

**IIT/AIIMS - 2021 SCREENING CUM SCHOLARSHIP EXAM**

**Date : 30<sup>th</sup> September 2018**

**IMPORTANT INSTRUCTIONS**

*Please read the instructions carefully*

1. This booklet is your Question Paper. Do not break the seal of this booklet before being instructed to do so by the invigilators
2. Please fill in the items such as name, roll number and signature of the candidate in the columns given below.
3. The test is of **2 ½ hours** duration.  
This question booklet contains 90 questions. The **Maximum Mark is 360**
5. There are three sections. Physics, Chemistry & Mathematics having 30 questions each. Each section consists of two parts. **In Part 1** (25 questions) each question has four options (A), (B), (C) and (D). **Only one** of these four options is correct. Each correct answer will be awarded **FOUR** marks. **ONE** mark will be deducted for each incorrect answer.
6. **In Part 2** (5 questions) each question has an answer which is a number with one/two/three digits. Each correct answer will be awarded **FOUR** marks. **NO NEGATIVE** mark for incorrect answer.
7. Mark the bubble corresponding to the Answer in the Optical Response Sheet (ORS) by using either **Blue or Black ball - point pen only**
8. More than one answer marked against a question will be deemed as incorrect answer.
9. No negative mark for unattended Question.
10. Question paper booklet code is printed on the right hand top of this booklet
11. The paper CODE is printed on the right part of the ORS. Ensure that the code is identical and same as that on the question paper booklet. If not, contact the invigilator for change.
12. Handover the Answer sheet to the invigilator at the end of the examination

**IMMEDIATELY AFTER OPENING THIS QUESTION BOOKLET, THE CANDIDATE SHOULD VERIFY WHETHER THE QUESTION BOOKLET ISSUED CONTAINS ALL THE 90 QUESTIONS. IF NOT, REQUEST FOR REPLACEMENT**

**Name of the Candidate**

**I have read all the instructions and shall abide by them**

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**Signature of the Candidate**

**Roll Number**

**I have verified all the information filled by the candidate**

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**Signature of the Invigilator**

## PART I

This part contains **25** questions

Question No. Physics - (1-25) , Chemistry (31 - 55), Mathematics (61 - 85)

Each question has FOUR options [A], [B], [C] and [D]. ONLY ONE of these four options is correct

For each question, darken the bubble corresponding to the correct option in the ORS










For each question, marks will be awarded in one of the following categories

**Full Marks** : +4 If only the bubble corresponding to the correct option is darkened

**Zero Marks** : 0 If none of the bubbles is darkened

**Negative Marks** : -1 In all other cases

### CORRECT METHOD FOR MARKING PART - I QUESTIONS

Correct method of marking	Wrong methods of marking							
	Tick mark	X mark	Dot mark	Scratch mark	Partial Mark	Line Mark	Outside Mark	Multiple Mark
								

## PART II

This part contains **5** questions

Question No. Physics - (26 - 30) , Chemistry (46-60), Mathematics (86 - 90)

The answer to each question is a NUMBER ranging from 0 to 999, both inclusive

For each question, darken the bubble corresponding to the correct integer/s in the ORS

**Full Marks** : +4 If only the bubble corresponding to the correct option is darkened

**Zero Marks** : 0 If none of the bubbles is darkened

**Negative Marks** : No negative mark for incorrect answer

### CORRECT METHOD FOR MARKING PART - II QUESTIONS

If Single Digit Answer  
If answer is 3

Example 1

Single Digit Answer		
1	1	1
2	2	2
<input checked="" type="radio"/>	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
0	0	0

If Two Digit Answer  
If answer is 90

Example 2

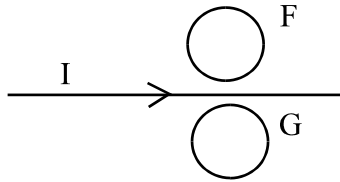
Two Digit Answer		
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
<input checked="" type="radio"/>	9	0
0	<input checked="" type="radio"/>	0

If Three Digit Answer  
If answer is 180

Example 3

Three Digit Answer		
<input checked="" type="radio"/>	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	<input checked="" type="radio"/>	0
9	0	<input checked="" type="radio"/>
0	0	<input checked="" type="radio"/>

- Two conducting circular loops F and G are kept in a plane on either side of a straight current carrying wire as shown in the figure below



