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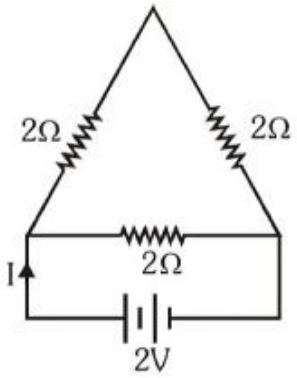
SECTION-A : PHYSICS

This section contains **15 Multiple Choice Questions**. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

1. Two lamps X and Y are connected in series. The lamp X glows less bright than Y. Then
(1) The resistance of X is greater than the resistance of Y.
(2) The resistance of X is less than the resistance of Y.
(3) The resistance of X is equal to the resistance of Y.
(4) There is no relation between the resistances of X and Y.

2. What is the current in the circuit shown (Fig.)?



(1) 1.5 A
(2) 0.5A
(3) 2.0 A
(4) None of these

3. When a bar magnet is broken into two pieces,
(1) We will have a single pole on each piece
(2) Each piece will have two like poles
(3) Each piece will have two unlike poles
(4) Each piece will lose magnetism

4. A heater coil is cut into two equal parts and only one part is now used in the heater. The heat generated will now be
(1) Doubled
(2) Four times
(3) One fourth
(4) Halved

5. A boy stands straight in front of a mirror at a distance of 30 cm away from it. He sees his erect image whose height is 1/5th of his real height. The mirror he is using is
(1) Plane mirror
(2) Convex mirror
(3) Concave mirror
(4) Never possible

6. When the current is passing through a straight wire, then the associated magnetic field around it is
(1) Straight
(2) Elliptical
(3) Circular
(4) Parabolic

7. A convex mirror of focal length f produces an image (1/n)th of the size of the object. The distance of the object from the mirror is
(1) nf
(2) f/n
(3) (n + 1)f
(4) (n – 1)f

8. A passenger travels along a straight line with velocity v_1 for first half time and with velocity v_2 for next half time, then the mean velocity v is given by,

(1) $v = \sqrt{\frac{v_2}{v_1}}$
(2) $v = \sqrt{v_1 v_2}$
(3) $v = \frac{2v_1 v_2}{v_1 + v_2}$
(4) $v = \frac{v_1 + v_2}{2}$

9. An object placed at 10 cm in front of a lens has an image at 20 cm behind the lens. What is the power of the lens (in dioptre)?

(1) + 1.5 (2) + 3.0

(3) – 5.0 (4) + 15.0

10. An object A of mass 2 kg is moving with a velocity of 3 m/s and collides head-on with an object B of mass 1 kg moving in opposite direction with a velocity of 4 m/s. After collision, both objects combine so that they move with a common velocity equal to

(1) 3 m/s (2) 2 m/s

(3) 1 m/s (4) 2/3 m/s

11. A body starts from rest and accelerates uniformly. Ratio of distances travelled in one, two and three seconds of its motion is

(1) 1 : 3 : 5 (2) 1 : 4 : 9

(3) 1 : 2 : 3 (4) 9 : 4 : 1

12. A solid cylinder of density 800 kg m^{-3} floats in water. The percentage volume of solid cylinder outside the water is

(1) 10% (2) 50%

(3) 50% (4) 20%

13. An object is put one by one in three liquids having different densities. The object floats with 1/9 ; 2/11 ; 3/7 parts of their volumes outside the liquid surface in liquids of densities d_1, d_2 and d_3 respectively. Which of the following statement is correct?

(1) $d_1 > d_2 > d_3$ (2) $d_1 > d_2 < d_3$

(3) $d_1 < d_2 > d_3$ (4) $d_1 < d_2 < d_3$

14. g_e and g_p denote the acceleration due to gravity on the surface of the earth and another planet whose mass and radius are twice that of the earth. Then

(1) $g_p = g_e$ (2) $g_p = g_e/2$

(3) $g_p = 2g_e$ (4) $g_p = \frac{g_e}{\sqrt{2}}$

15. Two persons do the same amount of work, one in 10 s and the other in 20 s. Find the ratio of the power used by the first person to that by the second person.

