Aakash

Medical | IIT-JEE | Foundations

(Divisions of Aakash Educational Services Limited)

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Answers & Solutions

for

NTSE (Stage-I) 2019-20

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you open the question booklet.

1. Use blue/black ballpoint pen only. There is no negative marking.

2. Part I : MAT : 1 - 100 questions

    Part II : SAT : 1 - 100 questions

3. This test booklet contains 200 questions of one mark each. All the questions are compulsory.

4. Answer each question by darkening the one correct alternative among the four choices on the OMR SHEET with blue/black ballpoint pen.

    Example :

	Q. No.	Alternatives
Correct way :	1	Ⓐ Ⓑ ● Ⓓ
	Q. No.	Alternatives
Wrong way :	1	⊗ Ⓑ̶ Ⓒ Ⓓ

    Student must darkening the right circle only after ensuring correct answer on OMR Sheet.

5. Students are not allowed to scratch / alter / change out an answer once marked on OMR Sheet, by using white fluid / eraser / blade / tearing / wearing or in any other form.

6. Separate sheet has been provided for rough work in this test booklet.

7. Please handover the OMR Sheet to the invigilator before leaving the Examination Hall.

8. Darken completely the circles of your answer on OMR Sheet in the time limit allotted for that particular paper.

9. Your OMR Sheet will be evaluated through electronic scanning process. Incomplete and incorrect entries may render your OMR Sheet invalid.

10. Use of electronic gadgets, calculator, mobile etc., is strictly prohibited.

PART-I : MENTAL ABILITY TEST (MAT)

Directions: (Question 1 to 10) In the following questions there is a relationship between the two words/ letters/ numbers and figures given to the left of the proportionality (: :) sign. The same relationship exists between the words/letters numbers/figures given to the right of the sign (: :) of which one is missing. Choose the missing one from the given alternatives.

1. Sculptor : Statue :: Poet :?

   (A) Canvas   (B) Pen

   (C) Poem   (D) Chisel

Answer (C)

2. ABCD : NPRT :: FGHI : ?

   (A) RTUW   (B) KLMN

   (C) SUWY   (D) OQST

Answer (C)

Sol.

1	2	3	4		14	16	18	20
A	B	C	D		N	P	R	T
6	7	8	9	→	19	21	23	25
F	G	H	I		S	U	W	Y

3. 24 : 126 :: 48 : ?

   (A) 433   (B) 192

   (C) 240   (D) 344

Answer (D)

Sol. $5^2 - 1 = 24$ $5^3 + 1 = 126$

$7^2 - 1 = 48$ $7^3 + 1 = 344$

4. Food : Menu :: Books : ?

   (A) Almirah   (B) Newspaper

   (C) Library   (D) Catalogue

Answer (D)

5. 9 : 50 :: ? : 105

   (A) 22   (B) 18

   (C) 15   (D) 20

Answer (D)

Sol. $9 \times 5 + 5 = 50$

$20 \times 5 + 5 = 105$

6. Ocean : Pacific :: Island : ?

   (A) Greenland   (B) Ireland
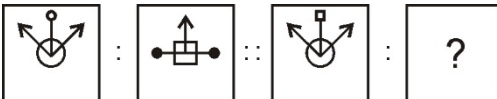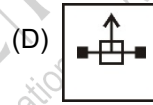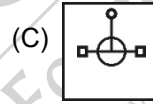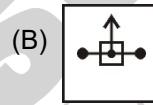
   (C) Netherland   (D) Borneo

Answer (A)
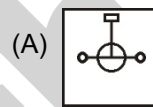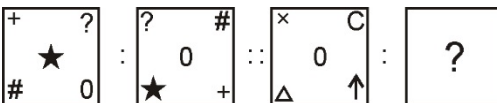
7. 9 : 24 :: ? : 6

   (A) 1   (B) 2

   (C) 5   (D) 3

Answer (D)

8. ASTN : ZTSO :: MSUB : ?

   (A) LRRC   (B) LTTA

   (C) NTVC   (D) LTTC
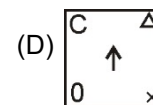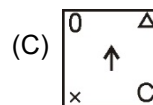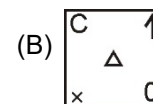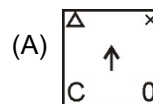
Answer (D)

9.

Answer (D)

10.

Answer (D)

Directions: (Question 11 to 18) In the following questions numbers/letters/figures are arranged in a sequence on the basis of some logic. Find out the logic and select the correct answer and fill in the missing term/figure from the given alternatives.

11. W-144, ?, S-100, Q-81, O-64

   (A) U-121   (B) U-122

   (C) V-121   (D) V-128

Answer (A)

Sol. W − 23 $\left(\dfrac{23+1}{2}\right)^2 = 144$

U − 21 $\left(\dfrac{21+1}{2}\right)^2 = 121$

S − 19 $\left(\dfrac{19+1}{2}\right)^2 = 100$

Q − 17 $\left(\dfrac{17+1}{2}\right)^2 = 81$

12. DHL, PTX, BFJ, ?

(A) CGK   (B) KOS

(C) NRV   (D) RVZ

Answer (C)

Sol. DHL $\xrightarrow{+12}$ PTX $\xrightarrow{+12}$ BFJ $\xrightarrow{+12}$ NRV

13. 1, 6, 15, ?, 45, 66, 91

(A) 25   (B) 26

(C) 27   (D) 28

Answer (D)

Sol. 1 $\xrightarrow{+5}$ 6 $\xrightarrow{+9}$ 15 $\xrightarrow{+13}$ 28 $\xrightarrow{+17}$ 45 $\xrightarrow{+21}$ 66 $\xrightarrow{+25}$ 91

14. 10000, 11000, 9900, 10890, 9801, ?

(A) 10929   (B) 10241

(C) 10423.3   (D) 10781.1

Answer (D)

Sol.
10000 11000 9900 10890 9801 10781

+1000   −1000   +990   −1089   +980

−10   −10

15. 1, 6, 21, 66, ?

(A) 250   (B) 201

(C) 310   (D) 308

Answer (B)

16. 13, 14, 30, 93, 376, 1885, ?
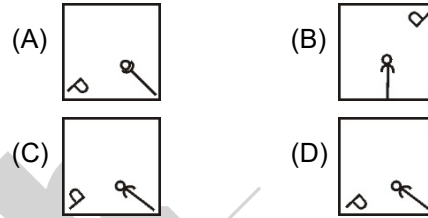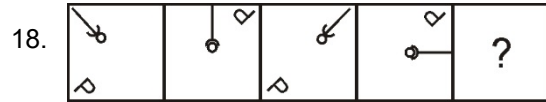
(A) 10818   (B) 10316

(C) 11316   (D) 11318

Answer (C)

Sol. 13 × 1 + 1 = 14

14 × 2 + 2 = 30

30 × 3 + 3 = 93

93 × 4 + 4 = 376

376 × 5 + 5 = 1885

1885 × 6 + 6 = 11316

17. 6, 42, 67, ?, 92, 96

(A) 77   (B) 82

(C) 70   (D) 83

Answer (D)

Sol. 6 $\xrightarrow{+6^2}$ 42 $\xrightarrow{+5^2}$ 67 $\xrightarrow{+4^2}$ 83 $\xrightarrow{+3^2}$ 92 $\xrightarrow{+2^2}$ 96

18.

(A)   (B)

(C)   (D)

Answer (D)

Directions: (Question 19 to 28) In the following questions four items are given. Find the odd item.

19. (A) SPQR   (B) MKLN

(C) WUVX   (D) FDEG

Answer (A)

20. (A) B Ꮸ   (B) C C
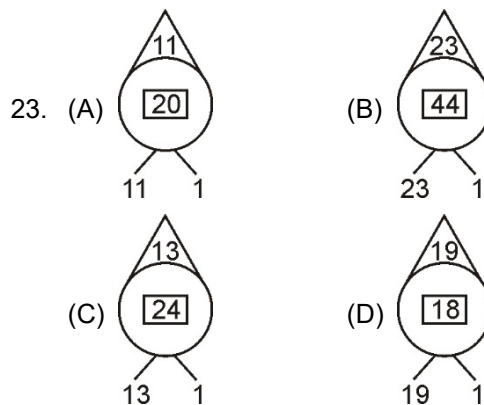
(C) A A   (D) K Ʞ

Answer (B)

21. (A) TWXZ   (B) ADEG

(C) EHIK   (D) LNOQ

Answer (D)

22. (A) Sodium   (B) Chlorine

(C) Glucose   (D) Nitrogen

Answer (C)

23. (A)   (B)

(C)   (D)

Answer (D)

Sol. 11 + 11 − 2 = 20

23 + 23 − 2 = 44

13 + 13 − 2 = 26

19 + 19 − 2 = 36

24. (A) Clove   (B) Black Pepper

(C) Cumin   (D) Groundnut

Answer (D)

25. (A) PLHD   (B) PKOJ

(C) TPLH   (D) UQMI

Answer (B)

26. (A) 3-28   (B) 4-64

(C) 7-343   (D) 6-216

Answer (A)
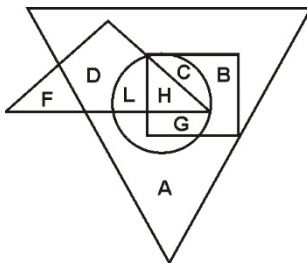
27. (A) 3   (B) 9

(C) 5   (D) 7

Answer (B)

Sol. 9 is not prime.

28. (A)

(B)

(C)

(D)

Answer (A)

Directions: (Question 29 to 33) Study the following diagram and answer the questions.

Here the big triangle represents artists, small triangle represents scientists, square represents dancers and circle represents doctors.

29. Which letter represents the artists who are dancer only?

(A) A   (B) B

(C) C   (D) H

Answer (B)

30. Which letters represent the artists who are neither scientists nor doctors?

(A) A and B   (B) A and L

(C) B and G   (D) L and H

Answer (A)

31. Which letters represent the artists who are dancers as well as doctors, but not scientist?

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

(C) C and D   (D) C and G

Answer (D)

32. Which letter represents the artists who are neither doctors nor scientists nor dancers?

(A) A   (B) B

(C) F   (D) G

Answer (A)

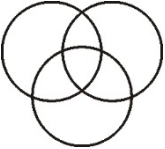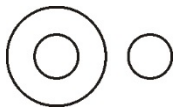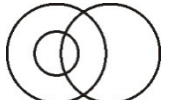33. Which letter represents the scientists who are not artists?
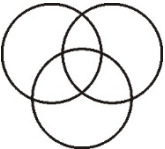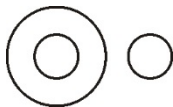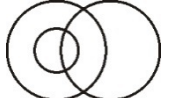
(A) A   (B) B

(C) F   (D) G

Answer (C)

Directions: (Question 34 to 35) In the following figures which figure best represents the relationship amongst the three classes?