If the current in the wire decreases in magnitude, the induced current in the loops will be

- A) Clockwise in F and clockwise in G      B) Anti-clockwise in F and clockwise in G  
 C) Clockwise in F and anti-clockwise in G      D) Anti-clockwise in F and anti-clockwise in G

2. A body falling from rest describes distance  $S_1$ ,  $S_2$  and  $S_3$  in the first, second and third seconds of its fall. Then the ratio of  $S_1 : S_2 : S_3$  is :

- A) 1 : 3 : 5      B) 1 : 1 : 1      C) 1 : 2 : 3      D) 1 : 4 : 9

3. A comb run through ones dry hair attracts small bits of paper. This is due to :

- A) comb is a good conductor  
 B) Paper is a good conductor  
 C) The atoms in the paper gets polarised by the charged comb  
 D) The comb possesses magnetic properties

4. Ice is floating on water in a beaker when ice completely melts then level of water in beaker :

- A) Increases      B) Decreases  
 C) Remains the same      D) First increases then decreases

5. An apple falls from a tree because of gravitation between the earth and apple. If  $F_1$  is the magnitude of force exerted by the earth on the apple and  $F_2$  is the magnitude of force exerted by apple on earth, then :

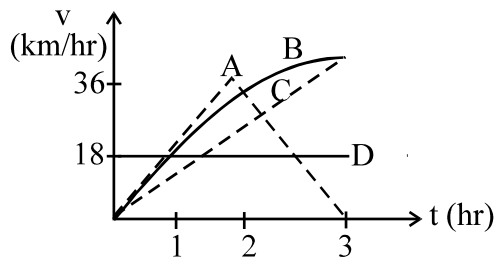
- A)  $F_1$  is very much greater than  $F_2$       B)  $F_2$  is very much greater than  $F_1$   
 C)  $F_1$  is only a little greater than  $F_2$       D)  $F_1$  and  $F_2$  are equal

6. A vehicle is moving on a road. Ink drops are falling, one at a time, on the road from the vehicle. After the vehicle has moved away, what one observes is shown (qualitatively) in the figure given below. From the figure we can conclude about the vehicle to be moving



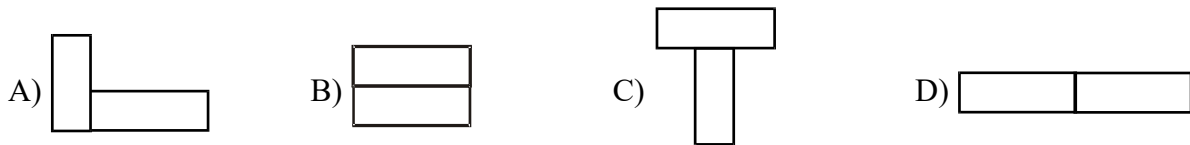
- A) From left to right with increasing speed      B) From right to left with uniform speed  
 C) From right to left with decreasing speed      D) From left to right with decreasing speed

7. Velocity time graph of four athletes for three seconds as given below. Who has travelled maximum distance?



- A) A                      B) B                      C) C                      D) D

8. You are given two identical steel pieces and only one of those is magnetized. In all the following arrangements, there is attraction between them. Which of the following arrangements helps us in identifying the magnet?



9. The S.I unit of pressure is

- A)  $Nm^2$                       B)  $N/m^2$                       C)  $m^2/N$                       D)  $N/m$

10. The frequency of a source of sound is 50 Hz. How many times does it vibrate in 1 minute

- A) 50                      B) 300                      C) 3000                      D) 30000

11. A student was asked to draw a ray diagram for formation of image by a convex lens for the following positions of the object :

- a) Between F and 2F                      b) At F  
 c) At 2 F                      d) Between F and optical centre

The position for which virtual image can be formed among these is

- A) b                      B) a                      C) c                      D) d

12. Which one of the following expressions has the same units as power?

- A) Force  $\times$  distance      B) Work  $\times$  time                      C) Force  $\times$  acceleration      D) Force  $\times$  velocity

13. Suppose you are given three resistances of values 2, 4, 6 ohms. Which of the following value is not possible to get by arranging resistances in various combinations?