(l) 6 : 1 (2) 2 : 1

(3) 9 : 1 (4) 4 : 1

SECTION-B : CHEMISTRY

This section contains **15 Multiple Choice Questions**. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

16. Two containers have equal weights of NO_2 and N_2O. The one containing more number of moles is :

(1) NO_2 (2) N_2O

(3) Both have samenumber of mole (4) Cannot be determined

17. Alloys are :

(1) Elements (2) Compounds

(3) Homogeneous mixture (4) Hetrogeneous mixture

18. 3.011×10^{22} atoms of an element weight 1.15 gm. The atomic mass of the element is :-

(1) 10 (2) 2.3

(3) 35.5 (4) 23

19. Isotone of $^{30}_{14}Si$ is -

(1) $^{77}_{34}Se$ (2) $^{31}_{15}P$

(3) $^{32}_{16}S$ (4) (2) & (3) both

20. Fluoride ion is isoelectronic with :-

(1) Ne (2) O^{2-}

(3) N^{3-} (4) All of these

21. Ratio of specific charge of a proton and deutarium is -

(1) 2 : 1 (2) 1 : 2

(3) 1 : 4 (4) 1 : 1

22. Which pair of elements are transition element :-

(1) Sc, Zn (2) Sc, Cu

(3) Cu, Ag (4) 2 & 3 both

23. The group no. for the inner transition elements is :-

(1) 6^{th} (2) 4^{th}

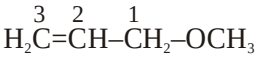
(3) 3^{rd} (4) 8^{th}

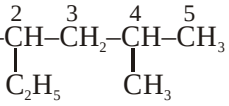
24. Consider the given elements /ion, Mg, Mg^{2+}, Al, Al^{3+}. Find species which is largest & smallest respectively :-

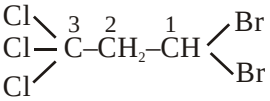
(1) Al & Al^{3+} (2) Mg & Mg^{2+}

(3) Mg & Al^{3+} (4) Al & Mg^{2+}

25. Which of the following does not represent correct numbering of C-atoms according to IUPAC system :-

(1) 

(2) 

(3) 

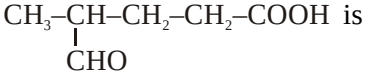
(4) All

26. Match the list-I and list-II and select the correct answer :-

List - I	**List - II**
(a) C_nH_{2n}	(p) Alcohol, ether
(b) C_nH_{2n-2}	(q) Alkene, cycloalkane
(c) $C_nH_{2n+2}O$	(r) Aldehyde, Ketones
(d) $C_nH_{2n}O$	(s) Alkynes, Alkadiene

(1) (a - p), (b - q), (c - r), (d - s) (2) (a - s), (b - r), (c - q), (d - p)

(3) (a - q), (b - s), (c - p), (d - r) (4) (a - r), (b - p), (c - s), (d - q)

27. The IUPAC name of  is :-

(1) 4 – formyl pentanoic acid (2) 2 – formyl pentanoic acid

(3) 4 – methyl – 4 oxo pentanoic acid (4) 4 – carboxy – 2 – methyl butanal

28. Which is the strongest acid (pKa value is given)

(1) HCOOH [3.77] (2) C_6H_5COOH [4.22]

(3) CH_3COOH [4.7] (4) CH_3CH_2COOH [4.88]

29. Which of the following compound is tribasic acid:-

(1) H_3PO_2 (2) H_3PO_3

(3) H_3PO_4 (4) $H_4P_2O_7$

30. Which of the following is correct order of increasing acidity :-

(1) HF < HCl < HBr < HI (2) HI < HBr > HCl < HF

(3) HF > HCl < HBr > HI (4) HF > HCl > HBr > HI

SECTION-C : BIOLOGY

This section contains **15 Multiple Choice Questions**. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

