SAMPLE PAPER

SET - 1

CLASS - X

AVIRAL CLASSES™
CREATING SCHOLARS
JEE (ADVANCED), PMT & FOUNDATIONS

AVIRAL CLASSES
2nd Floor, World Trade Tower, 99-Rajpur Road, Dehradun
Web : www.aviral.co.in
E-mail : info@aviral.ac.in

PHYSICS

1. The image formed by a plane mirror is
   (a) real (b) virtual
   (c) virtual with lateral inversion (d) real with lateral inversion

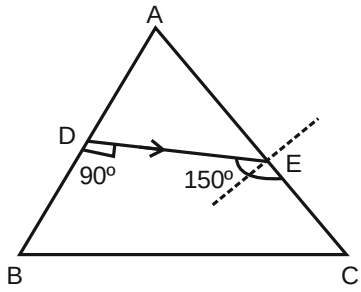
2. For an object placed in between the two perpendicular mirrors, the numbre of images formed will be
   (a) 2 (b) 4 (c) 3 (d) 1

3. In a barber's shop, two plane mirrors are placed
   (a) Perpendicular to each other (b) Parallel to each other
   (c) At an angle of 60º between them (d) At an angle of 45º between them

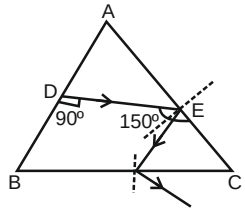
4. A concave lens forms an errect image of 1/3rd the size of the object which is placed at a distance 30 cm infront of the lens, then the position of the image will be
   (a) 10 cm in front of the lens (b) 10 cm behind the lens
   (c) 20 cm infront of the lens (d) 20 cm behind the lens

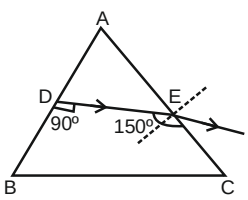
5. Which of the following statement/statements regarding total internal reflection (TIR) is/are correct :
   (A) takes place only when light passes from a denser medium to a rarer medium
   (B) Entire light is reflected
   (C) There is no loss of energy
   (D) Angle of incidence is greater than the critical angle for a pair of media
   (a) A, B and D (b) B, C and D (c) C and D (d) A, B, C and D

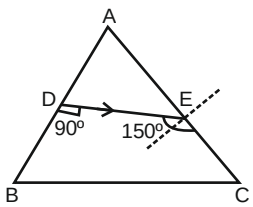
6. The critical angle for material of which the equiangular prism ABC shown below is made is 60º. A ray of light incident on the side AB of prism is refracted along DE such that the angle it makes with the side AC is 150º and ∠EDB = 90º

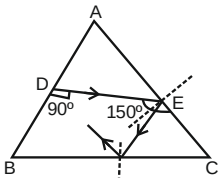


On completing the diagram which one of the following is correct.

(a) 

(b) 

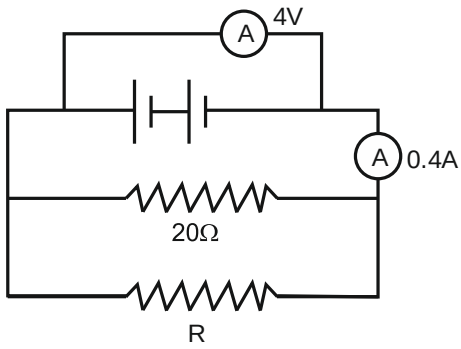
(c) 

(d) 

7. The main fuse is connected in
   (a) Live wire (b) Neutral wire
   (c) Both the live and earth wire (d) Both the earth and neutral wire

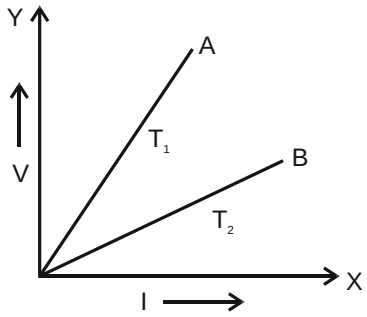
8. An electrical appliance has a rating 100 W, 120 V. The resistance of element of appliance when in use is
   (a) 1.2 Ω (b) 144 Ω (c) 120 Ω (d) 100 Ω