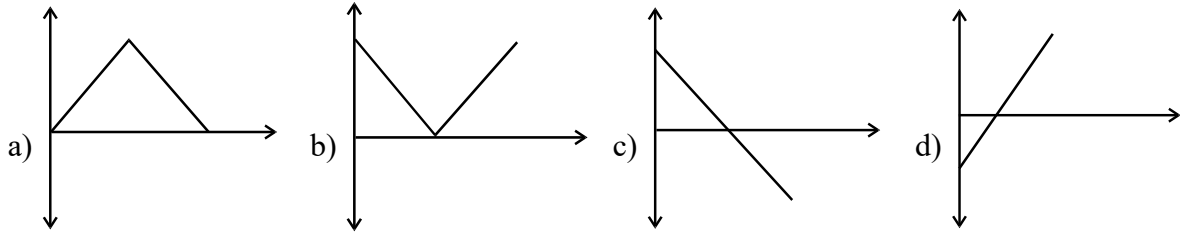
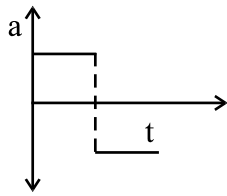
- A) Less than 2                      B) Equal to 4.4                      C) Equal to 7.33                      D) Equal to 6.75

14. The coil of the heater is cut into two equal halves and only one of them is used in the heater. The ratio of the heat produced by the original coil to the halved coil is

- A) 2 : 1                      B) 1 : 2                      C) 4 : 1                      D) 1 : 4

15. Which of the given velocity time graphs matches the given acceleration time graph .

(Time is plotted along the horizontal axis in all cases)



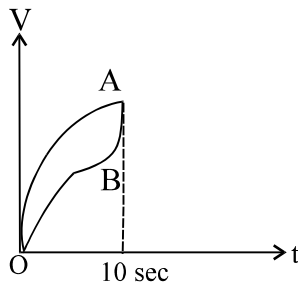
A) a

B) b

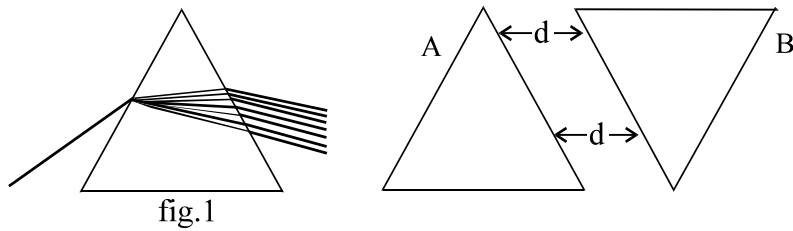
C) c

D) d

16. A graph given, shows the variation of velocity and time of two bodies A and B. Choose an alternative for their average velocities

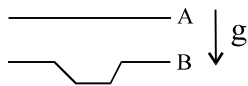


- A) Average velocities of both are same since they have same initial and final velocities
- B) Average velocities of both are same since both cover equal distance in equal interval of time
- C) Average velocity of A is greater than that of B since it covers more distance than B in 10 sec
- D) Nothing can be said since their accelerations are not given
17. A flat mirror creates a virtual image of your face which of the following optical elements in combination with the flat mirror can form a real image?
- A) convex lens      B) concave lens      C) concave mirror      D) convex mirror
18. When a ray of white light enters a prism, it begins to spread out in rainbow colours (figure 1). An inverted prism is brought close to this prism as shown in the figure 2. Both the prisms are made of same material. If a ray of white light is incident on surface A and “d” is made zero then output from surface “B” will be



- A) White light  
 B) Rainbow colours which are converging  
 C) Rainbow colours which are spreading out  
 D) no light comes out from surface B

19. There are two tracks A and B as shown in the figure. The direction of gravity is also shown in the figure



If two similar balls begin to move at same uniform velocity at the same time which of the two balls will reach the end of the track faster?

- A) Ball on track A  
 B) Ball on track B  
 C) They will reach on the same time  
 D) Cannot decide by the date given

20. Current  $I$  is equal to ( $Q$  - charge,  $t$  - time)

- A)  $Q \times t$   
 B)  $Q/t^2$   
 C)  $Q \times t^2$   
 D)  $Q/t$

21. Two bodies with kinetic energies in the ratio  $2 : 3$  are moving with equal momentum. The ratio of their masses

- A)  $1 : 3$   
 B)  $1 : 2$   
 C)  $3 : 2$   
 D)  $2 : 3$

22. Figure 1 show a metallic disc with a hole at its centre. Which one of the figures from 2 to 5 schematically shows how the disc will appear after it is uniformly heated?

