>NOT</u>** true about Indian federalism?
    (1) The union government is vested with more financial powers than the State governments.
    (2) Power to legislate on residuary subjects is vested in the Union government.
    (3) The name and boundaries of a State can be changed by the Union government without the consent of the concerned State.
    (4) The Union legislature can amend any provision of the Constitution without the consent of the State governments.

Ans. (4)

91. Democracy promotes equality through the following :
    I. Universal adult franchise
    II. Equality before law and equal protection of law
    III. Reservation for Scheduled Castes, Scheduled Tribes and women
    IV. Independent and impartial media
    (1) I and II   (2) I, II and III   (3) I, III and IV   (4) II and IV

Ans. (2)

92. Read the following statements and select one of the four options given below :
    Statement I : Enjoyment of pollution-free water is a fulfillment of right to life.
    Statement II : Release from forced labour is a fulfillment of right to life.
    (1) Only I is correct.   (2) Only II is correct.
    (3) Both I and II are correct.   (4) Both I and II are incorrect.

Ans. (1)

93. The daily wage of a person in urban areas is ₹300. The poverty line for a person is fixed at ₹1000 per month for the urban areas. The following table shows the details of employment of four families living in Mumbai city.

Family	Total Days of Employment got in a Month by the family	Members of the Family
Hari	12	3
Tenzin	15	4
Bala	15	5
Phulia	20	5

    Identify the family living below poverty line.
    (1) Hari   (2) Tenzin   (3) Bala   (4) Phulia

Ans. (3)

94. In a particular year, the price of wheat in a market is ₹15 per kg and a farmer produces 100 kgs of wheat. In the next year the price of wheat has fallen to ₹10 per kg and the farmer produces 120 kgs. If the government wishes to stabilize the income of the farmer, then what will be the minimum support price?
    (1) ₹12 per kg   (2) ₹12.5 per kg   (3) ₹13 per kg   (4) ₹13.5 per kg

Ans. (2)

95. A country has four groups of people. The table below describes some social indicators of these groups. Identify the group that is the most vulnerable.

Groups	Literacy rate (%)	Life Expectancy (years)	Unemployment rate (%)
A	74	82	5
B	93	80	10
C	63	78	15
D	65	78	10

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

Ans. (3)

96. Which of the following statements are correct?
     I.   Bank deposits share the essential features of money.
     II. Any depositor may demand his deposit at any point of time from a bank.
     III. Bank must retain all deposits by itself.
     (1) I and II are true, but III is false.   (2) I is true, but II and III are false.
     (3) I and II are false, but III is true.   (4) All statements I, II and III are true.
Ans.   **(1)**

97. Bira and his wife Sheena have two daughters aged 12 and 16. Sheena's mother and father, aged 65 and 72, also live with them. Bira is currently looking for work, but can't find any. His elder daughter completed class 10 and prefers to look for work. Sheena prefers to stay at home to look after house works. How many unemployed members does Bira's family have?
     (1) 1   (2) 2   (3) 3   (4) 4
Ans.   **(2)**

98. Which of the following statements are correct?
     I.   Globalization has led to increased flow of capital across countries.
     II. Increase in flows of labour across countries has been larger than the increase in flows of capital.
     III. MNCs spread their production and work with local producers in various countries across the globe.
     (1) I and II   (2) I and III   (3) II and III   (4) I, II and III
Ans.   **(2)**

99. In a village Puranpur, 200 families are living. Eighty five families work on their own piece of land, 60 families work on the field of other farmers, 5 families run their own shops and 50 families work in a nearby factory to earn their livelihood. What percentage of Puranpur village depends on the secondary sector?
     (1) 20   (2) 25   (3) 35   (4) 55
Ans.   **(2)**

100. Identify the correct pairs from List-I (Rights) and List-II (Violation of rights) and select the correct option using the codes given below.

	List I (Rights)		List II (Violation of rights)
A	Right to choose	I	Raman buys a packet of milk on which the company's name, manufacturing date, and expiry date were missing.
B	Right to be informed	II	Sakina wants a particular channel from her cable operator but operator offers some other channel as part of complete package.
C	Right to safety	III	Joseph bought a television from a shop. He suffered electric shock while using it.
D	Right to seek redressal	IV	Murli fell ill and was admitted in the hospital because of stale food served in the restaurant.

     (1) A-I and C-III   (2) B-II and C-III   (3) B-II and D-IV   (4) C-III and D-IV
Ans.   **(4)**