Aakash

Medical | IIT-JEE | Foundations

(Divisions of Aakash Educational Services Pvt. Ltd.)

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Time : 3 Hours

Answers & Solutions

for

NTSE (Stage-I) 2017-18

Max. Marks : 200

INSTRUCTIONS TO CANDIDATES

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

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

3. Part-I : MAT : 1 - 50 questions

   Part-II : Language : 51 - 100 questions

   Part-III : SAT : 101 - 200 questions

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

   Example :

   Correct way :

Q. No.	Alternatives
1	① ② ● ④

   Wrong way :

Q. No.	Alternatives
1	⊗ ⊘ ③ ④

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

5. Disparity in mentioning (SC, ST & PH) in application form and OMR Sheet can make your candidature invalid.

6. 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.

7. Separate Sheet has been provided for rough work in this test booklet.

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

   *Take all your question booklets with you.

9. Darken completely the ovals of your answers on OMR Sheet in the time limit allotted for that particular paper.

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

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

PART-I : MENTAL ABILITY TEST (MAT)

1. In the given sequence some letters are missing. Which of the given options can fill the blanks in the correct order from left to right?

    (1) abaab   (2) abbab

    (3) aabba   (4) bbabb

Answer (4)

Sol. abb/abb/abb/abb

2. Which set of numbers is like the given set?

    Given set 11 ; 1210

    (1) 8 : 448   (2) 6 : 2160

    (3) 7 : 1029   (4) 9 : 729

Answer (1)

Sol. $x : x^2 (x-1)$

    11 : 1210

    $11 : 11^2 \times 10$

    $8 : 8^2 \times 7$

3. CIRCLE is related to RICELC in the same way as SQUARE is related to

    (1) QSUERA   (2) QUSERA

    (3) UQSAER   (4) UQSERA

Answer (4)

Sol.

    CIRCLE   SQUARE
    (crossed)   (crossed)
    RICELC   UQSERA

4. In a code language, STARK is written as LBFMG and MOBILE is written as TNRSPJ. How is BLAME written in that code?

    (1) TSFRJ   (2) RPFTJ

    (3) NJFTP   (4) TSFGJ

Answer (2)

Sol. STARK = LBFMG

    MOBILE = TNRSPJ

    BLAME = RPFTJ

5. If each of the letters in the English aplhabet is assigned odd numerical value beginning A = 1, B = 3 and so on, what will be the total value of the letters of the word INDIAN?

    (1) 86   (2) 88

    (3) 89   (4) 96

Answer (4)

Sol. I = 17, N = 27, D = 7, A = 1

    INDIAN = 2 × 17 + 2 × 27 + 7 + 1

    = 96

6. On another planet, the local terminology for 'earth', 'water', 'light', 'air' and 'sky' are 'sky', 'light', 'air', 'water' and 'earth' respectively. If someone is thirsty there, what would he drink?

    (1) Light   (2) Air

    (3) Sky   (4) Water

Answer (1)

Sol. Water is called light

7. Choose the odd numeral pair

    (1) 2 : 4   (2) 4 : 8

    (3) 6 : 18   (4) 8 : 32

Answer (1)

Sol. $x : x^2/2$

    (1) is odd one

8. Choose the odd one out

    (1) NJN   (2) JLP

    (3) PRU   (4) QSW

Answer (3)

Sol.

    (1) H J N   +2 +4

    (2) J L P   +2 +4

    (3) P R U   +2 +3

    (4) Q S W   +2 +4

9. If A = 2, M = 26, Z = 52, then BET = ?

    (1) 44   (2) 54

    (3) 64   (4) 72

Answer (2)

Sol. BET = 2 × 2 + 5 × 2 + 20 × 2

    = 54

10. Pointing toward Rita, Nikhil said, "I am the only son of her mother's son". How is Rita related to Nikhil?

    (1) Aunt   (2) Niece

    (3) Mother   (4) Cousin

Answer (1)

Sol.

    MOTHER
    /   \
    RITA   SON
            |
          NIKHIL

    so RITA is Nikhil's Aunt

Directions (Q.11 to Q.13) : Read the following information carefully and answer the questions given below

Ravi and Kunal are good in hockey and volleyball. Sachin and Ravi are good in Hockey and baseball. Gaurav and Kunal are good in cricket and volleyball. Sachin, Gaurav and Michael are good in football and baseball.