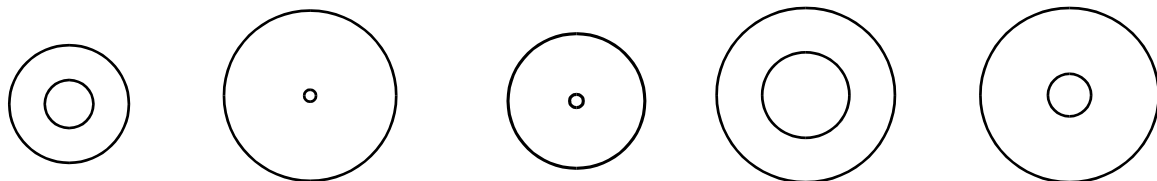


Figure 1      Figure 2      Figure 3      Figure 4      Figure 5

- A) Figure 2  
 B) Figure 3  
 C) Figure 4  
 D) Figure 5

23. Unit of velocity is

- A)  $m/s$   
 B)  $m \times s$   
 C)  $m/s^2$   
 D)  $m \times s^2$

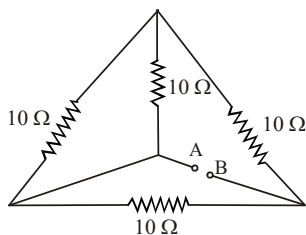
24. An object with an initial velocity  $V_0$  speeds up with an acceleration  $a$ , travelling a distance  $L_1$ , then it slows down with a deceleration  $a$ , and stops after travelling an additional distance  $L_2$ . If  $\frac{L_2}{L_1} = k$ , then what is the maximum velocity of the object during its travel?

- A)  $\frac{k-1}{k+1} v_0$   
 B)  $\sqrt{\frac{k}{k-1}} v_0$   
 C)  $\frac{k}{k-1} v_0$   
 D)  $\sqrt{\frac{k+1}{k}} v_0$

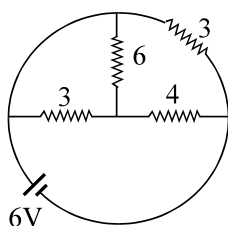
25. A boy and a cart are moving in the same direction, with the boy going twice as fast as the cart. When he gets into the cart, the speed of the cart increases by 20%. Find the ratio of mass of cart to mass of boy

- A) 5  
 B) 4  
 C) 3  
 D) 2

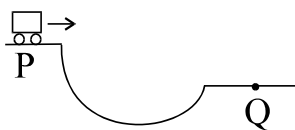
26. Calculate equivalent resistance between points A and B in the following circuit (in ohms)



27. A body of mass 2 kg is moving on a smooth floor in straight line with a uniform velocity of 10 m/s. Resultant force acting on the body is (in N)
28. In the circuit shown, the total current supplied by the battery is (in Ampere)



29. A trolley runs from point P to Q along a track, as shown in the figure. At point Q, its potential energy is 50 kJ less than at point P. At point P, the trolley has kinetic energy 5 kJ. Between P and Q, the work done against friction is 10 kJ. What is the kinetic energy at point Q? (in kJ)



30. A ball is dropped from the top of a tower of height 100 m. Simultaneously, another ball was thrown upward from the bottom of the tower with a speed of 50 m/s ( $g = 10 \text{ m/s}^2$ ). These two balls would cross each other after a time (in second)
31. A student is given four sample of solids W, X, Y and Z, all of which have metallic lustre. The results of her investigations are written a tabular form not matched correctly. Select the correct match sequence for W, X, Y and Z.

**Property**

**Solid**

a) W is a good electrical conductor. X, Y, Z are poor electrical conductors.