34. Boys, Students, Sportsman

Answer (A)

35. Thief, Lawyer, Criminal

Answer (B)

36. A girl starts walking from her home, first she walks 30 meters in the North-West direction, then she walks 30 meters in the South-West direction. After this, she walks 30 meters in South-East direction. In the end, she turns towards her house. In which direction is she walking now?

    (A) South-East   (B) South-West

    (C) North-East   (D) North-West

Answer (C)

Sol.
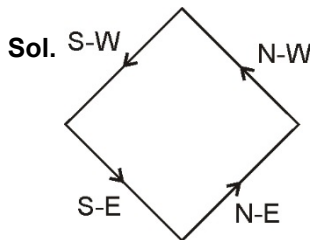
37. X is to the south-west of Y. L is to the east of X and south-east of Y. M is to the north of L and in a straight line with XY. In which direction of Y is M located?

    (A) South   (B) South-West

    (C) North   (D) North-East

Answer (D)

38. Neeta starts walking from point X and walks straight 5 km. towards west, then she turns left and walks straight 2 km. She again turns left and walks straight 7 km. ahead. In which direction is she from X now?

    (A) North - East   (B) South - West

    (C) South - East   (D) North - West

Answer (C)

39. If in a code language BEAT is written as YVZG, then how will MILD be written in the same language?

    (A) ONRW   (B) NOWR

    (C) ONWR   (D) NROW

Answer (D)

Sol. B E A T --------------------Y V Z G

   M I L D --------------------N R O W

40. A man is standing facing south. He turns 135° in the anti clockwise direction and then again at 180° in the clockwise direction. Which direction is he facing now?

    (A) North - East   (B) North - West

    (C) South - East   (D) South - West

Answer (D)

41. The letters of the English alphabet are arranged in reverse order i.e. Z = 1, Y = 2, ……B = 25, A = 26. Using the same order which of the following order denotes the name of a famous scientist?

    (A) 16-26-15-26-3

    (B) 11-6-9-22-18

    (C) 13-22-4-7-12-13

    (D) 22-18-13-8-1-22-13-22

Answer (C)

Sol. NEWTON

42. In a certain code REFRIGERATOR is coded as ROTAREGIRFER. Which word would be coded as NOITINUMMA in the same code language?

    (A) ANMOMIUTNI   (B) AMNTOMUIIN

    (C) AMMUNITION   (D) NMMUNITOA

Answer (C)

Sol. Alphabets are written in reverse order.

43. If in certain code language REFORM is written as 426349 and FORMULA is written as 6349871 then how will MULE be written in that same language?

    (A) 8792   (B) 7982

    (C) 9872   (D) 2978

Answer (C)

44. If in a code language 7 is coded as CBRT 343, then 9 will be coded as

    (A) CBRT 27   (B) SQRT 81

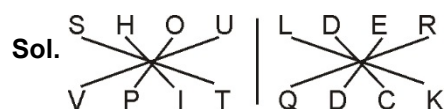   (C) CBRT 729   (D) CBRT 6561

Answer (C)

Sol. $7^3 = 343$

   $9^3 = 729$

45. If in a certain code language SHOULDER is written as VPITQDCK then how will MORNINGS be written in the same code language?

    (A) OSPNRFMH   (B) NPSORFMH

    (C) OSPNHMFR   (D) OSPNSFEM

Answer (A)

Sol.

46. If in a certain code language SOLID is written as WPSLPIMFHA, then ATEXXQIBVO is the code of which word in the same language?

    (A) WATER   (B) WAGER

    (C) EAGER   (D) WAFER

Answer (A)

47. Ravi is son of Aman's father's sister. Sahil is the son of Divya, who is the mother of Gaurav and Grandmother of Aman. Ashok is the father of Tanya and maternal grand father of Ravi. How is Divya related to Ashok?

    (A) Niece   (B) Sister

    (C) Wife   (D) Sister–in-law

Answer (C)

48. If in a certain code language the word LOYALITY is coded as B6 M2 E5 A0 D3 C6 J2 S6 then how will you code the word BOKARO?

    (A) A2 G8 K1 A0 I2 K5

    (B) A2 F9 K1 A0 B9 K4

    (C) A2 L3 K1 A0 I9 K4

    (D) A2 H7 K1 A0 D4 K4

Answer (B)

49. P is the only sister of M and N. B is the brother-in-law of M. None of the sons of W is married. W is the mother of N. W is married to Y. V, who is the wife of T, has a daughter W. How is B related to T?

    (A) Grandson

    (B) Son-in-law of daughter

    (C) Grand daughter

    (D) Son-in-law

Answer (B)

50. Krishna is the wife of Raju. Gopal and Pallav are brothers. Raju is the brother of Pallav. Pallav is Krishna's

    (A) Cousin   (B) Brother

    (C) Brother-in-law   (D) Uncle

Answer (C)

51. A clock gains 15 minutes every day. If it is corrected at 12 O'clock in the afternoon, then what time will it show at 4 O'clock in the morning?

    (A) 4:10   (B) 4:15

    (C) 4:20   (D) 4:30

Answer (A)

Sol. Minute gain by clock in 24 hours = 15 min.

Minute gain by clock in 1 hour = $\dfrac{15}{24}$ min.

Minute gain by clock in 16 hours = $\dfrac{15}{24} \times 16 = 10$ min.

∴ 4 : 10

52. What will be the angle between the hands of a clock at 8:30?

    (A) 15°   (B) 30°

    (C) 45°   (D) 75°

Answer (D)

Sol. $\theta = \dfrac{1}{2}\left|60H - 11M\right|$

$= \dfrac{1}{2}\left|60 \times 8 - 11 \times 30\right|$

$= 75°$

53. If 1st January is a Saturday, then what day will it be on the last day of the month of February in a leap year?

    (A) Tuesday

    (B) Wednesday

    (C) Thursday

    (D) Friday

Answer (A)

Sol. Odd days in January = 2

Odd days in February = 1

Total odd days = 3

∴ 3rd odd day after Saturday is Tuesday.

54. After the year 1990 which year will have the same calendar as 1990?

    (A) 1995   (B) 1997

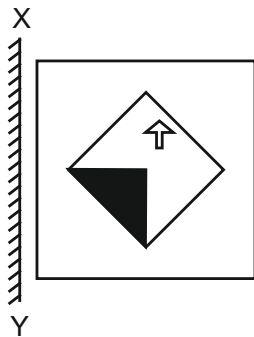   (C) 1996   (D) 1992

Answer (C)

55. If 4th Saturday of a month was the 22nd day, then what would be the 13th day of the same month?

    (A) Tuesday

    (B) Wednesday

    (C) Thursday

    (D) Friday

Answer (C)

Directions: (Question 56 to 57) If a mirror is placed at XY position then which of the following answer figures will be exactly a mirror image of the question figure?

56. **Question Figure**

Answer Figure

(A)   (B)

(C)   (D)
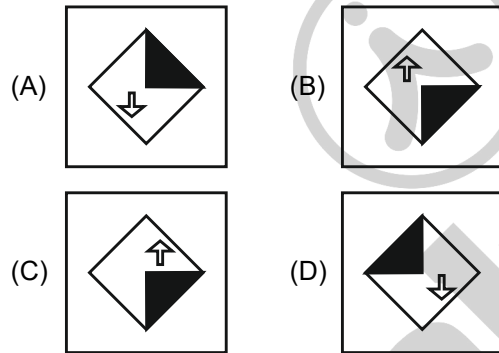
Answer (B)

57. **Question Figure**

Answer Figure

(A)   (B)

(C)   (D)
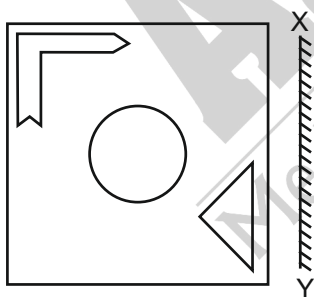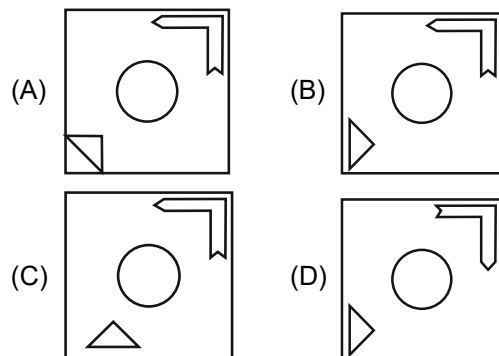
Answer (B)

58. What will be the water image of the following question figure?

Question Figure

Answer Figure

(A)   (B)

(C)   (D)
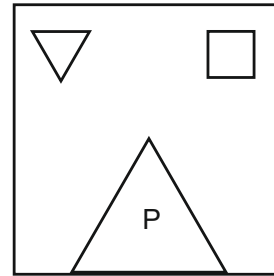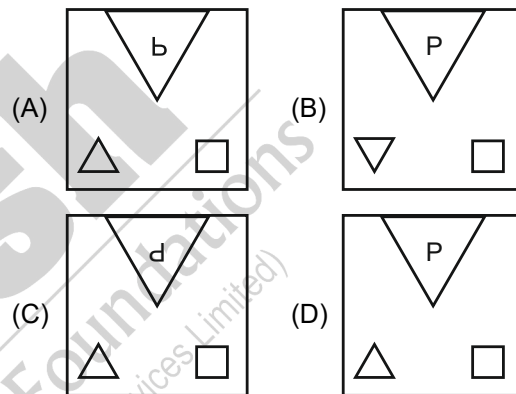
Answer (A)

59. If P stands for X, Z stands for +, G stands for –, and V stands for ÷ then value of 6 Z 6 P 6 V 6 will be

(A) 18   (B) 7

(C) 12   (D) 36

Answer (C)

Sol. $6 + 6 \times 6 \div 6$

= 12

60. If the signs × and ÷ and the numbers 2 and 4 are interchanged, then which of the following equation will be correct?

(A) $4 - 6 \times 3 + 1 \div 2 = 7$

(B) $2 \times 4 + 5 \div 1 - 6 = 3$

(C) $4 \div 3 - 8 + 16 \times 2 = 1$

(D) $5 \times 5 + 4 - 8 \div 2 = -29$

Answer (D)

Sol. Option (A) $2 - 6 \div 3 + 1 \times 4 = 4$

Option (B) $4 \div 2 + 5 \times 1 - 6 = 1$

Option (C) $2 \times 3 - 8 + 16 \div 4 = 2$

Option (D) $5 \div 5 + 2 - 8 \times 4 = -29$

61. If M × N means M is the daughter of N, M + N means M is the father of N, M ÷ N means M is the mother of N and M − N means M is the brother of N. According to the given equation P ÷ Q + R − T × K, how is P related to K?

