





**PART – I: IQ****SECTION A****Single Correct Choice Type**

Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

**Direction Questions 1-2:** In the following questions, four items (numbers / number pairs / letter groups) are given. Three of them are a like in a certain way and one is different. Find the odd one out from the alternative.

1. (A) 242 (B) 80  
(C) 25 (D) 728
2. (A) EBD (B) IFH  
(C) QMO (D) YVX

**Direction Questions 3-4:** In the following Questions, there is a relationship between two figures on the left of the sign (:). The same relationship exists between the figures to the right of the sign (: :) of which one is missing. Find the missing one from the alternatives.

3. 49 : 21 :: 169 : ?  
(A) 26 (B) 39  
(C) 42 (D) 13
4. CEGI : WUSQ :: DFHJ : ?  
(A) WUSQ (B) VTRP  
(C) XVTR (D) USQO
5. x \_ y y z \_ x x y \_ z z x \_ y y z z  
(A) y x z y (B) x z y x  
(C) x y y x (D) z x y x
6. If the word TRIPPLE is coded as DMOQHSS, how the word VICTORY will be coded?  
(A) UJBUNSX (B) WHDSPQZ  
(C) XSNUBJU (D) ZXPSDHW
7. If train is called bus, bus is called tractor, tractor is called car, car is called scooter, scooter is called bicycle and bicycle is called aeroplane then which is used to plough a field?  
(A) Train (B) Bus  
(C) Car (D) Tractor
8. Pointing to a man in a photograph, Reena and, "His brother's father is the only son of my grandfather." How is Reena related to the man in photograph?  
(A) Mother (B) Grand Daughter  
(C) Sister (D) Daughter
9. A monkey climbs 30 feet at the beginning of each hour and rests for a while when he slips back 20 feet before he again starts climbing the beginning of the next hour. If he begins his ascent at 8.00 am, at what time will he first touch a flag at 120 feet from the ground?  
(A) 4 pm (B) 5 pm  
(C) 6 pm (D) 3 pm

SPACE FOR ROUGH WORK

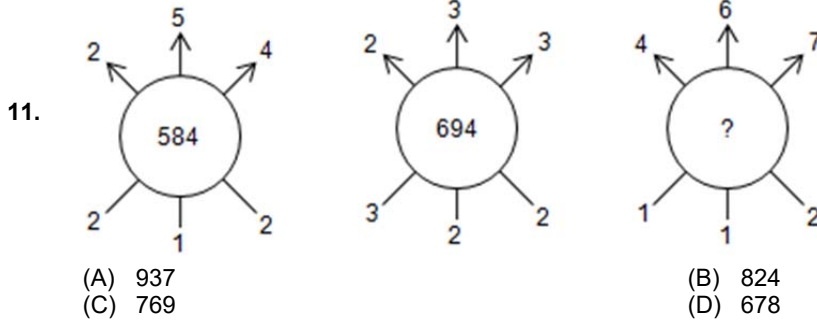
**Direction Questions 10-11:** Find the missing character / number in each of the following questions:

10.

2	4	0
1	2	4
3	1	3
36	?	91

- (A) 25  
(C) 59

- (B) 48  
(D) 73



**Direction Questions 12-14:** In the following questions, which of the interchange of sign/signs would make the equations correct?

12.  $5 + 3 \times 8 - 12 \div 4 = 3$

- (A) + & -  
(C)  $\times$  & +

- (B) - &  $\div$   
(D) + &  $\div$

13.  $12 \div 2 - 6 \times 3 + 8 = 16$

- (A)  $\div$  & +  
(C)  $\times$  & +

- (B) - & +  
(D)  $\div$  &  $\times$

14. If '+' stands for multiplication, '-' stands for division, 'X' stands for subtraction and ' $\div$ ' stands for addition then

$$\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 \div 1}$$

- (A) 0  
(C) 12

- (B) 8  
(D) 16

15. In one of the following sequences, the number of letters skipped between its adjacent letters increases by one. Identify the sequence

- (A) KMPTY  
(C) HJMQT

- (B) IJKOT  
(D) DFIJK

16. Arrange the given words in the sequence in which they occur in the English dictionary and then choose the correct sequence.