P)  $I_2$

b) When the solids are hit with a hammer W, flattens out, X shatters into

many pieces, Y is smashed into powder and Z is not affected

Q)  $SiO_2$

c) When the solids are heated with a Bunsen burner, Y melts with some

sublimation, but X, W, Z do not meet

R) PbS

d) In treatment with 6M  $HNO_3$  X dissolves, there is no effect on W or Z

S) Au

A) (W - P), (Y - S), (X - R), (Z - Q)

B) (W - S), (Y - P), (X - R), (Z - Q)

C) (W - S), (Y - P), (X - Q), (Z - R)

D) (W - S), (Y - Q), (X - P), (Z - R)

32. Which one of the following oxides gives pink colour with phenolphthalein indicator in aqueous solution

A)  $N_2O$

B) NO

C) BaO

D)  $CO_2$

33. What are the gases formed, when lead nitrate on heating

A)  $N_2O$  and  $NO_2$

B)  $NO_2$  and  $H_2$

C)  $NO_2$  and NO

D)  $NO_2$  and  $O_2$

34. Alumino thermite process is used for welding the railway tracks. This process is highly exothermic displacement reaction. Thermite composition is

A)  $Fe_2O_3 : Al : C$   
(2:1:3)

B)  $Fe_2O_3 : Al$   
(1:3)

C)  $Fe_2O_3 : Al$   
(2:1)

D)  $Fe_2O_3 : Al$   
(3:1)

35. Pure gold known as 24 carat gold. It is very soft. In order to make jewellery, it mix with silver or copper. In India 22 carat Au is used for making ornaments. What is the percentage of Au present in 18 carat Au?

A) 91.6%

B) 50.6%

C) 75%

D) 88.8%

36. Among the following is not an oxide ore of metal

A) Copper pyrites

B) Cuprite

C) Bauxite

D) Magnetite

37. To protect decay, one is advised to brush the teeth regularly. The ingredient of the paste which checks the tooth decay is

A) Acidic

B) Basic

C) Neutral

D) Corrosive

38. A metal 'X' has high melting point, good conductor of electricity, and is most malleable. Then the metal 'X' is

A) Cu

B) Au

C) Fe

D) Pt

39. By which property are gases and liquids different from solid?

A) Volume

B) Mass

C) Conductivity

D) Fluidity

40. Structure of nuclei of three atoms A, B and C are given below.

A has 90 protons and 146 neutrons

B has 92 protons and 146 neutrons

C has 90 protons and 148 neutrons

Based on the above data, which of these atoms are isotopes and which are isobars?

A) A and C are isotopes B and C are isobars

B) A and B are isotopes A and C are isobars



C) B and C are isobars A and B are isotopes      D) A and C are isotopes A and B are isobars

41. How much time it would take to distribute one Avogadro's number of wheat grains, if  $10^{10}$  grains are distributed each second
- A)  $1.9 \times 10^2$  years      B)  $1.9 \times 10^{10}$  years      C)  $1.9 \times 10^8$  years      D)  $1.9 \times 10^6$  years
42. The number of atoms present in 0.1 mole of  $P_4$  (atomic mass 31) are
- A)  $2.4 \times 10^{24}$  atoms      B) Same as in 0.05 mol of  $S_8$
- C)  $6 \times 10^{22}$  atoms      D) Same as in 3.1 g of phosphorous
43. A compound contain three elements A, B and C. If the oxidation number of  $A = +2$ ,  $B = +5$  and  $C = -2$ , the possible formula of the compound is
- A)  $A_3(B_4C)_2$       B)  $A_3(BC_4)_2$       C)  $A_4(B_4C_4)_2$       D)  $ABC_2$
44. Select the anhydrous of acids from the following
- A)  $NH_3$       B) BaO      C)  $NO_2$       D) CaO
45. A Brown and bright element 'x' when heated in presence of air turns into black substance 'y'. If hydrogen gas is passed over this heating material again 'x' is obtained 'x' and 'y' are
- A) Cu and CuO      B) S and  $SO_2$       C) C and  $CO_2$       D) Na and NaH
46. Somebody wanted to calculate the number of moles of oxygen atoms comprising of  $9.033 \times 10^{23}$  number of its atoms. The person further thought to calculate its mass and to find the number of moles of hydrogen atoms required to combined completely with this amount of oxygen to form water. The number of moles of oxygen atoms, their mass (in grams) and the number of moles of hydrogen atoms are
- A) 1.5, 3 and 24 respectively      B) 15, 18 and 3 respectively
- C) 0.15, 27, 3 respectively      D) 1.5, 24 and 3 respectively
47. Some rocket engines use a mixture of hydrazine,  $N_2H_4$  and hydrogen peroxide,  $H_2O_2$  as the propellant. The reaction is given by the following equation  $N_2H_{4(l)} + 2H_2O_{2(l)} \longrightarrow N_{2(g)} + 4H_2O_{(g)}$ . How much of the excess reactant, remains unchanged? When 0.850 mol of  $N_2H_4$  is mixed with 17g of  $H_2O_2$ ?
- A) 16g of  $N_2H_4$       B) 0.25 mol  $H_2O_2$       C) 19.2 g of  $N_2H_4$       D) 8.5 g of  $H_2O_2$
48. An element X reacts with dilute.  $H_2SO_4$  as well as with NaOH to produce salt and  $H_2(g)$ . Hence, it may be concluded that-
- I. X is an electropositive element
- II. oxide of X is basic in nature
- III. oxide of X is acidic in nature
- IV. X is an electronegative element
- A) I, II, III are correct      B) IV, I, II are correct      C) III, IV, I are correct      D) II, III, IV are correct
49. A substance A react with another substance B to produce the product C and a gas D. If a mixture of the gas D and ammonia is passed through an aqueous solution of C, baking soda is formed. The substances A