31. Which of the following are phagocytic cells?

(1) Neutrophils, mast cells (2) Mast cells, macrophages

(3) Mast cells, antibodies (4) Neutrophils, macrophages

32. _____ is a characteristic feature of epithelial cells of the intestine

(1) Glottis (2) Pilus

(3) Bolus (4) Microvilli

33. Dominance is not an autonomous feature of a gene or the product, when :-

(1) More than one gene influence the same phenotype.

(2) More than one phenotype is influenced by the same gene.

(3) More than one genotype in influenced by the same gene.

(4) More than one allele are there for a character.

34. Which one of the following is an eye disease?

(1) Hepatitis (2) Measles

(3) Glaucoma (4) Bronchitis

35. Which of the following is found in sponges only?

(1) Mesoglea (2) Nerve cells

(3) One exit (4) Numerous inlets

36. Excretion in flatworms is by

(1) Malpighian tubule (2) Nephridia

(3) Flame cells (4) Nephrons

37. The _____ synthesizes most of the excretory compound in humans and is eliminated through____

(1) Liver, Urine (2) Kidneys, Urine

(3) Liver, Bile juice (4) None of the above

38. Which of the following is the name of the combination vaccine given to children to protect them against Tetanus, Whooping Cough, and Diphtheria?

(1) BCG Vaccine (2) DPT Vaccine

(3) HIB Vaccine (4) TAB Vaccine

39. Read the following statement (a–d) and answer as asked next to them :-

(a) The water we take in plays an important role in metabolic processes and also prevents dehydration of the body.

(b) Digestion in digestive system of hydra is carried out by mechanical and biochemical methods.

(c) Oral cavity has a number of teeth and a muscular tongue.

(d) All mammals including human beings forms two set of teeth during their life.

How many of the above statements are incorrect?

(1) Four (2) Two

(3) Three (4) One

40. During far vision :-

(1) Focal length of lens is reduced. (2) Radius of curvatue of Lens increased

(3) Curvature of lens is increased (4) All of the above

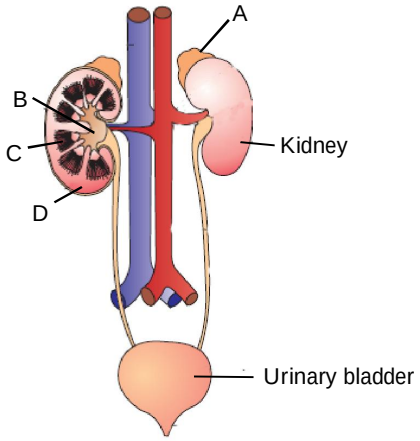
41. Some waste products are listed below:

* Grass Cutting
* Polythene Bag
* Plastic Toys
* Used Tea Bags
* Old Clothes
* Paper Straw

Which group of waste materials can be classified as non-biodegradable?

(1) plant waste, used tea bags
(2) polyethene bags, plastic toys
(3) used tea bags, paper straw
(4) old clothes, broken footwear

42. Figure shows human urinary system with structures labelled A to D. Select option which correctly identifies them and gives their characteristics and/or functions :-



(1) D-Cortex - outer part of kidney and do not contain any part of nephrons

(2) A-Adrenal gland - located at the anterior part of kidney. Secrete Catecholamines which stimulate glycogen breakdown

(3) B-Pelvis - broad funnel shaped space inner to hilum, directly connected to loops of Henle

(4) C-Medulla-inner zone of kidney and contains complete nephrons

43. Which one of the following options is an example of an exotic breed of cattle ?

(1) Aseel
(2) Leghorn
(3) Jersey
(4) Sahiwal

44. Rapid elongation of a bamboo stem is due to

(1) Intercalary meristem
(2) Apical meristem
(3) Cambium
(4) None of the above

45. The largest amount of extracellular material is present in the

(1) Stratified epithelium
(2) Striated muscle
(3) nerve fibres
(4) Areolar tissue