    (A) Daughter-in-law   (B) Mother-in-law

    (C) Sister-in-law   (D) Brother-in-law

Answer (B)

62. The ratio between the present ages of A and B is 5:3 respectively. The ratio between A's age 4 years before and B's age 4 years after is 1 : 1. What will be the ratio between A's age after 4 years and B's age 4 years before?

    (A) 1 : 3   (B) 2 : 1

    (C) 3 : 1   (D) 4 : 1

Answer (C)

63. Mani's age is 47 years and John's age is 13 years. In how many years will Mani's age be twice of John's age?

    (A) 20 years   (B) 21 years

    (C) 10 years   (D) 15 years

Answer (B)

64. 5 years ago, the combined age of Rohan & Mohit was 40 years. Now the ratio of Rohan's age to Mohit's age is 4:1. How old is Rohan now?

    (A) 10   (B) 40

    (C) 60   (D) 20

Answer (B)

Sol. Let present age of Rohan and Mohit be x and y years respectively

then $x - 5 + y - 5 = 40$

Or $x + y = 50$ …(i)

Also $\dfrac{x}{y} = \dfrac{4}{1}$ …(ii)

From (i) and (ii)

$x = 40$ years

65. 3 years ago the average age of a family of 5 members was 17 years. With the birth of a new baby, the average age of the family still remains the same. What is the age of the new baby?

    (A) 1½ years   (B) 3 years

    (C) 4 years   (D) 2 years

Answer (D)

Sol. Let present age of family members be x_1, x_2, x_3, x_4 and x_5 years and age of new born baby be x_6 years.

Now,

$$\frac{x_1 - 3 + x_2 - 3 + x_3 - 3 + x_4 - 3 + x_5 - 3}{5} = 17$$

$$\Rightarrow x_1 + x_2 + x_3 + x_4 + x_5 = 100 \qquad …(i)$$

Also $\dfrac{x_1 + x_2 + x_3 + x_4 + x_5 + x_6}{6} = 17$

$$\Rightarrow \frac{100 + x_6}{6} = 17$$

$$\Rightarrow x_6 = 2 \text{ years}$$

66. If the word PALM is rearranged to form a new meaningful word. What will be the third letter from the left in the new word?

    (A) M   (B) L

    (C) P   (D) A

Answer (A)

67. Study the set of numbers given below and answer the question.

    489 541 654 953 783

    If in each number set all the three digits are arranged in ascending order then which of the following numbers will make the smallest number?

    (A) 489   (B) 541

    (C) 654   (D) 953

Answer (B)

68. In the series given below, how many even numbers are immediately preceded by 6 as well as immediately followed by 3?

    6 6 5 6 8 3 9 4 3 6 7 3 6 4 3 2 8 6 4 6 8 2 6 6 3

    (A) 1   (B) 2

    (C) 3   (D) 4

Answer (C)

Sol. 6 6 5 6 ⬚8 3 9 4 3 6 7 3 6 ⬚4 3 2 8 6 4 6 8 2 6 ⬚6 3

69. In the following number series how many such 7's are there which are immediately preceded by a pair of numbers whose product is more than the product of pair of the numbers immediately following 7?

    22713948765428357465978643974652

    (A) 1   (B) 4

    (C) 2   (D) 3

Answer (D)

Sol. 2 2 ⬚7 1 3 9 4 8 ⬚7 6 5 4 2 8 3 5 7 4 6 5 9 7 8 6 4 3 9 ⬚7 4 6 5 2

70. Shriyash remembers that his brother's birthday is after 15th of February but before 18th of February, while his sister remembers that her brother's birthday is after 16th of February but before 19th of February. On which date of February is Shriyash's brother's birthday?

    (A) 16   (B) 18

    (C) 19   (D) 17

Answer (D)

71. Five students were administered psychological test to know their intellectual levels. In the report, psychologists found out that A is less intelligent than B. C is less intelligent than D. B is less intelligent than C and A is more intelligent than E. Who is the most intelligent?

    (A) A   (B) B

    (C) D   (D) E

Answer (C)

Sol. D > C > B > A > E

72. In the Olympic games, the flags of six nations are flown on the flag pole in the following way:

    The flag of America is to the left of the Indian tricolour and to the right of the flag of France. The flag of Australia is on the right of Indian flag but is to the left of the flag of Japan which is to the left of the flag of China. Find the two flags which are in the centre?

    (A) India and Australia

    (B) America and India

    (C) Japan and Australia

    (D) America and Australia

Answer (A)

Sol. France America India Australia Japan China

Directions: (Q. No. 73 to 77) Study the following paragraph and answer the questions.

Five friends P, Q, R, S and T travel from Delhi to five different cities – Dehradun, Jaipur, Chandigarh, Raipur and Bangalore through three different means of transport – train, aeroplane and car though not in the same order. Out of the three means of transport, maximum two persons use two types of transport. Only the person travelling to Bangalore uses aeroplane. T travelled to Jaipur by Car and P travelled to Chandigarh by train. The one who travels by train does not go to Dehradun. Q travels by train while R travels by car.

73. Which of the following combination is true for Q?

    (A) Chandigarh – Car

    (B) Jaipur – Train

    (C) Raipur – Train

    (D) Jaipur – Car

Answer (C)

Sol.

Name	City	Means Transport
P	Chandigarh	Train
Q	Raipur	Train
R	Dehradun	Car
S	Bangalore	Aeroplane
T	Jaipur	Car

74. Which of the following combination of person and transport is true?

    (A) T - Train

    (B) P - Car

    (C) Q - Car

    (D) S - Aeroplane

Answer (D)

Sol.

Name	City	Means Transport
P	Chandigarh	Train
Q	Raipur	Train
R	Dehradun	Car
S	Bangalore	Aeroplane
T	Jaipur	Car

75. Which medium was used by the person going to Dehradun?

    (A) Train   (B) Aeroplane

    (C) Bus   (D) Car

Answer (D)

Sol.

Name	City	Means Transport
P	Chandigarh	Train
Q	Raipur	Train
R	Dehradun	Car
S	Bangalore	Aeroplane
T	Jaipur	Car

76. Who amongst the following travelled to Dehradun?

    (A) T   (B) S

    (C) R   (D) P

Answer (C)

Sol.

Name	City	Means Transport
P	Chandigarh	Train
Q	Raipur	Train
R	Dehradun	Car
S	Bangalore	Aeroplane
T	Jaipur	Car

77. Which of the following combination of place and means of transport is incorrect?

(A) Chandigarh – Train

(B) Jaipur – Car

(C) Raipur – Car

(D) Bangalore – Aeroplane

Answer (C)

Sol.

Name	City	Means Transport
P	Chandigarh	Train
Q	Raipur	Train
R	Dehradun	Car
S	Bangalore	Aeroplane
T	Jaipur	Car

78. Rama ranks 16th from the top and 15th from the bottom in a class test. How many students are there in the class?

(A) 30

(B) 31

(C) 32

(D) 33

Answer (A)

79. In a class Sanjay's position is fifth from the top and Prakash's position is ninth from the bottom. If their positions are interchanged, then Prakash's Position becomes twenty seventh from the bottom. How many students are there in the class?

(A) 30

(B) 31

(C) 33

(D) None of these

Answer (B)

Directions: (Q. No. 80 to 86) Study the pattern of numbers/figures in the matrix and find out the mission figure/number which will replace the question mark (?)

80.
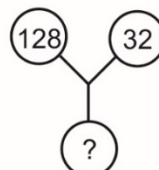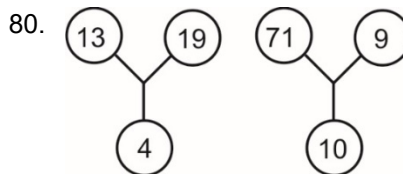
(A) 10   (B) 15

(C) 20   (D) 25

Answer (C)

Sol. $(13 + 19) \div 8 = 4$

$(71 + 9) \div 8 = 10$

$(128 + 32) \div 8 = 20$

81.

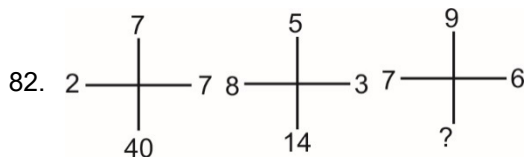| 6	15	20
8	4	5
3	5	20
51	65	?

(A) 12   (B) 57

(C) 56   (D) 120

Answer (D)

Sol. $(6 \times 8) + 3 = 51$

$(15 \times 4) + 5 = 65$

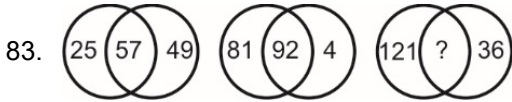$(20 \times 5) + 20 = 120$

82.