11. Who is good in Hockey, Cricket and Voleyball?

    (1) Sachin   (2) Kunal

    (3) Ravi   (4) Gaurav

Answer (2)

Sol.

Hockey	Volleyball	Baseball	Cricket	Football
Ravi, Kunal, Sachin	Ravi, Kunal, Gaurav	Sachin, Ravi, Gaurav, Michael	Gaurav & Kunal	Sachin, Gaurav & Michael

12. Who is good in Baseball, Cricket, Volleyball and Football?

    (1) Saching   (2) Kunal

    (3) Gaurav   (4) Ravi

Answer (3)

13. Who is good in Baseball, Volleyball and Hockey?

    (1) Sachin   (2) Kunal

    (3) Ravi   (4) Gaurav

Answer (3)

14. A,P,R,X,S and Z are sitting in a row. S and Z are in the centre, and A and P are at the ends. R is sitting on the left of A. Then who is sitting on the right of P?

    (1) A   (2) S

    (3) X   (4) Z

Answer (3)

Sol. P̲ X̲ S/Z̲ S/Z̲ R̲ A̲

15. A man is facing west. He turns 45º in the clockwise direction and then another 180º in the same directio and then 270º in the anticlockwise direction. Which direction is he facing now?

    (1) South   (2) North West

    (3) West   (4) Sourth West

Answer (4)

16. Kunal walks 10 km towards North. From there, he walks 6 km towards South. Then, he walks 3 km towards East. How far and in which direction is he with reference to his starting point?

    (1) 5 km West   (2) 5 km North East

    (3) 7 km East   (4) 7km West

Answer (2)

17. A watch reads 4 : 30. If the minute hand points East, in what direction will the hour hand point?

    (1) North   (2) North-West

    (3) South-East   (4) North-East

Answer (4)

Directions (Q.18 to Q.20) : These questions are based on the following information :

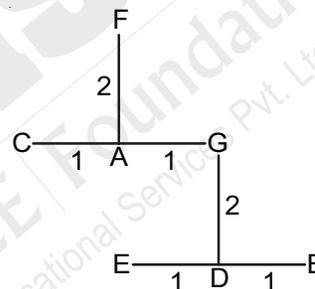*Saven villages A, B,C,D,E,F and G are situated as follows*

   E is 2 2km to the west of B

   F is 2km to the North of A

   C is 1 km to the West of A

   D is 2 km to the South of G

   G is 2 km to the East of C

   D is exactly in the middle of B and E

18. A is in the middle of _____

    (1) E and C   (2) E and G

    (3) F and G   (4) G and C

Answer (4)

Sol.

19. Which two villages are the farthest from one another?

    (1) D and C   (2) F and E

    (3) F and B   (4) G and E
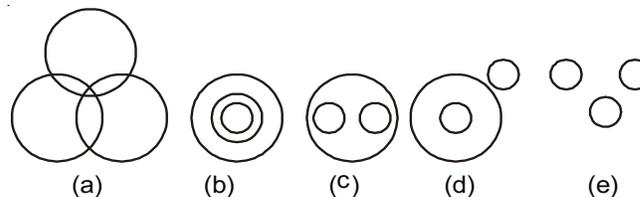
Answer (3)

20. How far is E from F (in km) as the crow flies?

    (1) 4   (2) $\sqrt{20}$

    (3) 5   (4) $\sqrt{26}$

Answer (1)

Directions (Q.21 to Q.25) : In each of these questions, three words are related in some ways. The relationship among the words in the question can best be represented by one of the five diagrams (a), (b), (c), (d) and (e) given below. Mark your answer according.

(a)   (b)   (c)   (d)   (e)

21. Teacher, College, Student

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

Answer (2)

22. Universe, Galaxy, Star

    (1) b   (2) c
    (3) e   (4) a

Answer (1)

23. Parots, Birds, Mice

    (1) e   (2) c
    (3) d   (4) a

Answer (3)

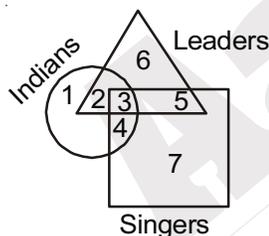24. Professor, Researcher, Scientist

    (1) d   (2) a
    (3) b   (4) c

Answer (2)