9. The current having in R, in the given circuit below is



   (a) 0.2 A (b) 0.4 A (c) 0.8 A (d) 2A

10. V-I graph for a conductor at two different temperature T_1 and T_2 is given below



   Which one of the following is correct ?
   (a) $T_1 = T_2$ (b) $T_1 > T_2$ (c) $T_1 < T_2$ (d) Data incomplete

11. Unit of conductivity
   (a) Ω^{-1} m (b) Silmen metre^{-1} (c) Silmen (d) Silmen^{-1} metre^{-1}

12. How resistance depends on the temperature
   (a) Increases on increase in temperature
   (b) Decreases on increase in temperature
   (c) Remains constant
   (d) Initially increase and further on decreases

13. Which of the following correctly describes the magnetic field near a long straight wire ?
   (a) The field consists of straight lines perpendicular to the wire
   (b) The field consists of straight lines parallel to the wire
   (c) The field consists of radial lines originating from the wire
   (d) The field consists of concentric circles centred on the wire

14. A positively-charged particle (alpha-particle) projected towards west is deflected towards north by a magnetic field. The direction of magnetic field is
(a) Towards south (b) Towards east (c) Downward (d) Upward

15. Two main organs in the human body where the magnetic field produced is significant are the heart and the brain. The magnetic field inside the body forms the basis of obtaining the images of different body parts. This is done by using a technique called
(a) Ultrasound (b) X-ray (c) MRI (d) Scanning

CHEMISTRY

16.

	Column-A		Column-B
A.	HCL	1.	Monobasic
B.	KOH	2.	Triacidic
C.	$Mg(OH)_2$	3.	Monoacidic
D.	$Al(OH)_3$	4.	Diacidic

(a) A-3, B-1, C-4, D-2 (b) A-2, B-4, C-1, D-3
(c) A-1, B-3, C-4, D-2 (d) A-4, B-1, C-2, D-3

17. What is the hydrogen ion concentration for a solution whose POH is 9?
(a) 10^{-9} M (b) 10^{-3} M (c) 10^{-5} M (d) 10^{-7} M

18. Aluminium liberates hydrogen gas on reaction with
(a) Concentrated sulphuric acid (b) Nitric acid
(c) Hydrochloric acid (d) None of these

19. The element which has the strongest metallic bond among $_{11}A^{23}$, $_{12}B^{24}$, $_{13}C^{27}$ and $_{19}D^{39}$ is
(a) A (b) B (c) C (d) D

20. The ease of formtation of which of following chlorides is maximum ?
(a) NaCl (b) KCl (c) RbCl (d) CsCl

21. Which of the following salt can produce only two types of radicals ?
(a) $NaKCO_3$ (b) $CaOCl_2$ (c) NH_4HSO_4 (d) $Na(NH_4)HPO_4$

22. CO_2 and SO_2 gass can be distinguishing by using
(a) Lime water (b) Litmus solution
(c) Acidified $K_2Cr_2O_7$ (d) All of these

23. According to lewis theory, neutralisation is the
(a) Transfer of proton from acid to base
(b) Transfer of proton from base to acid
(c) Transfer of electron pair from acid to base
(d) Transfer of electron pair from base to acid

24. Identify the set of metals which require same amount of charge for the deposition of one mole of metals
(a) Na, Ag, Al (b) Zn, Cu, Ag (c) Al, Cu, Zn (d) Mg, Zn, Cd

25. The flow chart represents the extraction of
Froth floation → Roasting → Smelting → Bessemerisation → Electrolytic refining
(a) Copper (b) Zinc (c) Iron (d) Aluminium

26. $H_2S + Cl_2 \rightarrow 2HCl + S$; the reaction is interpreted as
(a) H_2S is getting oxidised and Cl_2 is getting reduced
(b) H_2S is getting reduced and Cl_2 is getting oxidised
(c) Only H_2S is oxidised
(d) Both H_2S and Cl_2 are reduced

27. Which of the following molecules show violation of octed rule ?
(a) PCl_5 (b) XeF_4 (c) SF_6 (d) All of these

28. Which of the following are iso-electronic species ?
(a) CO_2, NO_2 (b) NO_2^- (c) CN^-, CO (d) SO_2, CO_2

29. Which of the following does not form an acidic salt ?
(a) Phosphoric acid (b) Hydrochloric acid
(c) Carbonic acid (d) Sulphuric acid