- (A) Select  
(E) Seller  
(A) A, B, D, E, C  
(C) B, A, D, E, C

(B) Seldom

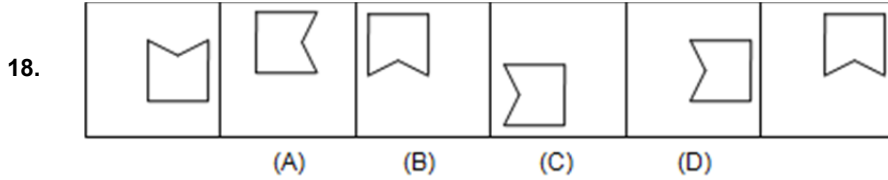
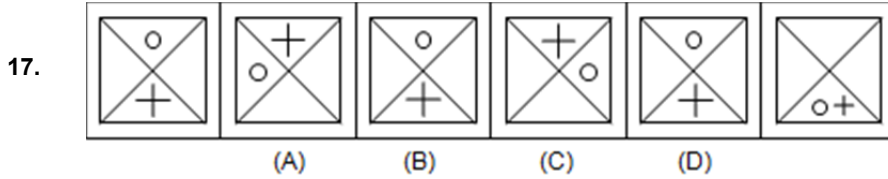
(C) Send

(D) Selfish

- (B) B, A, E, D, C  
(D) B, E, D, A, E

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**Direction Questions 17-18:** In the following questions, find the one that does not fit into the series established by the six figures given.



**Direction Questions 19-22:** To answer the questions, read the information carefully:

The six members of a family A, B, C, D, E and F are travelling together. B is the son of C but C is not the mother of B. A and C are married Couple. E is the brother of C. D is the daughter of A. F is the brother of B.

19. How many male members are there in family?  
 (A) 1 (B) 2  
 (C) 3 (D) 4
20. Who is the mother of B?  
 (A) D (B) F  
 (C) E (D) A
21. How many children does A have?  
 (A) One (B) Two  
 (C) Three (D) Four
22. Which of the following is a pair of females?  
 (A) AE (B) BD  
 (C) DF (D) AD

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**Direction Questions 23-26:** Study the given information carefully and answer the questions given below:

- (i) A, B, C, D, E, F and G are sitting on wall and facing east.
- (ii) C is on the immediate right to D.
- (iii) B is at an extreme end and has E as his neighbour.
- (iv) G is between E and F.
- (v) D is sitting third from south end.

23. Who is sitting to the right of E?

- (A) A
- (B) C
- (C) D
- (D) G

24. Which of the following pairs of people is sitting at the extreme ends?

- (A) AB
- (B) AE
- (C) CB
- (D) FB

25. Name the person who should change the place with C such that he gets the third place from north end:

- (A) E
- (B) F
- (C) G
- (D) D

26. Immediately between which of the following pairs of people is D sitting?

- (A) AC
- (B) AF
- (C) CE
- (D) CF

**Direction Questions 27-30:** Read the information carefully and answer the questions given below:

- (i) Seven students P, Q, R, S, T, U and V take a series of tests.
- (ii) No two students get similar marks.
- (iii) V always scores more than P.
- (iv) P always scores more than Q.
- (v) Each time either R scores the highest and T gets least, or alternatively S scores highest and U or Q scores least.

27. If S is ranked sixth and Q is ranked fifth, which of the following can be true?

- (A) V is ranked first or fourth
- (B) R is ranked second or third
- (C) P is ranked second or fifth
- (D) U is ranked third or fourth

28. If R is ranked second and Q is ranked fifth, which of the following must be true?

- (A) S is ranked third
- (B) T is ranked sixth
- (C) P is ranked sixth
- (D) V is ranked fourth

29. If S is ranked second, which of the following can be true?

- (A) U gets more than V
- (B) V gets more than S
- (C) P gets more than R
- (D) P gets more than V

30. If V is ranked fifth, which of the following must be true?

- (A) S scored the highest
- (B) R is ranked second
- (C) T is ranked third
- (D) Q is ranked fourth

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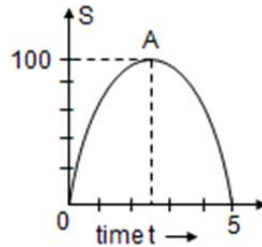
## PART – II: Science