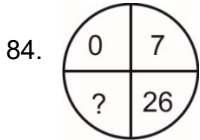(A) 72   (B) 68

(C) 82   (D) 96
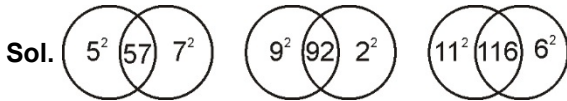
Answer (B)

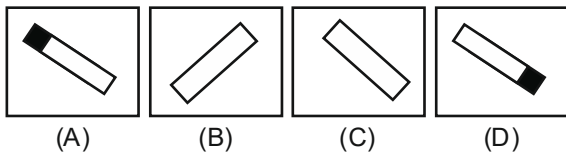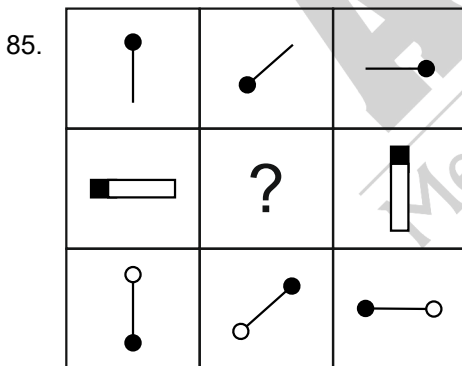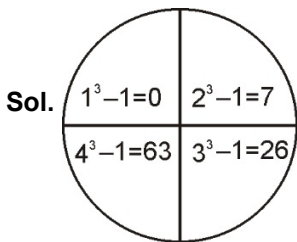**Sol.** $7^2 - (2 + 7) = 40$

$5^2 - (8 + 3) = 14$

$9^2 - (7 + 6) = 68$
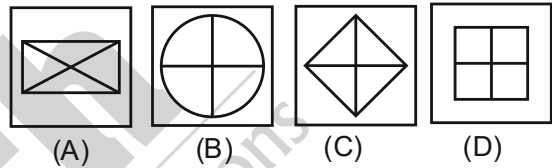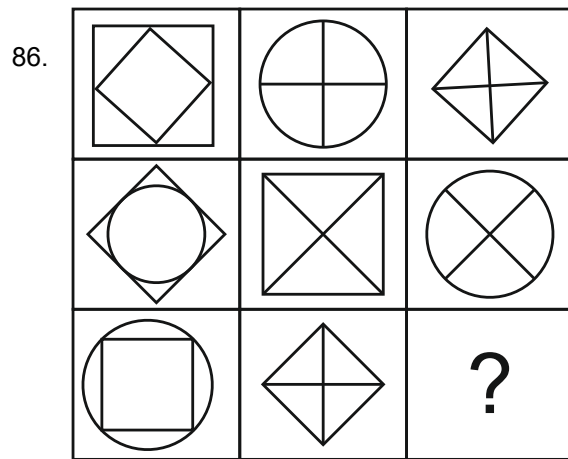
83.

(A) 116 (B) 93

(C) 49 (D) 23

Answer (A)

Sol.

84.

(A) 45 (B) 50

(C) 60 (D) 63

Answer (D)

Sol.

$$1^3 - 1 = 0 \quad 2^3 - 1 = 7$$
$$4^3 - 1 = 63 \quad 3^3 - 1 = 26$$

85.

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

Answer (D)

Sol. Complete figure is rotating 45° anticlockwise with respect to shaded portion.

86.

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

Answer (D)

87. **Statement** – All girls in the class are diligent.

Conclusion-

I. There is not even a single boy in the class.

II. The boys in the class are feeble minded.

(A) Only conclusion I follows the statement.

(B) Only conclusion II follows the statement.

(C) Both conclusion I and II follow the statement.

(D) Neither conclusion I nor II follows the statement.

Answer (D)

Sol. Nothing is said about the boys.

88. **Statement-** All actors are writers. Some writers are dancers. All poets are writers.

Conclusion-

I. All actors are poets.

II. Some dancers are writers.

III. Some dancers are actors

(A) Only conclusion II follows.

(B) Only I and II follow
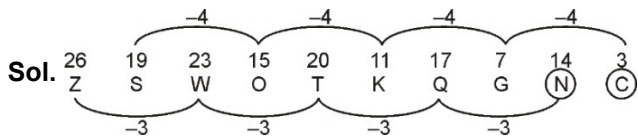
(C) Only II and III follow

(D) Only I and III follow

Answer (A)

89. Complete the given series.
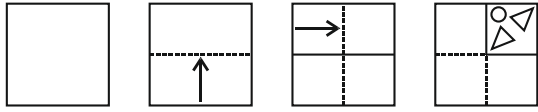
Z, S, W, O, T, K, Q, G, …., ……

(A) N, C (B) N, D

(C) O, C (D) O, D

Answer (A)

Sol.

-4	-4	-4	-4

26 19 23 15 20 11 17 7 14 3
Z S W O T K Q G (N) (C)

-3 -3 -3 -3
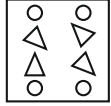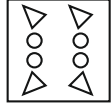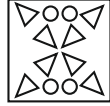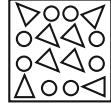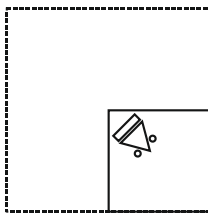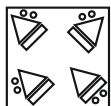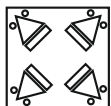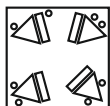
Directions: (Q. No. 90 to 92) Choose the figure from the given answer figures which will be formed by folding, punching and there after opening the page.

90.
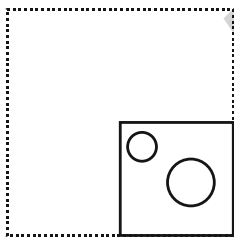
(A)   (B)   (C)   (D)
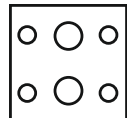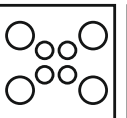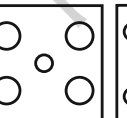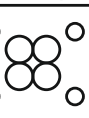
Answer (C)

91.

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

Answer (B)

92.

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

Answer (B)

93. How many rectangles are there in the following figure?
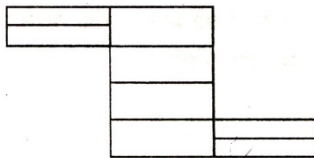
(A) 8   (B) 18
(C) 17   (D) 20

Answer (B)

94. Find out the number of triangles in the given figure.
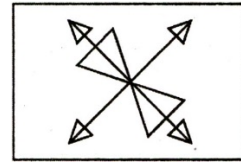
(A) 18   (B) 12
(C) 14   (D) 16
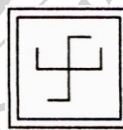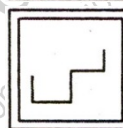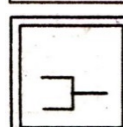
Answer (A)

95. Find the answer figure which is hidden in the question figure?

Question Figure
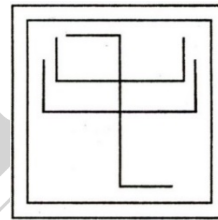
Answer Figure

(A)

(B)

(C)

(D)

Answer (B)

96. How many cubes are there in the given figure?
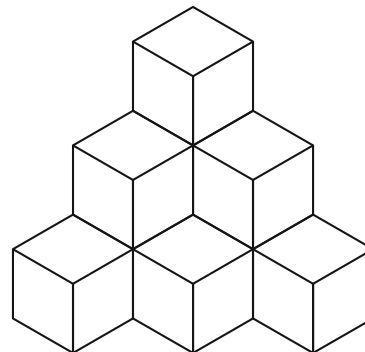
(A) 6   (B) 8
(C) 10   (D) 12

Answer (C)

97. The figure given below shows two different positions of a dice. Which number will appear opposite to number 2?
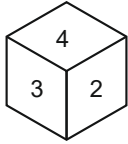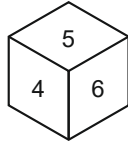
(A)   (B)

(A) 3
(B) 4
(C) 5
(D) 6

Answer (C)

98. Identify the missing part of the question figure and select it from the answer figures.

Question Figure
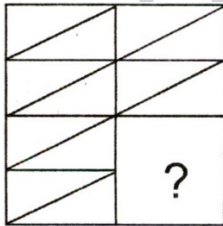
Answer Figure
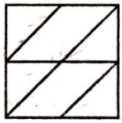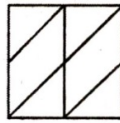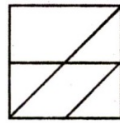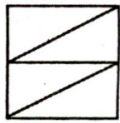
(A)   (B)   (C)   (D)

Answer (D)

Directions: (Q. No. 99 to 100) In the following questions which answer figure has most of the components of the question figure?

99. **Question Figure**
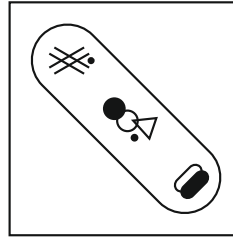
Answer Figure

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

Answer (A)

100. **Question Figure**
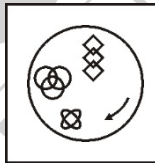
Answer Figure
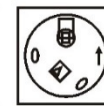
(A)   (B)   (C)   (D)

Answer (C)

PART-II : SCHOLASTIC APTITUDE TEST (SAT)

1. Why was the Bastille fort hated by the French people?

   (A) Louis XVI used to live there.

   (B) Prisoners were kept there.

   (C) It stood for the despotic power of the King.

   (D) It was a centre of arms and ammunition.

Answer (C)

Sol. Bastille fort stood for the despotic power of the King.

2. Who took over the government in Russia through the October revolution of 1917?

   (A) The Nationalists   (B) The Radicals

   (C) The Liberals   (D) The Socialists

Answer (D)

Sol. The Socialists

3. Match the Column 'A' with Column 'B' and choose the correct option.

Column A	Column B
I. Duma	a. St Petersburg
II. The National Assembly	b. Germany
III. Reichstag	c. Russia
IV. The Winter Palace	d. France

	I	II	III	IV
(A)	c	d	a	b
(B)	c	d	b	a
(C)	d	c	a	b
(D)	d	a	b	c

Answer (B)

4. The Council elections during Non-Cooperation movement were boycotted in other provinces except

   (A) Madras

   (B) Bombay

   (C) United Province

   (D) Central Province

Answer (A)

5. The central theme of a book 'Gulamgiri' is

   (A) Living conditions of slaves.

   (B) Working conditions of mill workers

   (C) Injustices of the caste system

   (D) Social condition of women.

Answer (C)

Sol. The theme of the Gulamgiri is injustices of the caste system.

6. Match the Column 'A' with Column 'B' and choose the correct option.

Column A	Column B
I. FICCI	a. 1932
II. Depressed Classes Association	b. 1931
III. Poona Pact	c. 1930
IV. Second Round Table Conference	d. 1927

	I	II	III	IV
(A)	a	b	c	d
(B)	b	c	d	a
(C)	c	d	a	b
(D)	d	c	a	b

Answer (D)

7. Who said, "Printing is the ultimate gift of God and the greatest one"

   (A) Johann Gutenberg (B) Martin Luther

   (C) Marco Polo   (D) Ulrich Zwingli

Answer (B)

Sol. Martin Luther

8. The Bretton Woods system was based on

   (A) Fixed exchange rates

   (B) Floating exchange rates

   (C) Both (A) and (B)

   (D) None of the above

Answer (A)

Sol. Bretton woods system was based on Fixed exchange rates.