SECTION-D : MATHEMATICS

This section contains **15 Multiple Choice Questions**. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

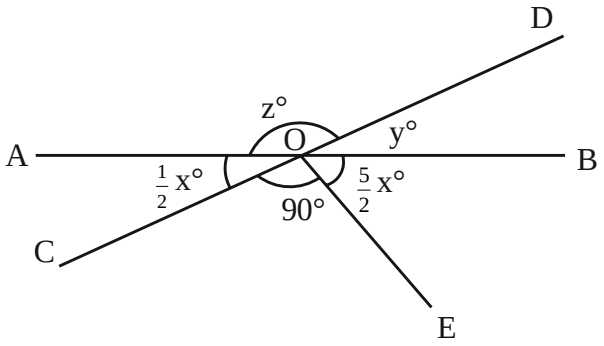
46. The sum of two irrational numbers is -

(1) Rational
(2) Irrational
(3) Either (1) or (2)
(4) Natural number

47. If $(x + a)$ is a factor of $x^2 + px + q$ and $x^2 + mx + n$ then the value of a is :

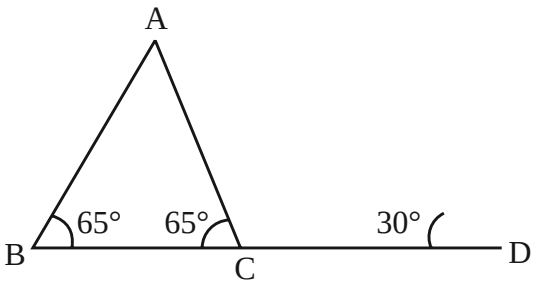
(1) $\frac{m-p}{n-q}$
(2) $\frac{n-q}{m-p}$
(3) $\frac{n+q}{m+p}$
(4) $\frac{m+p}{n+q}$

48. In the given figure, if AB and CD are straight lines and $\angle COE = 90°$, then the value of the angles x, y and z are :



(1) 16°, 50°, 130°
(2) 18°, 45°, 135°
(3) 20°, 40°, 140°
(4) 30°, 15°, 165°

49. In the given diagram $\angle B = \angle C = 65°$ and $\angle D = 30°$, then the true statement is :



(1) BC = CA
(2) CA > CD
(3) BD > AD
(4) AC = AD

50. Write the name of the quadrant in which the point (–3, 5) lies.
(1) First quadrant
(2) Second quadrant
(3) Third quadrant
(4) Fourth quadrant

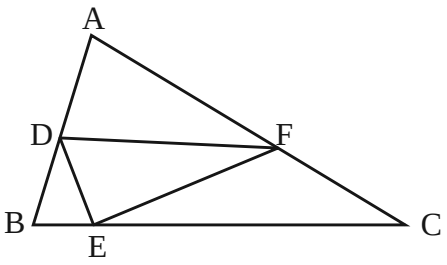
51. In a trapezium ABCD with bases AB and CD, where AB = 52, BC = 12, CD = 39 and DA = 5. The area of the trapezium ABCD, is :
(1) 182
(2) 195
(3) 210
(4) 260

52. If $\frac{2x+7}{5x+8} = \frac{2x+8}{5x+4}$, then x = ?

(1) $-2\frac{10}{13}$
(2) $-3\frac{5}{9}$
(3) $-2\frac{1}{2}$
(4) $-3\frac{6}{7}$

53. Suppose the triangle ABC has an obtuse angle at C and let D be the midpoint of side AC. Suppose E is on BC such that the segment DE is parallel to AB. Consider the following three statements.
(i) E is the midpoint of BC
(ii) The length of DE is half the length of AB
(iii) DE bisects the altitude from C to AB
(1) Only (i) is true
(2) Only (i) and (ii) are true
(3) Only (i) and (iii) are true
(4) All three are true.