30. The percentage of alloy content present in 20 carat of gold is
(a) 83.3% (b) 16.7% (c) 73.3% (d) 24%

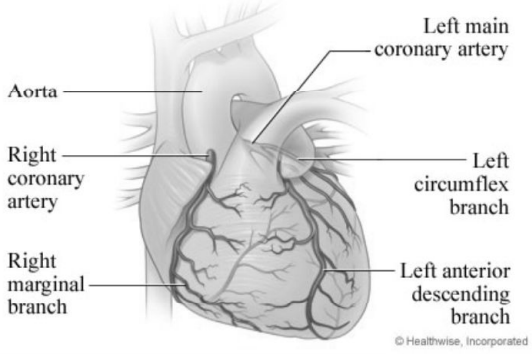
BIOLOGY

31. Mammalian heart is
(a) Neurogenic (b) Myogenic (c) Digenic (d) Non of the above

32. Tricuspid valve is found in between
(a) Sinus venosus and right auricle (b) Right auricle and right ventride
(c) Left ventricle and left auricle (d) Ventricle and aorta

33. The hepatic portal vein drains blood to liver from
(a) Heart (b) Stomach (c) Kidney (d) Intestine

34. In the given diagram the role X is to



(a) Generate cardiac imulse (b) Cause atrial systole
(c) Cause ventricular diastole (d) Carry cardiac impulse to ventricles

35. A normal human cell has 23 pairs of chromosomes of which two chromosomes are sex chromosomes which of these cells will have sex chromosomes ?

P. a muscle cell Q. a cell from the tests R. a cell from the ovary

(a) Only P (b) Only Q (c) Only Q and R (d) All P, Q & R

36. In an experiment on O_2 evolution by photosynthisising hydrilla plant, a pinch of sodium bicarbonate is added to water. The rate of photosynthesis or O_2 evolution will

(a) Increase (b) Decrease (c) Stop (d) Not be affected

37. The site for light reaction is

(a) Grana (b) Stroma (c) ER (d) Cytoplasm

38. Cyclic photophasphorylation produces

(a) NADPH (b) ATP and NADPH

(c) ATP, NADPH and O_2 (d) ATP only

39. Body coordination is mainlained by

(a) Circulatory system (b) Nervous system

(c) Endocrine system (d) Both (b) and (c)

40. Respiratory centre is situated in

(a) Cerebellum (b) Medulla oblongata (c) Hypothalamus (d) Cerebrum

41. Which genetic disorder is characterized by the absence of melanin in the skin, hair and eyes?

(a) Albinism (b) Down syndrome

(c) Cystic fibrosis (d) Muscular dystrophy

42. Which of the following is not a component of a nucleotide in DNA

(a) Phosphate group (b) Deoxyribose sugar

(c) Uracil (d) Nitrogenous base

43. The colour of urineis primarily due to the presnece of

(a) Blood cells (b) Bile (c) Urochrome (d) Melanin

44. What hormones regulates the water reabsorption in the kidneys ?

(a) Insulin (b) Thyroxine (c) Aldosterone (d) Estrogen

45. Humans have two different sex chromosomes X and Y. Based on Mendel's laws, a male offspring will inherit which combination of chromosomes ?

(a) Both the X chromosome, from one of its parents

(b) Both the Y chromosome, from one of its parents

(c) A combination of X chromosomes from either of its parents

(d) A combination of X and Y chromosomes from either of its parents

MATHEMATICS

46. If p is prime, then HCF and LCM of p and p + 1 would be

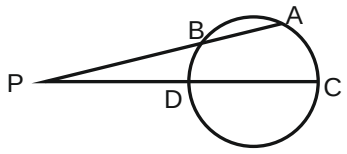
(a) HCF = p, LCM = p + 1 (b) HCF = 1, LCM = p(p + 1)