### SECTION A

### PHYSICS

Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

31. The unit of impulse is the same as that of:  
 (A) energy (B) force  
 (C) angular momentum (D) linear momentum
32. A wooden block is dropped from the top of a cliff 100 m high and simultaneously a bullet of mass 10 g is fired from the foot of the cliff upwards with a velocity of 100 m/s. The bullet and wooden block will meet each other after a time:  
 (A) 10 s (B) 0.5 s  
 (C) 1 s (D) 7 s
33. A ball is released from the top of height  $h$  metre. It takes  $T$  second to reach the ground. Where is the ball at the time  $T/2$  sec?  
 (A) At  $(h/4)m$  from the ground (B) At  $(h/2)$  m from the ground  
 (C) At  $(3h/4)m$  from the ground (D) Depends upon the mass and volume of the ball
34. The figure shows the displacement time graph of a body subjected to the force of gravity alone. This graph indicates that:

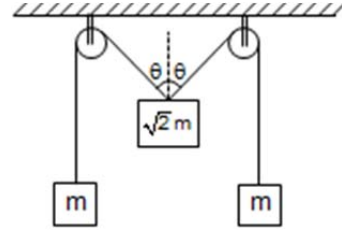


- (A) at A, acceleration = 0 (B) at A, velocity = maximum  
 (C) at A, displacement = 0 (D) the acceleration is constant at all the time
35. A cannon balls has the same range  $R$  on a horizontal plane for two angles of projection. If  $h_1$  and  $h_2$  are the greatest heights in the two paths for which this is possible, then:  
 (A)  $R = h_1 h_2$  (B)  $R = 4\sqrt{h_1 h_2}$   
 (C)  $R = \sqrt[3]{h_1 h_2}$  (D)  $R(h_1 h_2)^{1/4}$

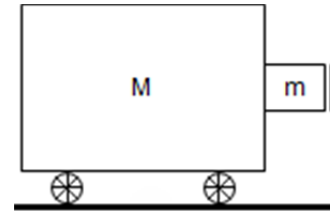
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36. Engine of a train that is moving with uniform acceleration passes a pole with speed 'u' while the last compartment passes the pole with speed 'v'. The middle point of the train passes the given pole with speed:
- (A)  $\frac{v-u}{2}$  (B)  $\frac{u-v}{2}$   
 (C)  $\sqrt{v^2 - u^2}$  (D)  $\sqrt{\frac{v^2 + u^2}{2}}$

37. The pulleys and strings shown in the figure are smooth and of negligible mass. For the system to remain in equilibrium, the angle  $\theta$  should be:
- (A)  $0^\circ$   
 (B)  $30^\circ$   
 (C)  $45^\circ$   
 (D)  $60^\circ$



38. A cart of mass M has a block of mass m attached to it as shown in the figure. The coefficient of friction between the block and cart is  $\mu$ . The minimum acceleration of the cart so that the block m does not fall is:
- (A)  $\frac{g}{\mu}$  (B)  $\frac{\mu}{g}$   
 (C)  $\mu g$  (D)  $\frac{M\mu g}{m}$



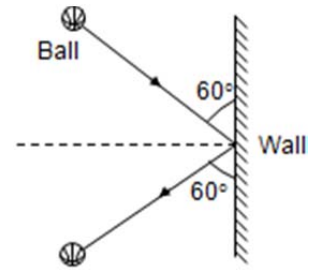
39. A block B is pushed momentarily along a horizontal surface with an initial velocity v, if  $\mu$  is the coefficient of sliding friction between B and the surface, block B will come to rest after a time:
- (A)  $\frac{v}{g\mu}$  (B)  $\frac{g\mu}{v}$   
 (C)  $\frac{g}{v}$  (D)  $\frac{v}{g}$



SPACE FOR ROUGH WORK



40. A ball of mass 3kg, moving with a speed of 100 m/s, strikes horizontally a wall at an angle  $60^\circ$  as shown. The ball rebounded at the same speed and remains in contact with the wall for 0.2 sec. The force exerted by the ball on the wall is: (Take  $g = 10 \text{ m/s}^2$ )



- (A)  $1500\sqrt{3}\text{N}$   
 (B) 1500 N  
 (C)  $300\sqrt{3}\text{N}$   
 (D) 300 N

41. The escape velocity of a particle of mass  $m$  varies as:

- (A)  $m^2$  (B)  $m$   
 (C)  $m^0$  (D)  $m^{-1}$

42. The escape velocity of a body projected vertically upwards from the earth's surface is 11.2 km/sec. If the body is projected in a direction making  $30^\circ$  angle to the vertical, its escape velocity in this case will be:

- (A) 11.2 km/s (B)  $11.2 \times (1/2)\text{ km/s}$   
 (C)  $11.2 \times (\sqrt{3}/2)\text{ km/s}$  (D)  $11.2 \times (1/3)\text{ km/s}$

43. The mean radius of the earth is  $R$ , its angular speed about its own axis is  $\omega$  and the acceleration due to gravity at earth surface is  $g$ . The cube of radius of orbit of a 'geostationary satellite' will be:

- (A)  $(R^2g/\omega)$  (B)  $(R^2\omega/g)$   
 (C)  $(Rg/\omega^2)$  (D)  $(R^2g/\omega^2)$

SPACE FOR ROUGH WORK

## SECTION B

## CHEMISTRY

Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

44. A pure substance which contains only one type of atoms is called  
 (A) an element (B) a compound  
 (C) a solid (D) a liquid
45. Atomic mass of an element is not a whole number because  
 (A) it contains electrons, protons and neutrons. (B) it contains isotopes.  
 (C) it contains allotropes (D) all the above
46. One part of an element A combines with two parts of B (another element). Six parts of element C combine with four parts of element B. If A and C combine together, the ratio of their masses will be governed by  
 (A) Law of definite proportion (B) Law of multiple proportion  
 (C) Law of reciprocal proportion (D) Law of conservation of mass
47. The pressure of a system at the boiling point of a liquid is  
 (A) equal to external pressure (B) > 1 atmosphere  
 (C) <1 atmosphere (D) Can't be related
48. Two volumes of ammonia on dissociation gave one volume of nitrogen and three volume of hydrogen. How much hydrogen will be obtained from the dissociation of 10 litre of  $\text{NH}_3$  ?  
 $2\text{NH}_3 \rightarrow \text{N}_2 + 3\text{H}_2$   
 (A) 30 litre (B) 10 litre  
 (C) 15 litre (D) 20 litre
49. A mixture of kerosene and water can be separated by  
 (A) distillation (B) separating funnel  
 (C) evaporation (D) filtration
50. Naphthalene balls disappear with time without leaving behind any residue. This is because of the following phenomenon  
 (A) evaporation (B) sublimation  
 (C) condensation (D) vaporization

SPACE FOR ROUGH WORK

51. The increasing order of force of attraction between the particles of water, helium, diamond will be  
(A) Water < Diamond < Helium (B) Water = Diamond = Helium  
(C) Helium < Diamond < Water (D) Helium < Water < Diamond
52. A gaseous mixture contains oxygen and nitrogen in the ratio of 1 : 4 by mass. Therefore the ratio of their molecules is  
(A) 1 : 4 (B) 1 : 8  
(C) 7 : 32 (D) 3 : 16
53. A simplest formula of a compound 50% of element X (At. Mass = 10) and 50% of the element Y (At. Mass = 20) is  
(A) XY (B) X<sub>2</sub>Y  
(C) XY<sub>2</sub> (D) X<sub>2</sub>Y<sub>2</sub>
54. Calcium pyrophosphate is represented by the formula Ca<sub>2</sub>P<sub>2</sub>O<sub>7</sub>. The molecular formula of ferric pyrophosphate is  
(A) Fe<sub>2</sub>P<sub>2</sub>O<sub>7</sub> (B) Fe<sub>2</sub>P<sub>2</sub>O<sub>7</sub>  
(C) Fe(P<sub>2</sub>O<sub>7</sub>)<sub>3</sub> (D) Fe<sub>4</sub>(P<sub>2</sub>O<sub>7</sub>)<sub>3</sub>
55. Which one of the following is not a mixture?  
(A) Distilled water (B) Milk  
(C) Liquefied petroleum gas (LPG) (D) Blood
56. Atoms may be regarded as comprising of protons, neutrons and electrons. If the mass attributed by electrons was doubled, the atomic mass of <sup>12</sup>C would be  
(A) approximately the same (B) doubled  
(C) reduced approx 25% (D) approx halved

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**SECTION C****BIOLOGY**

Each question has 4 choices (A), (B) (C) and (D) for its answer, out of which **ONLY ONE** is correct.