54. In the figure AD = DB, BE = $\frac{1}{2}$ EC and CF = $\frac{1}{3}$ AF. If the area of Δ ABC = 120 cm^2, the area (in cm^2) of Δ DEF is :



(1) 21 (2) 35
(3) 40 (4) 45

55. In Δ ABC, line segments AD, BE and CF are the altitudes. If AB × AC = 28.80 and BE × CF = 20, then AD × BC equals :
(1) 24.4 (2) 24.2
(3) 24.0 (4) 23.8

56. AB and CD are two parallel chords of a circle of radius 3 cms. If AB = 4 cms and CD = 5 cms. Then the distance between them in cms is

(1) $\frac{\sqrt{5}}{2}+\sqrt{11}$ (2) $\sqrt{5}+\sqrt{11}$

(3) $\sqrt{5}+\frac{\sqrt{11}}{2}$ (4) $\sqrt{2}+\frac{\sqrt{11}}{\sqrt{5}}$

57. A hollow spherical ball whose inner radius is 4 cm is full of water. Half of the water is transferred to a conical cup and it completely filled the cup. If the height of the cup is 2 cm, then the radius of the base of cone in cm is :
(1) 4 (2) 10
(3) 8 (4) 16

58. The mean weight of a class of 34 students is 46.5 kg. If weight of the teacher is included, the mean rises by 500 gm. Then weight of the teacher is:
(1) 175 kg (2) 62 kg
(3) 64 kg (4) 72 kg

59. A bag contains 40 balls out of which some are red, some are blue and remaining are black. If the probability of drawing a red ball is $\frac{11}{20}$ and that of blue ball is $\frac{1}{5}$, then the number of black balls is
(1) 5 (2) 25
(3) 10 (4) 30

60. If $a^m . a^n = a^{mn}$, then m(n – 2) + n(m – 2) is -

(1) $\frac{2n-4}{n-1}$ (2) 0

(3) $\frac{n(2n-4)}{(n-1)}$ (4) $\frac{n}{n-1}$

SECTION-E : IQ (MENTAL ABILITY)

This section contains **20 Multiple Choice Questions**. Each question has four choices (1), (2), (3) and (4) out of which **ONLY ONE** is correct.

Directions : (61) Find the missing numbers.

61. 0, 6, 24, 60, 120, ?

(1) 340 (2) 210 (3) 260 (4) 222

62. QJV, OLS, MNP, KPM, ?

(1) IJR (2) IRJ (3) RJI (4) JIR

Direction : (63) : Which squence of letters when placed at the blanks one after the other will complete the given series ?

63. bc _ b _ c _ b _ ccb

(1) cbcb (2) bbcb (3) cbbc (4) bcbc

64.

2	6	3	4
204	636	309	?

(1) 408 (2) 104 (3) 416 (4) 404

65. Find out the sign to be interchange for making the given equation correct

10 + 10 ÷ 10 – 10 × 10 = 10

(1) + and – (2) + and × (3) ÷ and × (4) + and ÷

66. If PLAY = 50 , SOUL = 63, then TRUE = ?

(1) 64 (2) 60 (3) 63 (4) 62

67. If East become North-West, North-West become South and so on then what will South become ?

(1) North-West (2) South-West (3) West (4) North-East

68. In a class of students, Ravi occupies fifth position from the top and **25th** from the bottom in a test. How many students are there in the class ?

(1) 30 (2) 28 (3) 29 (4) 25

69. Pointing to a person, Rohit said to Neha, "His mother is the only daughter of your father. "How is Neha related to that person ?

(1) Aunt (2) Mother (3) Daughter (4) Wife

Directions : (70)

(i) J, K, L, M, N, O, P, and Q are sitting in a line facing towards East.