25. English, Latin, Greek

    (1) a   (2) d
    (3) c   (4) e

Answer (4)

Directions (Q.26 to Q.30) : *Study the following figure carefully and answer the given questions :*

26. Which region denotes Indian leaders who are not singers

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

Answer (1)

27. Which region represent Indian Leaders who are singers?

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

Answer (2)

28. Which region represents leaders who are neither singers nor Indians?

    (1) 2   (2) 3
    (3) 6   (4) 7

Answer (3)

29. Which region represents Indian singers who are not leaders?

    (1) 1   (2) 2
    (3) 3   (4) 4

Answer (4)

30. Which region represents singers who are neither Indians nor leaders?

    (1) 2   (2) 4
    (3) 6   (4) 7

Answer (4)

Directions Questions (31-32) In each of the following questions choose the word which comes at the end in the English Dictionary

31.

    (1) Clarinet   (2) Clandestine
    (3) Clause   (4) Clasp

Answer (3)

32.

    (1) Disconnect (2) Disembark
    (3) Disclose   (4) Disconcert

Answer (2)

33. Rohan ranks seventh from the top and twenty sixth from the bottom in a class. How many students are there in the class?

    (1) 31   (2) 32
    (3) 33   (4) 34

Answer (2)

Sol. Total = 26 + 7 − 1

    = 32

34. If 1st October is Sunday, then 1st November will be

    (1) Monday   (2) Tuesday
    (3) Wednesday   (4) Thurdsay

Answer (3)

Sol. Number of odd days = 3

35. If + stands for X, − for ÷, × for − and ÷ for +, find the value of 26 + 74 − 4 × 5 ÷ 2

    (1) 220   (2) 376
    (3) 478   (4) 488

Answer (3)

Sol. 26 × 74 ÷ 4 − 5 + 2

    = 478

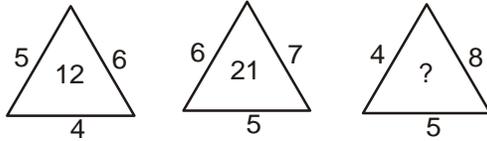36. A farmer built a fence around his square plot. He used 27 fence poles on each side of the square. How many poles did he need altogether.

    (1) 100   (2) 104
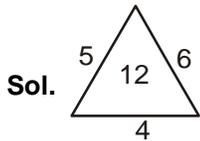   (3) 108   (4) None of these

Answer (2)

Sol. 25 × 4 + 4 = 104

37. Find the missing character from among the given alternatives. Direction (Qestions 37-38)
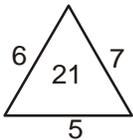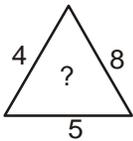

(1) 22
(2) 30
(3) 32
(4) None of these

Answer (4)

Sol.

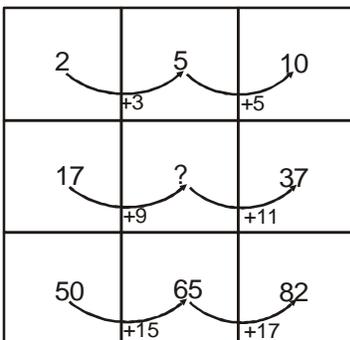$5 \times 4 \times 6 \div 10 = 12$

$6 \times 7 \times 5 \div 10 = 21$

$4 \times 8 \times 5 \div 10 = 16$

38.

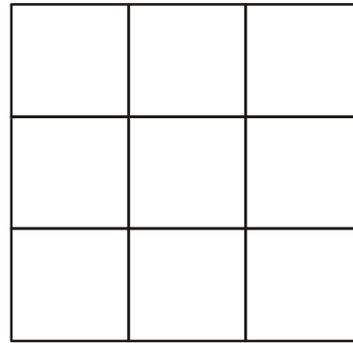| 2	5	10
17	?	37
50	65	82

(1) 20
(2) 26
(3) 27
(4) 32

Answer (2)

Sol.