9. The Guillotine was a

    (A) Tax

    (B) Declaration

    (C) Device

    (D) Law

Answer (C)

Sol. Guillotine was invented by Dr. Guillotine.

10. Leader of the Jacobin Club was

    (A) Roget de L'Isle

    (B) Robespierre

    (C) Camille Desmoulins

    (D) Olympe de Gouges

Answer (B)

Sol. The leader of the Jacobin Club was Maximmilian De Robespierre.

11. "Jikji" is a

    (A) Book

    (B) Parchment

    (C) Portrait

    (D) Letter

Answer (A)

12. In India, there is a provision of reservation for women in

    (A) Lok Sabha

    (B) Legislative assembly

    (C) Rajya Sabha

    (D) Local Self government

Answer (D)

Sol. One third sheets are reserved for the woman in Panchayati Raj System.

13. Who holds the power of Judicial review in India?

    (A) The Legislature

    (B) The Executive

    (C) The Judiciary

    (D) The President

Answer (C)

Sol. The Judiciary holds the power of Judicial review in India.

14. Veto means

    (A) A sudden overthrow of a government illegally.

    (B) The state controls all the property and industry.

    (C) A military authority take control of the administration and judiciary.

    (D) Absolute power to stop a decision.

Answer (D)

Sol. Permanent members of the UN have veto power.

15. Incorrect statement regarding UNO is

    (A) The UN is a global organisation of nations of the world.

    (B) The UN secretary general is its chief administrative officer.

    (C) The UN security council has fifteen permanent members.

    (D) Permanent members have veto rights.

Answer (C)

Sol. UN security council has five permanent members.

16. Incorrect statement about the Democracy is

    (A) It is a more accountable form of government.

    (B) It diminishes possibility of better decision making.

    (C) It provides method to deal with differences and conflicts.

    (D) It enhances the dignity of the citizens.

Answer (B)

Sol. Democracy provides the possibility of better decision making.

17. Read the following statements and choose the correct option

    Statement (S) – Basic values of the constitution are protected by the Judiciary.

    Reason (R) – The Supreme court and High courts both have powers of Judicial review.

    (A) Statement and reason both are correct but statement (S) is not explained by reason (R).

    (B) Statement and reason both are correct and statement (S) is explained by the reason (R).

    (C) Statement (S) is correct but reason (R) is incorrect.

    (D) Statement (S) is incorrect but reason (R) is correct.

Answer (B)

18. Match the column A with Column B and choose the correct option.

	Column A		Column B
I.	Sovereign	a.	Government will not favour any religion.
II.	Fraternity	b.	Head of the state is an elected person.
III.	Republic	c.	People have the supreme right to make decisions.
IV.	Secular	d.	People should live like a family.

	I	II	III	IV
(A)	d	c	b	a
(B)	c	d	a	b
(C)	d	c	a	b
(D)	c	a	b	a

Answer (D)

19. Choose the incorrect statement.

(A) India is divided into electoral constituencies for the purpose of elections.

(B) Some number of Lok Sabha constituencies are reserved for the people who belong to scheduled castes and scheduled tribes.

(C) Two- third of seats are reserved in rural and urban local bodies for women candidates.

(D) In order to be a candidate, the minimum age is 25 years while it is only 18 years for being a voter.

Answer (C)

Sol. One-third of seats are reserved in rural and urban local bodies for women candidates.

20. In 2019 ICC cricket world cup the 'player of the tournament' award was given to

(A) Ben Stokes

(B) Kane Williamson

(C) Mitchell Starc

(D) Shakib Al Hasan

Answer (B)

Sol. He was the player of the tournament in 2019 ICC Cricket World Cup.

21. The hot winds blowing in the northern plains of India in summer are called

(A) Kaal Baisakhi

(B) Trade winds

(C) Loo

(D) None of the above

Answer (C)

Sol. The hot winds blowing in the northern plain of India in summer are called Loo.

22. Which is not an example of primary sector activity?

(A) Animal husbandry

(B) Transport

(C) Fishing

(D) Agriculture

Answer (B)

Sol. Transport is an example of tertiary sector.

23. A large proportion of children in a population is a result of

(A) High birth rates

(B) High death rates

(C) High life expectancies

(D) More married couples

Answer (A)

Sol. Large proportion of children in a population is a result of high birth rates.

24. Which one among the following rivers flows through a rift valley?

(A) Mahanadi

(B) Tungbhadra

(C) Krishna

(D) Tapti

Answer (D)

Sol. Narmada & Tapti flows towards the rift valley.

25. Rubber is related to which type of vegetation

(A) Tundra

(B) Himalayan

(C) Tidal

(D) Tropical Evergreen

Answer (D)

Sol. Rubber is related to tropical evergreen vegetation.

26. Match the Column A with Column B and choose the correct option.

	Column A		Column B
I.	Endangered species	a.	Have small population.
II.	Vulnerable species	b.	Which are not found after searching them in their known areas where they were found.
III.	Rare species	c.	Whose population is declining.
IV.	Extinct species	d.	Which are in danger of extinction.

	I	II	III	IV
(A)	a	b	c	d
(B)	d	c	a	b
(C)	d	b	c	a
(D)	b	a	d	c

Answer (B)

27. "Regur soil" is known as

(A) Alluvial soil

(B) Laterite soil

(C) Black soil

(D) Forest soil

Answer (C)

Sol. "Regur soil" is known as Black soil

28. 'Slash and Burn' Agriculture is known as

(A) Plantation agriculture

(B) Horticulture

(C) Shifting agriculture

(D) Intensive agriculture

Answer (C)

Sol. 'Slash and Burn' Agriculture is known as shifting agriculture.

29. Which is not a measure of soil conservation?

(A) Deforestation

(B) Contour ploughing

(C) Terrace farming

(D) Strip farming

Answer (A)

Sol. Deforestation

30. The Pamir knot is situated between

(A) Vindhya and Satpura

(B) Sulaiman and Hindukush

(C) Aravali and Vindhya

(D) Hindukush and Kunlun

Answer (D)

31. Human capital investment includes

(A) Education   (B) Training

(C) Health   (D) All of the above

Answer (D)

32. Which is not a factor of production?

(A) Land   (B) Labour

(C) Capital   (D) Animal

Answer (D)

Sol. Land, labour, physical capital and human capital are the factors of production.

33. Disguised unemployment is found in which sector of economy?

(A) Industry   (B) Agriculture

(C) Services   (D) Technology

Answer (B)

34. Which Institute publishes Human Development Report?

(A) U.N.O.   (B) U.N.D.P.

(C) The World Bank (D) W.T.O.

Answer (B)

Sol. United Nation Development Programme published the human development report.

35. The population of which age group is included in the calculation of literacy rate in India?

(A) 3 years and above

(B) 5 years and above

(C) 6 years and above

(D) 7 years and above

Answer (D)

36. Construction sector is related to which sector of economy?

(A) Primary sector

(B) Secondary sector

(C) Tertiary sector

(D) None of the above

Answer (B)

37. The concept of currency stock includes

    (A) Time deposits in banks.

    (B) Time and demand deposits in banks.

    (C) Currency held by the people and demand deposits in banks.

    (D) None of the above

Answer (C)

38. The Hallmark logo used in the gold ornaments is a symbol of

    (A) The company making the ornaments

    (B) Quantitative description

    (C) Quality

    (D) None of the above

Answer (C)

39. Which one is not included in the concept of a multinational company?

    (A) Production in one country

    (B) Trade in more than one country

    (C) Labour specialisation

    (D) Production of goods at a lower price

Answer (A)

40. The concept of food security includes

    (A) Food availability to all at all time

    (B) Access to food

    (C) Capability to earn the food

    (D) All of the above

Answer (D)

41. If graph of polynomial p(x), has been given as y = p(x), then the number of zeroes of p(x) will be
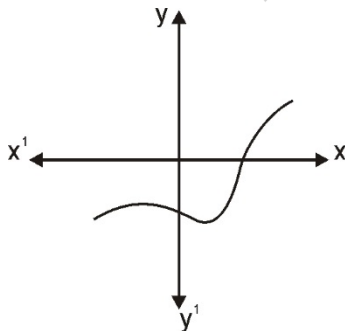
    (A) 1   (B) 0

    (C) 2   (D) 3

Answer (A)

42. In the given figure O is center of a circle, $\angle AOB = 40°$ and $\angle BDC = 100°$ then the value of $\angle OBC$ will be
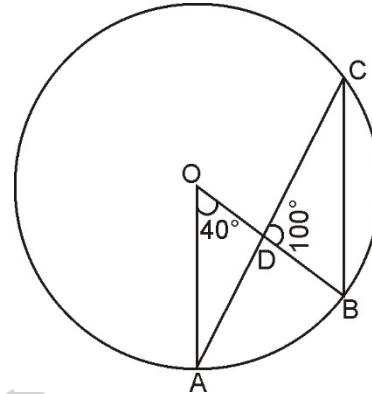
    (A) 50°   (B) 60°

    (C) 40°   (D) 70°

Answer (B)

Sol. $\angle ACB = \dfrac{1}{2}\angle AOB = 20°$

$\angle OBC = 180° - (100° + 20°) = 60°$

43. If $1^2 + 2^2 + 3^2 + \ldots\ldots + 10^2 = 385$, then the value of $2^2 + 4^2 + 6^2 + \ldots.. + 20^2$ will be

    (A) 1541   (B) 1540

    (C) 1542   (D) 1543

Answer (B)

44. If α, β are the zeroes of polynomial

    $2x^2 + 5x + k$ and $\alpha^2 + \beta^2 + \alpha\beta = \dfrac{21}{4}$,

    Then the value of k will be

    (A) 4   (B) 3

    (C) 2   (D) 1

Answer (C)

Sol. $\alpha + \beta = \dfrac{-5}{2}$, $\alpha\beta = \dfrac{k}{2}$

$(\alpha + \beta)^2 - \alpha\beta = \dfrac{21}{4}$

$\left(\dfrac{-5}{2}\right)^2 - \dfrac{k}{2} = \dfrac{21}{4}$

$\dfrac{k}{2} = 1$

k = 2

45. The diameter of a sphere is 6 cm. It is melted and drawn into a wire of diameter 2mm, then the length of the wire will be

(A) 36 m   (B) 36 cm

(C) 38 cm   (D) 38 m

Answer (A)