(c) HCF = p(p + 1), LCM = 1 (d) None of these

47. If $x = r\sin\alpha, \cos\beta, y = r\sin\alpha.\sin\beta$ and $z = r.\cos\alpha$, then
(a) $x^2 + y^2 + z^2 = r^2$ (b) $x^2 - y^2 + z^2 = r^2$
(c) $x^2 + y^2 - z^2 = r^2$ (d) $x^2 + y^2 - z^2 = r^2$

48. The points (a, b), (a_1, b_1) and $(a - a_1, b - b_1)$ are adlinear if
(a) $ab = a_1b_1$ (b) $ab_1 = a_1b$
(c) $a = b$ (d) $a_1 = b_1$

49. In the given fig., if PA = 8cm, PD = 4cm, CD = 3cm then AB is



(a) 3 cm (b) 3.5 cm (c) 4 cm (d) 4.5 cm

50. If α, β are the roots of equation $x^2 - 5x + 4 = 0$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$
(a) $\frac{27}{4}$ (b) $\frac{-37}{4}$ (c) $\frac{37}{4}$ (d) $\frac{-27}{4}$

51. If n is any natural number, then $9^n - 5^n$ ends with
(a) 3 (b) 6 (c) 5 (d) 8

52. When 2^{256} is divided by 17, the remainder would be
(a) 1 (b) 16 (c) 14 (d) None of these

53. The least number which is a perfect square and is divisible by each of 16, 20 and 24 is
(a) 240 (b) 1600 (c) 2400 (d) 3600

54. If $7\sin^2\theta + 3\cos^2\theta = 4$, then $\sec\theta + \text{cosec}\theta$ is equal to
(a) $\frac{2}{\sqrt{3}} - 2$ (b) $\frac{2}{\sqrt{3}} + 2$ (c) $\frac{2}{\sqrt{3}}$ (d) None of these

55. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, then $m^2 - n^2$ is equal to
(a) $\sqrt{mn}$ (b) $\sqrt{\frac{m}{n}}$ (c) $4\sqrt{mn}$ (d) None of these

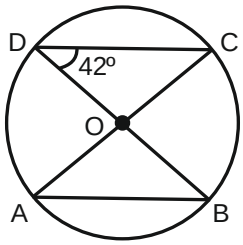
56. If $\sin\theta = 1/2$ and θ is acute, then $(3\cos\theta - 4\cos^3\theta)$ is equal to
(a) 0 (b) 1/2 (c) 1/6 (d) -1

57. The points A(-4, -1), B(-2, -4), C(4, 0) and D(2, 3) are the vertices of a
(a) praallelogram (b) rhombus
(c) rectangle (d) square

58. The distance between the points $(a\cos\theta + b\sin\theta, 0)$ and $(0, a\sin\theta - b\cos\theta)$ is
(a) $a^2 + b^2$ (b) $a + b$
(c) $a^2 - b^2$ (d) $\sqrt{a^2 + b^2}$

59. y-axis divides the join of P(-4, 2) and Q(8, 3) in the ratio
(a) 3 : 1 (b) 1 : 3 (c) 2 : 1 (d) 1 : 2

60. In the given circle, O is centre and $\angle BDC = 42^o$, the $\angle ACB$ is equal to



(a) 42^o (b) 45^o (c) 48^o (d) 60^o

61. Three wires of length l_1, l_2, l_3 form a triangle surmounted by another circular wire, if l_3 is the diameter and l_3 and $2l_1$, then the angle between l_1 and l_3 will be

(a) 30^o (b) 60^o (c) 45^o (d) 90^o

62. A chord of a circle is 12 cm in length and its distance from the centre is 8 cm, the length of the chord of the same circle which is at a distance of 6 cm from the centre is

(a) 30 cm (b) 24 cm (c) 16 cm (d) 18 cm

63. If $ax^2 + bx + c = 0$ has equal roots, then c =

(a) $\frac{-b}{2a}$ (b) $\frac{b}{2a}$ (c) $\frac{-b^2}{4a}$ (d) $\frac{b^2}{4a}$

64. The value of $\sqrt{6+\sqrt{6+\sqrt{6+.....}}}$ is

(a) 4 (b) 3 (c) -2 (d) 3.5

65. An integer when added to its square equals 182. The negative integer is

(a) -15 (b) -14 (c) -13 (d) None of these

MENTAL ABILITY

66. One morning after sunrise, sam was standing facing a pole. The shadow of the pole fell exactly to his right. To which direction was he facing ?