and B are

- A) HCl and NaOH      B) HCl and Na<sub>2</sub>CO<sub>3</sub>      C) Na and HCl      D) Na<sub>2</sub>CO<sub>3</sub> and H<sub>2</sub>O

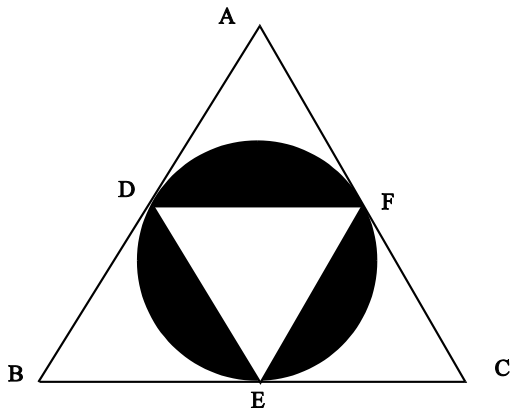
50. An element with atomic number 17 is placed in the group 17 of the long form periodic table. Element with atomic number 9 is placed above and with atomic number 35 is placed below it. Element with atomic number 16 is placed left and with atomic number 18 is placed right to it. Which of the following statements are correct?
- a) Valency of the element with atomic number 18 is zero  
b) Elements with same valency will have atomic number 16, 17 and 18  
c) Valency of elements with atomic number 9, 17 and 35 is one  
d) Element with atomic number 17 is more electronegative than element with atomic numbers 16 and 35
- A) a, b and c      B) b, c and d      C) a, c and d      D) a, b and d
51. What is the mass of oxygen required to react completely with 15g of H<sub>2</sub> gas to form water?
- A) 140 g      B) 115 g      C) 107.5 g      D) 120 g
52. Which of the following is a liquid metal?
- A) Bromine      B) Mercury      C) Iodine      D) Argon
53. King of chemical is :
- A) HCl      B) HNO<sub>3</sub>      C) H<sub>2</sub>SO<sub>4</sub>      D) NaOH
54. The transition of substance directly from the solid to the gas phase. Without passing through the intermediate liquid phase is called
- A) Sublimation      B) Freezing      C) Vapourisation      D) Boiling
55. A chemical equation is balanced in accordance with the law of:
- A) conservation of mass      B) multiple proportion  
C) constant proportion      D) reciprocal proportion
56. The ion of an element has 3 positive charge, 27 mass-number and 14 neutrons. What is the number of electrons in this ion?
57.  $A + 2B + 3C \longrightarrow AB_2C_3$ . Reaction of 6g of A,  $6 \times 10^{23}$  atom of B, 0.036 mol of C yields 4.8 g of compound AB<sub>2</sub>C<sub>3</sub>. If the atomic mass A and C are 60 and 80 respectively. The atomic mass of B is
58. Find the number of gram molecules of oxygen in  $6 \times 10^{24}$  molecules of CO
59. Formula of a metallic oxide is M<sub>2</sub>O<sub>3</sub>. Upon reduction with hydrogen the metallic oxide gives pure metal and water. 0.112 gm metal is produced by 6mg of hydrogen after complete reduction. Atomic mass of the metal is
60. Two elements A and B contain 13 and 8 proton respectively. If the number of neutrons in them happen to be 14 and 8 respectively, the formula unit mass for the compound between A and B unit would be