Sol. For sphere $r = \dfrac{6}{2} = 3cm$

For cylindrical wire

$r = \dfrac{0.2}{2} = 0.1cm$

Let the length of wire be x cm

$\pi r^2 h = \dfrac{4}{3}\pi r^3$

$0.1 \times 0.1 \times x = \dfrac{4}{3} \times 3 \times 3 \times 3$

x = 3600 cm or 36 m

46. The mean of all prime numbers between 50 to 80 will be

(A) $65\dfrac{1}{7}$ (B) $63\dfrac{1}{7}$

(C) $66\dfrac{1}{7}$ (D) $67\dfrac{1}{7}$

Answer (C)

Sol. Mean $= \dfrac{53 + 59 + 61 + 67 + 71 + 73 + 79}{7}$

$= 66\dfrac{1}{7}$

47. If each side of a Rhombus is 20cm and its shorter diagonal is $\dfrac{3}{4}$ of its longer diagonal then the area of Rhombus will be

(A) 384 cm²   (B) 390 cm²

(C) 386 cm²   (D) 385 cm²

Answer (A)

Sol. $(2x)^2 + \left(\dfrac{3x}{2}\right)^2 = 20^2$
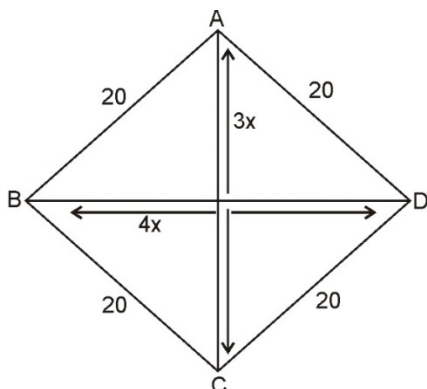
$4x^2 + \dfrac{9x^2}{4} = 400$

$\dfrac{25x^2}{4} = 400$

x = 8

Diagonals are 24 cm and 32 cm

Area $= \dfrac{1}{2} \times 24 \times 32 = 384cm^2$

48. In the given figure DE||BC and AD : DB = 5 : 4 then the ratio of ar ΔDEF : ar ΔCFB will be
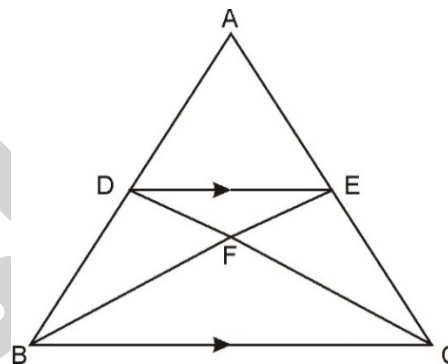
(A) 125 : 81   (B) 25 : 81

(C) 27 : 81   (D) 127 : 81

Answer (B)

Sol. $\dfrac{DE}{BC} = \dfrac{5}{9}$

$\dfrac{ar(\Delta DEF)}{ar(\Delta CBF)} = \left(\dfrac{5}{9}\right)^2 = \dfrac{25}{81}$

49. If sinA + sin²A = 1 then the value of (cos²A + cos⁴A) will be

(A) $\dfrac{1}{2}$ (B) 1

(C) 2   (D) 3

Answer (B)

Sol. sinA = 1 − sin²A

sinA = cos²A

cos²A + sin⁴A = cos²A + sin²A = 1

50. A cone, hemisphere and cylinder stand on equal bases and have the same height then the ratio of their volumes is

(A) 2 : 3 : 4   (B) 2 : 3 : 5

(C) 1 : 2 : 3   (D) 3 : 2 : 7

Answer (C)

Sol. $v_1 : v_2 : v_3 = \dfrac{1}{3}\pi r^3 : \dfrac{2}{3}\pi r^3 : \pi r^3$

$= 1 : 2 : 3$

51. The pair of equation x + 2y = – 5 and – 3x – 6y = – 1 will have

(A) Unique solution   (B) Exactly two solutions

(C) Infinite solutions   (D) No solutions

Answer (D)

Sol. x + 2y + 5 = 0

– 3x – 6y + 1 = 0

$a_1 = 1$; $b_1 = 2$, $c_1 = 5$

$a_2 = -3$; $b_2 = -6$, $c_2 = 1$

$\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2}$

∴ No solution

52. In the given figure PA and PB are two tangents of circle with centre O, and $\angle APB = 80°$ then value of $\angle AOP$ will be
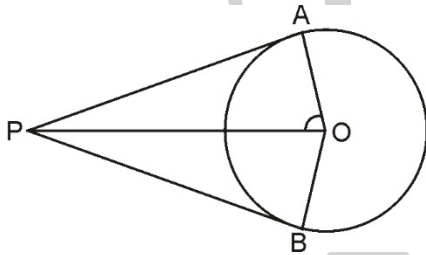
(A) 80°   (B) 70°

(C) 60°   (D) 50°

Answer (D)

Sol.
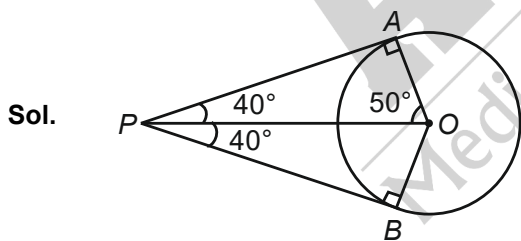
$\angle OPA = \angle OPB = 40°$

In $\triangle AOP$, by angle sum property

$\angle AOP = 180 - (90 + 40)$

$\angle AOP = 50°$

53. A circus artist is climbing on a 20 meter long rope which is tightly stretched and tied to the top of a vertical pole. If the angle made by the rope with the ground level is 30°, then the height of the pole will be

(A) 10 meter   (B) 15 meter

(C) 8 meter   (D) 12 meter

Answer (A)

Sol. Length of rope AC = 20 m
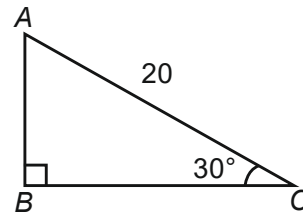
Height of pole = AB

In $\triangle ABC$,

$\sin 30° = \dfrac{AB}{AC}$

$\dfrac{1}{2} = \dfrac{AB}{20}$

⇒ AB = 10 m

54. Sides of two similar triangles are in the ratio 4:9, ratio of their areas will be

(A) 4 : 9   (B) 81 : 18

(C) 16 : 81   (D) 2 : 3

Answer (C)

Sol. Ratio of areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

55. In the given figure, AB || CD, $\angle ABO = 40°$ and $\angle CDO = 35°$. Then the value of x will be
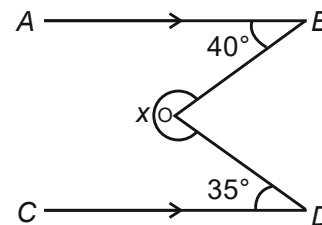
(A) 285°   (B) 180°

(C) 290°   (D) 282°

Answer (A)

Sol.
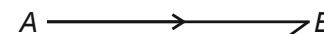
Draw XY || AB passing through E.

$\angle ABE + BEX = 180°$ (co-interior angles)

⇒ $40 + \angle BEX = 180°$

⇒ $\angle BEX = 140°$ …(i)

Also, $\angle XED + \angle EDC = 180°$

$\Rightarrow \angle XED + 35° = 180°$

$\Rightarrow \angle XED = 145°$ …(ii)

Adding (i) and (ii)

$\angle BEX + \angle XED = 140 + 145$

$x = 285°$

56. Two dices are thrown together, the probability that the sum of numbers on the two faces is divisible by 4 or 6 will be

(A) $\dfrac{2}{13}$ (B) $\dfrac{3}{13}$

(C) $\dfrac{7}{18}$ (D) $\dfrac{4}{19}$

Answer (C)

Sol. Sum = 4 : (1, 3) (2, 2) (3, 1)

Sum = 6 : (1, 5) (2, 4) (3, 3) (4, 2) (5,1)

Sum = 8 : (2, 6) (3, 5) (4, 4) (5, 3) (6, 2)

Sum = 12 : (6, 6)

$\therefore$ Required probability $= \dfrac{14}{36} = \dfrac{7}{18}$

57. The sum of the father's age (in years) and twice of the son's age is 90 and the sum of the twice of father's age (in years) and son's age is equal to 120, then age of father and son will be

(A) 40 years, 18 years

(B) 50 years, 20 years

(C) 70 years, 10 years

(D) 35 years, 25 years

Answer (B)

Sol. Let father's age be x years

And son's age be y years

According to question

x + 2y = 90 …(i)

2x + y = 120 …(ii)

On solving (i) & (ii),

We get $x = 50$ years and $y = 20$ years

58. The roots of the equation

$5^{x+1} + 5^{2-x} = 5^3 + 1$ will be

(A) 5, – 1 (B) 2, – 1

(C) 3, – 1 (D) None of these

Answer (B)

Sol. $5^x \times 5 + \dfrac{5^2}{5^x} = 5^3 + 1$

Let $5^x = a$

$\Rightarrow 5a^2 - 126a + 25 = 0$

$\Rightarrow a = \dfrac{1}{5}$ or $a = 25$

$\Rightarrow 5^x = 5^{-1}$ or $5^x = 5^2$

$\Rightarrow x = -1$ or 2

59. If $3x = \cosec\theta$ and $\dfrac{3}{x} = \cot\theta$ then the value of $3\left(x^2 - \dfrac{1}{x^2}\right)$ will be

(A) $\dfrac{1}{3}$ (B) $-\dfrac{1}{3}$

(C) $\dfrac{2}{3}$ (D) $\dfrac{-2}{3}$

Answer (A)

Sol. $\therefore$ $3\left(x^2 - \dfrac{1}{x^2}\right)$

$= 3\left(x + \dfrac{1}{x}\right)\left(x - \dfrac{1}{x}\right)$

$= 3\left(\dfrac{\cosec\theta}{3} + \dfrac{\cot\theta}{3}\right)\left(\dfrac{\cosec\theta}{3} - \dfrac{\cot\theta}{3}\right)$

$= 3\left(\dfrac{\cosec^2\theta - \cot^2\theta}{9}\right)$

$= 3 \times \dfrac{1}{9}$

$= \dfrac{1}{3}$

60. The factors of $x^4 + \dfrac{1}{x^4} + 1$ will be

(A) $\left(x^2 + \dfrac{1}{x^2} - 1\right)\left(x + \dfrac{1}{x} - 1\right)\left(x + \dfrac{1}{x} + 1\right)$

(B) $\left(x^2 + \dfrac{1}{x^2} + 1\right)\left(x + \dfrac{1}{x} - 1\right)\left(x + \dfrac{1}{x} + 1\right)$

(C) $\left(x^2 + \dfrac{1}{x^2} + 2\right)\left(x + \dfrac{1}{x} - 1\right)\left(x + \dfrac{1}{x} + 1\right)$

(D) None of these

Answer (A)

Sol. $x^4 + \dfrac{1}{x^4} + 1$

$= x^4 + \dfrac{1}{x^4} + 2 - 1$

$= \left(x^2 + \dfrac{1}{x^2}\right)^2 - 1$

$= \left(x^2 + \dfrac{1}{x^2} - 1\right)\left(x^2 + \dfrac{1}{x^2} + 1\right)$

$= \left(x^2 + \dfrac{1}{x^2} - 1\right)\left[x^2 + \dfrac{1}{x^2} + 2 - 1\right]$

$= \left(x^2 + \dfrac{1}{x^2} - 1\right)\left[\left(x + \dfrac{1}{x}\right)^2 - 1^2\right]$

$= \left(x^2 + \dfrac{1}{x^2} - 1\right)\left(x + \dfrac{1}{x} + 1\right)\left(x + \dfrac{1}{x} - 1\right)$

61. Which one of the following is not a homogeneous mixture?

(A) Brass

(B) Kerosene

(C) Copper sulphate solution

(D) Milk

Answer (D)

Sol. Milk is a colloidal solution so it is heterogenous in nature.