(a) East (b) West (c) South (d) None of above

67. Anne travel 35m towards the west, takes a right turn and travel 50 km more. Next, she takes another right turn and travel 35 km in that direction. How far is she now from her original position ?

(a) 75 km (b) 30 km (c) 35 km (d) 50 km

68. Amir was born on feb 29th of 2012 which was a wednesday. If he live to be 101 years old. How many birthday would he celebrate on wednesday

(a) 3 (b) 4 (c) 5 (d) 1

69. How does the reflection of SJR9PZE7C18 look like in the water ?

(a)  (b) 

(c)  (d) 

70. If REASON is coded as 5 and BELIEVED as 7, then what is the code for GOVERNMENT?

(a) 9 (b) 10 (c) 5 (d) 3

71. If the English letters A to Z are written in a reverse order then what is the fourth letter to the right of 12th letter from the left ?
(a) K (b) R (c) J (d) L

72. A is B's sister. C is B's mother. D is C's father. E is D's mother. Then, how is A related to D?
(a) Grandfather (b) Grandmother (c) Daughter (d) Grand daughter

73. Pointing to lady, a man said, "The son of her only brother is the borther of my wife". How is the lady related to the man ?
(a) Mother's sister (b) Grandmother
(c) Mother-in-law (d) Sister of father in-law

74. There are six persons A, B, C, D, E and F. C is the sister of F.B is the brother of E's husband. D is the father of A and grandfather of F. There are two fathers, three brothers and a mother in a group. Who is the mother ?
(a) A (b) B (c) D (d) F

75. Kim ranked 9th from the top and 38th from the bottom in a class. How many students are there in a class ?
(a) 45 (b) 46 (c) 47 (d) 48

76. Today is Thursday. The day after 59 days will be_____
(a) Sunday (b) Monday (c) Friday (d) Tuesday

77. Antonio goes to market which is towards East from his house, if he has to go 1st left then right from the market, in which direction will he move ?
(a) 1st south and then west (b) 1st south and then west
(c) 1st north and then east (d) None of these

78. A clock is placed that at 12 noon its minute hand points towards north-east. In which direction does its hour hand point at 1:30 pm ?
(a) West (b) South (c) East (d) North

79. Find the missing alphabet in the given sequence ?
A, Z, Y, B, C, ?, W, D
(a) E (b) F (c) Z (d) X

80. C U B A E D E D A B E B A U C D B C A D B D U B C A C B E D A
If all the A's are dropeed from the above arrangements, which of the following will be eleventh from the left end of the above arrangements ?
(a) E (b) U (c) C (d) D

ANSWER KEY

PHSICS

1.	(C)
2.	(C)
3.	(B)
4.	(A)
5.	(D)
6.	(C)
7.	(A)
8.	(B)
9.	(A)
10.	(B)
11.	(A)
12.	(A)
13.	(D)
14.	(D)
15.	(C)

CHEMISTRY

16.	(C)
17.	(C)
18.	(C)
19.	(C)
20.	(D)
21.	(C)
22.	(C)
23.	(D)
24.	(D)
25.	(A)
26.	(A)
27.	(D)
28.	(C)
29.	(D)
30.	(B)

BIOLOGY

31.	(B)
32.	(B)
33.	(D)
34.	(D)
35.	(C)
36.	(A)
37.	(A)
38.	(D)
39.	(D)
40.	(B)
41.	()
42.	(C)
43.	(C)
44.	(C)
45.	(D)

MATHEMATICS

31.	(C)
32.	(A)
33.	(B)
34.	(D)
35.	(D)
36.	(B)
37.	(A)
38.	(D)
39.	(B)
40.	(C)
41.	(A)
42.	(B)
43.	(D)
44.	(D)
45.	(C)
46.	(C)
47.	(C)
48.	(D)
49.	(B)
50.	(B)

MENTAL ABILITY

66.	(C)
67.	(D)
68.	(B)
69.	(D)
70.	(A)
71.	(A)
72.	(D)
73.	(D)
74.	(D)
75.	(B)
76.	(A)
77.	(C)
78.	(A)
79.	(D)
80.	(B)