61. If  $x, y$  and  $z$  are distinct real numbers such that  $x:(y+z)=y:(z+x)$ , then
- A)  $x, y, z$  are all positive  
 B)  $xy+yz+zx+1=0$   
 C)  $x+y+z=0$   
 D)  $x, y, z$  are all negative
62. If  $x$  and  $y$  are any two real numbers with opposite signs, which of the following is the greatest
- A)  $(|x|-|y|)^2$   
 B)  $|x^2 - y^2|$   
 C)  $x^2+y^2$   
 D)  $(x-y)^2$
63. The sides of a quadrilateral are all positive integers and three of them are 30, 80 and 90 units. How many possible values are there for the fourth side \_\_\_\_\_
- A) 120  
 B) 199  
 C) 125  
 D) 190
64. The number of distinct prime divisors of the number  $512^3-253^3-259^3$  is
- A) 5  
 B) 6  
 C) 7  
 D) 9
65. Let a sequence have 1000 zeroes. In step 1, to every position in the sequence we add 2. In step 2, to every even position in the sequence we add 2. In step 3, to every position which is a multiple of 3 we add 2. This continues up to 1000th step. After 1000th step, what will be the value in the 600th position
- A) 48  
 B) 24  
 C) 64  
 D) 124
66. The least number that is divisible by all the numbers from 1 to 10 both inclusive is \_\_\_\_\_
- A) 1820  
 B) 2320  
 C) 3520  
 D) 2520
67. Which one of the following is pure quadratic
- A)  $3x^2+2x$   
 B)  $3x^2+2x+4$   
 C)  $ax^2+bx+c, abc \neq 0$   
 D)  $x^2+1$
68. If  $x$  and  $y$  are co-ordinates of the vertices of a triangle and more over they are rational numbers, then the triangle can't be a/an
- A) Right angled triangle  
 B) Isosceles triangle  
 C) Isosceles and right angled triangle  
 D) Equilateral triangle
69. The ratio of the length of a side of an equilateral triangle and its height is
- A)  $1:\sqrt{3}$   
 B)  $\sqrt{3}:2$   
 C)  $2:\sqrt{3}$   
 D)  $2:1$
70. If  $x = \frac{1}{1+\sqrt{3}}$  then the value of  $4x^2+4x+2$  is
- A) 3  
 B) 5  
 C) 6  
 D) 4
71. The average marks scored by Aswin in certain number of test is 84. He scored 100 marks in the next test. His new average score of all those tests is 86, then the total number of tests he appeared, is
- A) 8  
 B) 7  
 C) 5  
 D) 10

72. The number of solution of the equation  $\sqrt{x} = x - 2$  is

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

73. In the given figure, ABC is an equilateral triangle whose side is  $2\sqrt{3}$ cm. A circle is drawn which passes through the midpoints D, E and F of its sides. The area of the shaded region is



- A)  $\frac{1}{4}(4\pi - 3\sqrt{3})$       B)  $\frac{1}{4}(\pi - 3\sqrt{3})$       C)  $\frac{1}{4}(2\pi - \sqrt{3})$       D)  $\frac{1}{4}(3\pi - \sqrt{3})$

74. If a cylinder of radius 3cm and height 10cm is melted and recast into the shape of small spheres of diameter 1cm, then the number of spheres so formed is

- A) 35                                      B) 270                                      C) 540                                      D) 1080

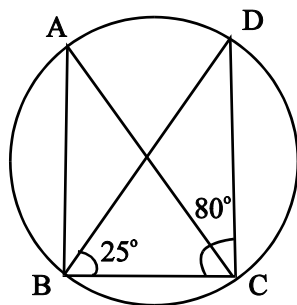
75. The angle of elevation of the top of a building from the foot of the tower is  $30^\circ$  and the angle of elevation of the top of the tower from the foot of the building is  $60^\circ$ . If the tower is 30m high, then the height of the building is

- A) 30m                                      B) 20m                                      C) 15m                                      D) 10m

76. If the heights and radii of a cone and a hemisphere are same then the ratio of their volumes is

- A) 1:2                                      B) 2:3                                      C) 1:3                                      D) 1:1