(ii) J is fourth to the right of N.

(iii) Q is fourth to the left of M.

(iv) L and O are not at the ends and are neighours of K and P respectively.

(v) Q is next to the left of J and J is the neighbour of K.

70. What is the position of O ?

(1) To the right of N (2) Next to the right of L

(3) Next to the right of M (4) Between P and J

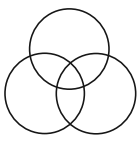
71. Who is the neighbourer of M

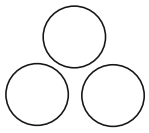
(1) O (2) L

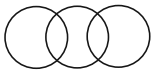
(3) K and L (4) Can not be determined

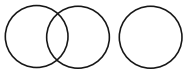
Directions : (72) Which of the Venn diagrams given in the alternatives best represents the relation between the given items ?

72. Doctors, Engineers, Lawyers

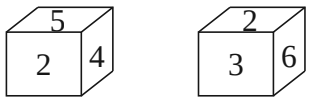
(1) 

(2) 

(3) 

(4) 

73. A dice has been thrown two times and produces following results.



(ii) (iv)

Which number will appear opposite to the number 3 ?

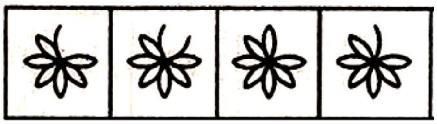
(1) 4 (2) 5 (3) 6 (4) 1

74. '**Height**' is related to '**Length**' in the same way as '**Weight**' is related to

(1) Length (2) Height (3) Mass (4) Breadth

Directions (70) : In each of the following, there are some figure which have some particular series. Find out the next figure ?

75.



(A) (B) (C) (D)

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

76. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.

Statements:

1. Some machines are kites.
2. No machine is a pigeon.

Conclusions:

I. Some machines are pigeons.

II. All kites are pigeons.

III. Some kites are not pigeons.

(1) Only conclusions I and II follow. (2) Only conclusions I and III follow.

(3) Only conclusion III follow. (4) Only conclusion II follow.

77. If a person was born on 29 Feb 1896 then his next birthday will fall on?

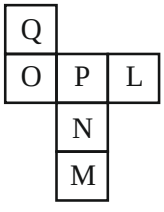
(1) 29 Feb 1908 (2) 29 Feb 1904 (3) 29 Feb 1912 (4) 28 Feb 1900

78. Study the given pattern carefully and select the number that can replace the question mark (?) in it.

23	5	110
56	9	121
49	3	?

(1) 77 (2) 111 (3) 95 (4) 113

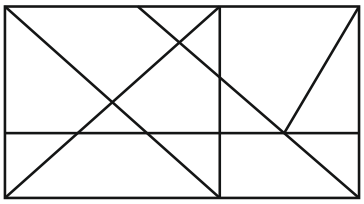
79.



which latter is opposite to Q?

(1) L (2) M (3) N (4) P

80. How many triangles are there in the given figure?



(1) 28 (2) 22 (3) 16 (4) 25

SHARP_CLASS- X

ANSWER KEY

TEST DATE:

PHYSICS	**Q. No**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**					
	Ans.	2	1	3	1	2	3	4	4	4	4	2	4	4	2	2					
CHEMISTRY	**Q. No.**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**					
	Ans.	2	3	4	4	4	1	4	3	3	4	3	1	1	3	1					
BIOLOGY	**Q. No.**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**					
	Ans.	4	4	2	3	4	3	1	2	2	2	2	2	3	1	4					
MATHS	**Q. No.**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**					
	Ans.	3	2	4	3	2	3	1	4	2	3	3	3	3	3	2					
MAT	**Q. No.**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**	**73**	**74**	**75**	**76**	**77**	**78**	**79**	**80**
	Ans.	2	2	1	3	2	2	4	3	2	1	2	2	1	3	1	3	2	1	3	2