57. The main organelle involved in modification and routing of newly synthesized proteins to their destination is  
(A) Chloroplast (B) Mitochondrion  
(C) Golgi complex (D) Lysosomes
58. Select the **incorrect** statement  
(A) Lysosomes are double membrane vesicles budded off from Golgi apparatus and contain digestive enzymes.  
(B) Endoplasmic reticulum consists of a network of membranous tubules and helps in synthesis, transport and secretion  
(C) Leucoplasts are bounded by two membranes, lack pigment but contain their own DNA.  
(D) All the above stated statements are incorrect.
59. Blood does not contains  
(A) erythrocytes (B) Leucocytes  
(C) thrombocytes (D) osteocytes
60. Which among the following are non living?  
(i) Sieve tubes (ii) Tracheids  
(iii) Sclerenchyma (iv) Companion  
(A) i and iv (B) i and ii  
(C) ii and iii (D) iii and iv

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## PART – III: Mathematics

### SECTION A

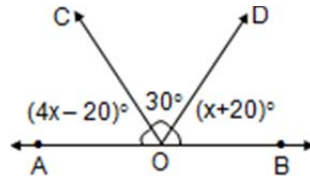
### Single Correct Choice Type

Each question has 4 choices (A), (B), (C) and (D) for its answer, out of which **ONLY ONE** is correct.

61. Which of the following is a impure surd?  
 (A)  $\sqrt{10}$  (B)  $\sqrt{8}$   
 (C)  $\sqrt[3]{7}$  (D)  $5\sqrt[3]{16}$
62. The p/q form of  $15.7\overline{12}$   
 (A)  $\frac{1087}{66}$  (B)  $\frac{1087}{33}$   
 (C)  $\frac{1037}{66}$  (D)  $\frac{1037}{33}$
63.  $(6 + \sqrt{6})(6 - \sqrt{6})$  is a  
 (A) Rational number (B) Irrational number  
 (C) Prime number (D) Odd number
64. Characteristics part of 433.529 is  
 (A) 2 (B) 0  
 (C) -1 (D) -3
65. The value of  $\log_{0.2} 625$   
 (A) 3 (B) -3  
 (C) 4 (D) -4
66. If  $x = \frac{1}{2}$  then the value of  $x + \frac{1}{1 + \frac{1}{1 + \frac{1}{x}}}$   
 (A)  $\frac{5}{4}$  (B)  $\frac{4}{5}$   
 (C)  $\frac{3}{4}$  (D)  $\frac{4}{3}$

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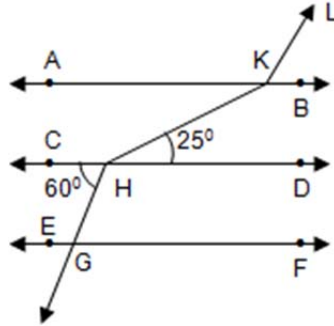
67. If 2356A23 is divisible by 9 then the value of A is  
 (A) 6 (B) 4  
 (C) 3 (D) 1
68. If  $\log_4 x + \log_2 x = 6$  find  $x = ?$   
 (A) 8 (B) 16  
 (C) 32 (D) 24
69. The value of  $\sqrt{3-2\sqrt{2}}$  is  
 (A)  $\sqrt{2}-1$  (B)  $1-\sqrt{2}$   
 (C)  $\sqrt{2}+1$  (D) none of these
70. If  $\triangle ABC$  and  $\triangle DEF$  are congruent triangles and  $\angle BAC = 47^\circ$  and  $\angle DEF = 83^\circ$  then  $\angle C$  is  
 (A)  $50^\circ$  (B)  $70^\circ$   
 (C)  $60^\circ$  (D)  $80^\circ$
71.  $AB = 8\text{ cm}$ ,  $BC = 12\text{ cm}$  and  $\angle ABC = 150^\circ$  then area of  $\triangle ABC$  is  
 (A)  $16\text{ cm}^2$  (B)  $24\text{ cm}^2$   
 (C)  $32\text{ cm}^2$  (D)  $12\text{ cm}^2$
72. In the given figure, AOB is a straight line. If  $\angle AOC = (4x - 20)^\circ$ ,  $\angle COD = 30^\circ$  and  $\angle BOD = (x + 20)^\circ$ , then  $\angle AOC = ?$