62. Wood spirit is

(A) C_2H_5OH (B) CH_3OH

(C) CH_3COOH (D) CH_3CHO

Answer (B)

Sol. Wood spirit is Methanol (CH_3OH)

63. Soap is

(A) Sodium and potassium salt of long chain carboxylic acid

(B) Ammonium salt of long chain carboxylic acid

(C) Sulphonic salt of long chain carboxylic acid

(D) Bromide salt of long chain carboxylic acid

Answer (A)

Sol. Soap is basically 'RCOONa' or "RCOOK" where 'R' is alkyl group. So soap is sodium or potassium salt of long chain of Carboxylic Acid.

64. Which one of the following is a dibasic acid

(A) HCl   (B) H_2SO_4

(C) H_3PO_4 (D) HNO_3

Answer (B)

Sol. $H_2SO_4 \longrightarrow$
$$H-O-\overset{\overset{O}{\|}}{\underset{\underset{O}{\|}}{S}}-O-H$$
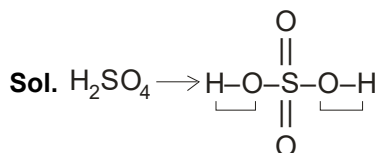
There are 2 ionisable H-atoms (attached to Oxygen)

$$H_2SO_4 \xrightarrow{-H^+} H_2SO_4^{\ominus} \xrightarrow{-H^+} SO_4^{2-}$$
$$\text{Bisulphate} \qquad \text{Sulphate}$$
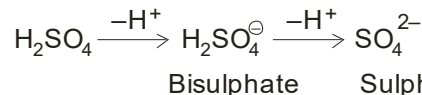
65. Which one of the following alloy does not contain Copper?

(A) Bronze   (B) German silver

(C) Solder   (D) Gun metal

Answer (C)

Sol. Solder contains 'Pb' and 'Sn'.

66. Correct decreasing order of element oxygen, sulphur, Aluminium and iron according to their abundance in earth crust is

(A) O > S > Al > Fe   (B) O > Al > Fe > S

(C) Al > Fe > O > S   (D) Fe > Al > O > S

Answer (B)

67. When ferrous sulphate is heated strongly, it decomposes to form

(A) $FeO + SO_2$ (B) $FeO + SO_3$

(C) $FeS + SO_2$ (D) $Fe_2O_3 + SO_2 + SO_3$

Answer (D)

Sol. $2FeSO_4(s) \xrightarrow{\triangle} Fe_2O_3(s) + SO_2 \uparrow + SO_3 \uparrow$

68. Latent heat of vaporisation is

(A) Heat required to raise the temperature of 1 kg. water from room temperature to 100°C

(B) Heat required to raise the temperature of 1 kg. water from 99°C to 100°C.

(C) Heat required to convert 1 kg. water at 100°C to vapour at 100°C.

(D) All of the above

Answer (C)

Sol. Latent Heat of vaporisation is the amount of heat required to convert 1 kg of water into vapours at its boiling point (100°C).

69. Pressure of a gas at STP is doubled and the temperature is raised to 546 K. Final volume of the gas will become

(A) Four times   (B) Double

(C) Remains same   (D) Half

Answer (C)

Sol. At STP condition

Initial pressure = P_1 Final pressure $P_2 = 2P_1$

Initial volume = V_1 $V_2 = ?$

(T_1) temperature = 273 K $T_2 = 546K$

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$\frac{P_1 \times V_1}{273} = \frac{2P_1 \times V_2}{546}$$

$V_2 = V_1$

Thus volume of gas remain same.

70. Small pieces of Al, Zn, Fe and Mg were placed in different test tubes and dilute HCl is added to them, rate of formation of H_2 gas with different metals in decreasing order will be

    (A) Mg > Fe > Zn > Al

    (B) Fe > Mg > Zn > Al

    (C) Mg > Al > Zn > Fe

    (D) Zn > Al > Fe > Mg

Answer (C)

Sol. Mg > Al > Zn > Fe (on the basis of reactivity)

71. Match reactions given in Column (A) with Precipitates of the product given in Column (B) and choose the correct option

	Column (A)		Column (B)
(i)	$Pb(NO_3)_2 + KI$	a.	Black Precipitate
(ii)	$CuSO_4 + H_2S$	b.	White Precipitate
(iii)	$AgNO_3 + NaCl$	c.	Yellow Precipitate
(iv)	$CuSO_4 + NaOH$	d.	Blue Precipitate

	(i)	(ii)	(iii)	(iv)
(A)	c	a	b	d
(B)	c	b	a	d
(C)	a	c	b	d
(D)	b	a	c	d

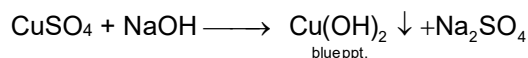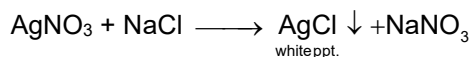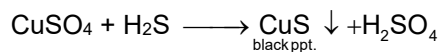**Answer (A)**

Sol. $Pb(NO_3)_2 + KI \longrightarrow PbI_2 \downarrow + KNO_3$
        (yellow ppt.)

$CuSO_4 + H_2S \longrightarrow CuS \downarrow + H_2SO_4$
        (black ppt.)

$AgNO_3 + NaCl \longrightarrow AgCl \downarrow + NaNO_3$
        (white ppt.)

$CuSO_4 + NaOH \longrightarrow Cu(OH)_2 \downarrow + Na_2SO_4$
        (blue ppt.)
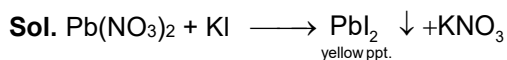
72. Read the following statement about $(NH_4)_2SO_4$ and choose the correct option

    I.   It is a salt of strong acid and strong base.

    II. Ammonium sulphate solution turns blue litmus into red.

    III. Solution of this salt contains more of hydrogen ions than hydroxide ions.

    IV. Aqueous solution of this salt behaves like NH_4Cl solution with litmus paper

    (A) Only I is correct   (B) Only II is correct

    (C) I, II, III are correct (D) II, III, IV are correct

Answer (D)

Sol. $(NH_4)_2SO_4$ is made up of NH_4OH (weak base) and H_2SO_4 (strong acid)

So the salt contains acidic character as made up of strong acid, so it turns blue litmus red. The behaviour of ammonium salt is same like NH_4Cl made up of weak base (NH_4OH) and strong Acid (HCl).

73. Which of the following statement is true about the solubility of a substance

    (A) Solubility of solids in liquids increases on decreasing the temperature

    (B) Solubility of solids in liquids increases on increasing the pressure.

    (C) Solubility of gases in liquids decreases on increasing the temperature

    (D) Solubility of gases in liquids increases on decreasing the pressure.

Answer (C)

Sol. Solubility of a gas decrease with increase in temperature, as the temperature increase K.E of particles increases so tendency to escape increases but solubility decreases.

74. Match reactions given in Column A with the changes given in Column B and choose the correct option

	Column (A)		Column (B)
(i)	$KI + Pb(NO_3)_2$	a.	Evolution of CO_2
(ii)	SO_2 + acidified $K_2Cr_2O_7$	b.	Formation of NH_3 and endothermic reaction
(iii)	$Ba(OH)_2 + NH_4Cl$	c.	Change in colour from orange to green
(iv)	Na_2CO_3 + Dil. HCl	d.	Formation of Yellow Precipitate

	(i)	(ii)	(iii)	(iv)
(A)	b	a	c	d
(B)	a	d	c	b
(C)	d	c	b	a
(D)	a	b	c	d

Answer (C)

Sol. $KI + Pb(NO_3)_2 \longrightarrow \underset{\text{yellow ppt.}}{PbI_2} \downarrow + KNO_3$

$K_2Cr_2O_7 + SO_2 + H^+ \longrightarrow \underset{\substack{\text{green colour} \\ \text{due to presence} \\ \text{of } Cr^{3+}}}{K_2SO_4 + Cr_2(SO_4)_3 + H_2O}$

$Ba(OH)_2 + NH_4Cl \xrightarrow{\Delta} BaCl_2 + NH_3 + H_2O$

$Na_2CO_3 + \underset{\text{dil}}{HCl} \longrightarrow NaCl + H_2O + CO_2\uparrow$
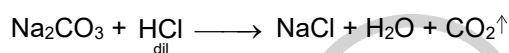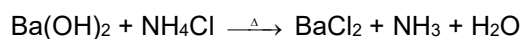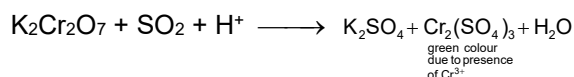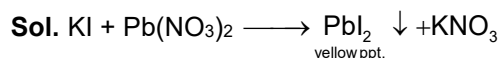
75. Raisin placed in which solution will swell up

   (A) Hypertonic solution

   (B) Isotonic solution

   (C) Hypotonic solution

   (D) Both in (A) and (B)

Answer (C)

Sol. Swelling occurs due to endo-osmosis. A cell shows endo-osmosis in Hypotonic solution.