77. In the given figure,  $\angle DBC = 25^\circ$  and  $\angle DCB = 80^\circ$  then  $\angle BAC$  is equal to

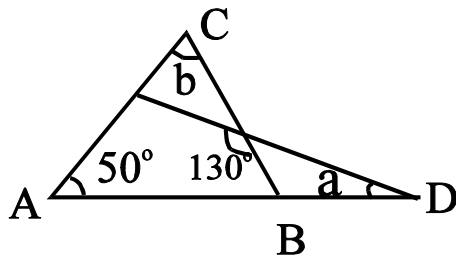


- A)  $90^\circ$                                       B)  $85^\circ$                                       C)  $75^\circ$                                       D)  $25^\circ$

78. The difference between the simple and compound interest on Rs 12500 for 3 years at 4% is

- A) Rs. 60.50                                      B) Rs. 60.80                                      C) Rs. 60.00                                      D) Rs. 60.30

79. In the diagram, the value of  $a+b =$



- A)  $70^\circ$                       B)  $90^\circ$                       C)  $100^\circ$                       D)  $80^\circ$

80. The radii of two circles are 9cm and 12cm. The circumference of a circle whose area is equal to sum of the areas of the given two circles is

- A) 15cm                      B)  $15\pi$ cm                      C) 225cm                      D)  $30\pi$ cm

81. In an examination A got 25% mark more than B, B got 10% less than C and C got 25% more than D. If D got 320 marks out of 500, the marks obtained by A was

- A) 400                      B) 405                      C) 450                      D) 360

82. If  $x-a$  is a factor of  $x^3-3x^2a+2a^2x+b$  then value of  $b$  is

- A) 2                      B) 0                      C) 3                      D) 1

83. The point which is equidistant from the points (0, 0) (0, 8) and (4, 6) is

- A)  $\left(\frac{1}{2}, -4\right)$                       B)  $\left(-\frac{1}{2}, 4\right)$                       C)  $\left(\frac{1}{2}, 4\right)$                       D)  $\left(-\frac{1}{2}, -4\right)$

84. If  $\frac{a}{b} = \frac{b}{c}$ , the value of  $\frac{1}{b-c} + \frac{1}{b-a}$  is

- A)  $\frac{1}{b}$                       B)  $\frac{1}{a}$                       C)  $\frac{1}{ab}$                       D)  $\frac{1}{c}$

85. The value of  $\sqrt{\frac{(\sqrt{12}-\sqrt{8})(\sqrt{3}+\sqrt{2})}{5+\sqrt{24}}}$  is

- A)  $\sqrt{6}-2$                       B)  $2-\sqrt{6}$                       C)  $2+\sqrt{6}$                       D) Both A and B

86. Five real numbers  $a_1, a_2, a_3, a_4, a_5$  are such that

$$\sqrt{a_1-1} + 2\sqrt{a_2-4} + 3\sqrt{a_3-9} + 4\sqrt{a_4-16} + 5\sqrt{a_5-25} = \frac{a_1 + a_2 + a_3 + a_4 + a_5}{2}. \text{ The value of}$$

$a_1 + a_2 + a_3 + a_4 + a_5$  is

87. How many ordered pairs of  $(x, y)$  integers satisfy  $\frac{x}{15} = \frac{36}{y}$
88. A certain school has 2000 students. Every student reads 5 newspapers and every newspaper is read by 25 students. Then the number of newspaper is
89. There are 4 lines in a plane no two of which are parallel. The maximum number of points in which they can intersect is
90. The median of 10, 14, 11, 9, 8, 12, 6 is

**PHYSICS**

1. B
2. A
3. C
4. C
5. D
6. D
7. B
8. C
9. B
10. C
11. D
12. D
13. D
14. A
15. A
16. C
17. A
18. A
19. B
20. D
21. C
22. C
23. A
24. B
25. B
26. 6
27. 0
28. 3
29. 45
30. 2

**CHEMISTRY**

31. B
32. C
33. D
34. D
35. C
36. A
37. B
38. B
39. D
40. A
41. D
42. B
43. B
44. C
45. A
46. D
47. C
48. A
49. B
50. C
51. D
52. B
53. C
54. A
55. A
56. 10
57. 50
58. 5
59. 56
60. 102

**MATHEMATICS**

61. C
62. D
63. B
64. B
65. A
66. D
67. D
68. D
69. C
70. D
71. A
72. B
73. A
74. C
75. D
76. A
77. C
78. B
79. D
80. D
81. C
82. B
83. C
84. A
85. A
86. 110
87. 48
88. 400
89. 6
90. 10