- (A) 30 (B) 40  
 (C) 100 (D) 60

SPACE FOR ROUGH WORK

73. Find the unit digit of  $(3)^{81}$   
 (A) 1 (B) 7  
 (C) 3 (D) 9
74. If  $x^2 - 1$  is a factor of  $x^4 + ax^3 + 3x - b$  then  
 (A)  $a = 3, b = -1$  (B)  $a = -3, b = 1$   
 (C)  $a = 3, b = 1$  (D) none of these
75. In the figure  $AB \parallel CD \parallel EF$  and  $GH \parallel KL$  then  $\angle HKL =$



- (A)  $145^\circ$  (B)  $135^\circ$   
 (C)  $110^\circ$  (D) none of these
76.  $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots \infty}}} =$   
 (A) 3 (B) 2  
 (C) 1 (D)  $\pm 3$
77. Three points  $A(1, -2), B(3, 4) C(4, 7)$  form  
 (A) Straight line (B) an equilateral triangle  
 (C) A right angled triangle (D) none of these
78. If  $a, b$  and  $c$  are the sides of a triangle and  $a^2 + b^2 + c^2 = ab + bc + ca$ , then the triangle is  
 (A) Equilateral (B) Isosceles  
 (C) Right angled (D) Obtuse- angled

SPACE FOR ROUGH WORK

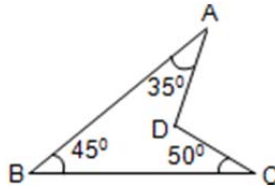
79. Find the value of  $\sqrt{\sqrt{(3+2\sqrt{2})} + \sqrt{11-6\sqrt{2}}}$
- (A) 1 (B) 2  
(C) 3 (D) 4
80. The degree of the polynomial
- $$\frac{x + x^2 + x^3 + x^4 + x^5 + x^6 + x^7}{x^{-2} + x^{-3} + x^{-4} + x^{-5} + x^{-6} + x^{-7} + x^{-8}}$$
- (A) 8 (B) 2  
(C) 9 (D) 7
81. If  $a^2 + 4b^2 = 9ab$  ( $a > 0, b > 0$ ), then  $\log(a+2b)$  is
- (A)  $\frac{1}{2}[\log 13 - \log a + \log b]$  (B)  $\frac{1}{2}[\log 13 + \log a + \log b]$   
(C)  $\frac{1}{2}\left[\log \frac{a}{2} + \log \frac{b}{2} + \log 13\right]$  (D) none of these
82. The remainder when  $x^3 - 3x^2 + 2x + 1$  is divided by  $x-3$
- (A) 4 (B) 3  
(C) 7 (D) 5
83. The point where the graph of  $f(x) = x^3 - 9x^2 + 26x - 24$  . Cross the x-axis is
- (A) (2, 0) (B) (5, 0)  
(C) (7, 0) (D) (6, 0)
84. If  $abc$  is a three digit number then  $(abc + bca + cab)$  is always divisible by
- (A) 31 (B) 7  
(C) 9 (D) 37
85.  $\frac{14}{3-\sqrt{2}} = a + b\sqrt{2}$ , then, find the value of  $a^3 - b^3$
- (A) 216 (B) 8  
(C) 108 (D) 208

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86. Find  $\angle ADC$

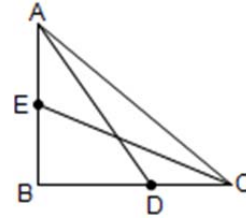
- (A)  $130^\circ$
- (B)  $150^\circ$
- (C)  $120^\circ$
- (D)  $160^\circ$



87. In figure, E and D are mid points of AB and BC respectively. Also

$\angle B = 90^\circ$ ,  $AD = \sqrt{292}$  and  $CE = \sqrt{208}$  find AC

- (A) 15
- (B) 18
- (C) 20
- (D) 24



88. Which point does not lie in any quadrant?

- (A) (3, 6)
- (B) (-3, 14)
- (C) (5, 7)
- (D) (0, 3)

89. The straight line  $3x - y + 5 = 0$  intersects y-axis at

- (A)  $\left(\frac{5}{3}, 0\right)$
- (B)  $\left(0, \frac{5}{3}\right)$
- (C) (0, 3)
- (D) (0, 5)

90. The inradius of an equilateral triangle is of length 3cm. Then find out the length of each median

- (A) 12 cm
- (B)  $\frac{9}{2}$  cm
- (C) 4 cm
- (D) 9 cm

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