76. Antibodies are

   (A) Protein   (B) Carbohydrate

   (C) Lipid   (D) Germs

Answer (A)

Sol. Antibodies are proteins.

77. Choose the incorrect pair from the following

   (A) White revolution – Milk production

   (B) Blue revolution   – Fish production

   (C) Silver revolution – Egg production

   (D) Green revolution – Silk production

Answer (D)

Sol. Green revolution was for increasing agricultural production.

78. The main function of bile is

   (A) Emulsification of fat.

   (B) Digestion of carbohydrate.

   (C) Absorption of fat.

   (D) Assimilation of fat.

Answer (A)

Sol. Bile mixes with food and breaks down large fat globules into smaller globules, thus increasing surface area for the action of lipase.

79. A person met with an accident in which two long bones of his left hand are dislocated. Which of the following will be the probable reason

   (A) Tendon break

   (B) Break of skeleton muscle

   (C) Ligaments break

   (D) Areolar tissue break

Answer (C)

Sol. Ligaments are dense connective tissue that connect bone to bone.

80. *Balanoglossus* is connecting link between

   (A) Urochordata and Cephalochordata

   (B) Urochordata and Vertebrata

   (C) Cephalochordata and Vertebrata

   (D) Non-Chordata and Chordata

Answer (D)

Sol. *Balanoglossus* belongs to phylum Hemi-chordata. It has features that are similar to non-chordates (no notochord, has dorsal heart) and to chordates (has notochord like structure, pharyngeal gill slits) thus serves as connecting link.

81. The water pollution is defined in several ways. Which of the following statement does not give the correct definition?

   (A) The addition of undesirable substances to water bodies

   (B) The removal of desirable substances from water bodies

   (C) A change in pressure of water bodies

   (D) A change in temperature of water bodies

Answer (C)

Sol. All other options are responsible for water pollution. A change in pressure is not responsible for water pollution.

82. A round green (RRyy) seed plant is crossed with a wrinkled yellow (rrYY) seed plant. According to Mendel's law the phenotypic ratio in F2 generation will be

   (A) 3 : 3 : 2 : 1   (B) 9 : 3 : 3 : 1

   (C) 1 : 2 : 1 : 1   (D) 9 : 2 : 3 : 1

Answer (B)

Sol. This is a dihybrid cross and it's phenotypic ratio is

   9 : 3 : 3 : 1

83. Plants having similar genotype produced by plant breeding are called

   (A) Clone   (B) Haploid

   (C) Autopolyploid (D) Genome

Answer (A)

Sol. Off-springs of asexual reproduction are exactly similar to their parents and are called Clones.

84. Inland fisheries is related to

   (A) Culturing of fish in fresh water

   (B) Trapping and capturing fish from sea shore

   (C) Deep sea fisheries

   (D) Extraction of oil from fishes

Answer (A)

Sol. Culturing of fresh and brackish water fish is done in inland fisheries. It is used for commercial production.

85. Consider the following statements

   (a) Ozone is formed in stratosphere by the action of ultraviolet radiation on oxygen.

   (b) Ozone layer is depleting due to Carbon dioxide, allowing more ultraviolet rays to reach the Earth Which of the above statement is correct?

   (A) Only (a)   (B) Only (b)

   (C) Both (a) and (b) (D) Neither (a) nor (b)

Answer (A)

Sol. Ozone layer is depleted due to ozone depleting substances (O.D.S) like CFCs, halogens, chlorine etc.

86. Electrical impulse travels in a neuron from

   (A) Dendrite→ axon→ axonal end→ cell body

   (B) Cell body→dendrite→axon→axonal end

   (C) Dendrite→cell body→axon→axonal end

   (D) Axonal end→axon→cell body→ dendrite

Answer (C)

Sol. The passage of information (impulse) occurs in neuron from dendrites to axon.

87. The breakdown of pyruvate to give carbon dioxide, water and energy. This process takes place in

   (A) Cytoplasm   (B) Mitochondria

   (C) Chloroplast   (D) Nucleus

Answer (B)

Sol. Pyruvate enters mitochondria to complete Kreb's cycle in aerobic respiration.

88. Relation between displacement and distance covered by a moving object will be

   (A) Displacement $\geq$ distance

   (B) Displacement < distance

   (C) Displacement > distance

   (D) Displacement $\leq$ distance

Answer (D)

Sol. Displacement $\leq$ distance

Displacement never be greater than distance

89. Action and reaction force acts on

   (A) Same body in opposite direction

   (B) Different bodies in opposite direction

   (C) Different bodies but in same direction

   (D) Same body in same direction

Answer (B)

Sol. Different bodies in opposite direction.

Action and reaction force acts on different bodies in opposite direction

90. If a wire of 1 meter length and 10 Ω resistance is stretched to 3 meter length. Now resistance of the wire will be

   (A) 100 Ω (B) 30 Ω

   (C) 90 Ω (D) 10 Ω

Answer (C)

Sol. 90 Ω

$$\frac{R_2}{R_1} = \left(\frac{\ell_2}{\ell_1}\right)^2 \; : \; \begin{array}{l} \ell_1 = 1m \; \ell_2 = 3m \\ R_1 = 10\Omega \end{array}$$

$$\frac{R_2}{R_1} = \left(\frac{3}{1}\right)^2 = 9$$

$R_2 = 9R_1$

$R_2 = 9 \times 10$

$R_2 = 90 \; \Omega$

91. The area enclosed by velocity-time graph and time axis by an object moving with uniform motion represents
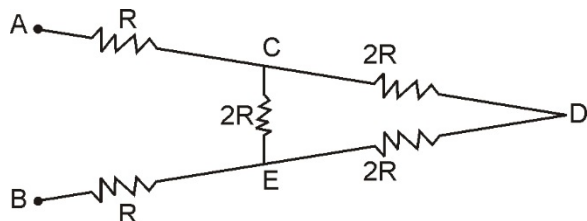
   (A) Magnitude of retardation

   (B) Magnitude of acceleration

   (C) Magnitude of distance

   (D) Magnitude of displacement

Answer (D)

Sol. Magnitude of displacement

Area under the curve of velocity-time graph gives us the displacement

92. In the given circuit the equivalent resistance between A and B is

(A) $\dfrac{4}{3}R$ (B) $\dfrac{10}{3}R$

(C) $\dfrac{5}{3}R$ (D) 10 R

Answer (B)

Sol. $\dfrac{10}{3}R$

$$\dfrac{1}{R_{ce}} = \dfrac{1}{4R} + \dfrac{1}{2R} = \dfrac{1+2}{4R} = \dfrac{3}{4R}$$

$$R_{CE} = \dfrac{4R}{3}$$

$$R_{AB} = R_{AC} + R_{CE} + R_{CB}$$

$$R_{AB} = R + \dfrac{4R}{3} + R$$

$$R_{AB} = \dfrac{3R + 4R + 3R}{3}$$

$$R_{AB} = \dfrac{10}{3}R$$

93. Match the following phenomena to their causes and choose the correct answer.

Phenomenon		**Cause**	
I.	Rainbow	a.	Scattering of light
II.	Brilliance of diamond	b.	Dispersion of light
III.	Blue colour of sky	c.	Atmospheric refraction
IV.	Advance sunrise and delayed sunset	d.	Total internal reflection

	I	II	III	IV
(A)	b	d	a	c
(B)	b	c	a	d
(C)	b	a	c	d
(D)	d	b	a	c

Answer (A)

Sol. Rainbow – Dispersion of light

Brilliance of diamond – Total internal reflection

Blue colour of sky – scattering of light

Advance sunrise and delayed sunset – Atmospheric refraction

94. Read the following statements and choose the correct option

Statement: Newton's second law of motion gives the measurement of force.

Reason: According to Newton's second law of motion, force is directly proportional to the rate of change of momentum.

(A) Both statement and reason are true and the reason is the correct explanation of the statement

(B) Both statement and reason are true but reason is not correct explanation of the statement

(C) Statement is true but reason is false

(D) Statement is false but reason is true

Answer (A)

Sol. Both statement and reason are true and the reason is the correct explanation of the statement.

According to second law of Newton

$$\vec{F} = \dfrac{\Delta \vec{p}}{\Delta t}$$

95. At the time of short circuit, the current in the circuit

(A) Reduces substantially

(B) Increases heavily

(C) Does not change

(D) Vary continuously

Answer (B)

Sol. Increase heavily

96. A glass slab is placed over a piece of paper on which VIBGYOR is printed with each letter in its corresponding colours. The colour that appears to be raised maximum is

(A) Red (B) Blue

(C) Green (D) Violet

Answer (D)

Sol. Violet

$$\Delta t = t\left(1 - \dfrac{1}{h}\right), \ \Delta t_{max} \rightarrow h_{max} \rightarrow \lambda_{min}.$$

$$\lambda v < \lambda R$$

97. The quantity that remains constant in uniform circular motion is

    (A) Velocity   (B) Acceleration

    (C) Speed   (D) Force

Answer (C)

Sol. Speed

In a uniform circular motion speed and kinetic energy remains constant

98. Rays used for taking photograph of object in the dark are

    (A) Gamma rays   (B) Infrared rays

    (C) X-rays   (D) None of these

Answer (B)

Sol. Infrared rays

Taking photograph in dark infrared rays are used

99. A person clapped his hands near a cliff and heard the echo after 4 second. The distance between the cliff and person will be

    (Speed of sound = 346 ms⁻¹)

    (A) 346 meter   (B) 692 meter

    (C) 1384 meter   (D) None of these

Answer (B)

Sol. 692 m

For echo;

$$d = \frac{vt}{2} = \frac{346 \times 4}{2} = 692\,m$$

D = 692 m

100. The work done to increase the velocity of a car from 30 km/h to 60 km/h, if the mass of the car is 1500 kg, is

    (A) $\dfrac{156250}{3}$ Joule   (B) $\dfrac{625000}{3}$ Joule

    (C) $\dfrac{781250}{3}$ Joule   (D) 156250 Joule

Answer (D)

Sol. 156250J

From work-energy theorem

$$W = \frac{1}{2}m\left(v^2 - u^2\right)$$

$$W = \frac{1}{2}1500\left[\left(60 \times \frac{5}{18}\right)^2 - \left(30 \times \frac{5}{18}\right)^2\right]$$

W = 156250J

❏ ❏ ❏