$17 + 9 = 26$

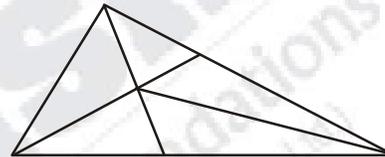39. Count the number of squares in the given figure

(1) 18
(2) 14
(3) 10
(4) 9

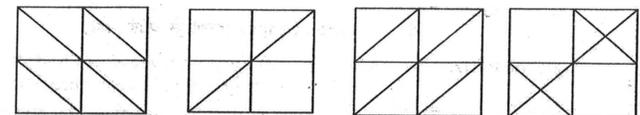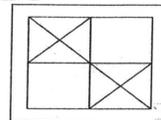**Answer (2)**

Sol. $1^2 + 2^2 + 3^2 = 14$

40. How many triangles are there in the following figures?

(1) 6
(2) 10
(3) 11
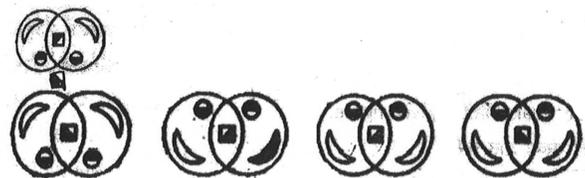(4) 12

Answer (4)

41. Choose the correct mirror image of the figure given below
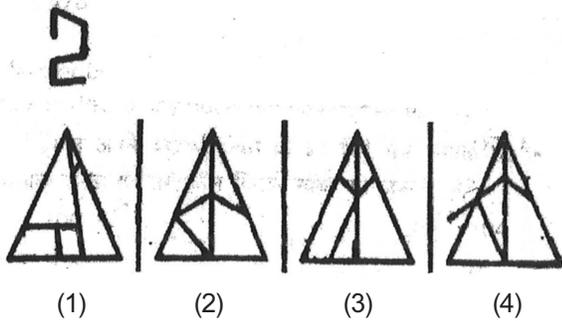

(1)　　(2)　　(3)　　(4)

Answer (4)

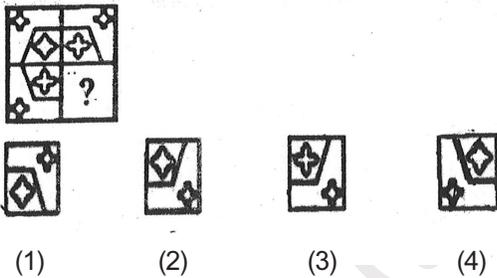42. Chosoe the correct water image for the given figure

(1)　　(2)　　(3)　　(4)

Answer (4)

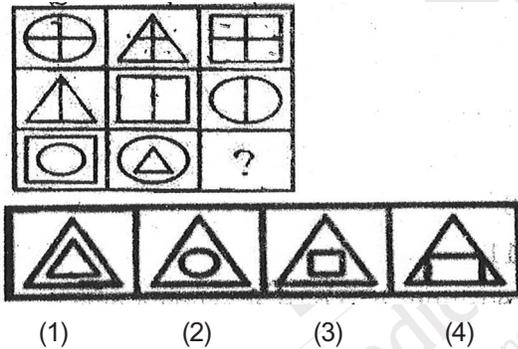43. Find the figure in which the given figure is embeded

(1)　　　(2)　　　(3)　　　(4)

Answer (1)

44. Find the correct figure from the givne four figures which fits in the question figure

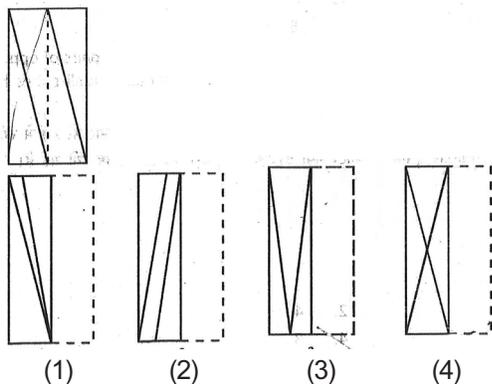(1)　　　(2)　　　(3)　　　(4)

Answer (2)

45. Find out, which of the answer figures complete the figure matrix

(1)　　　(2)　　　(3)　　　(4)

Answer (3)

46. Three figures are followed by foru answer figures from which you have to choose a figure which would most closely resemble the uploaded from of the figure

(1)　　　(2)　　　(3)　　　(4)

Answer (4)

47. Figure out from amongst the four alternatives as to how the pattern would have appear when the transparent sheet is placed along the dotted line

(1)　　　(2)　　　(3)　　　(4)
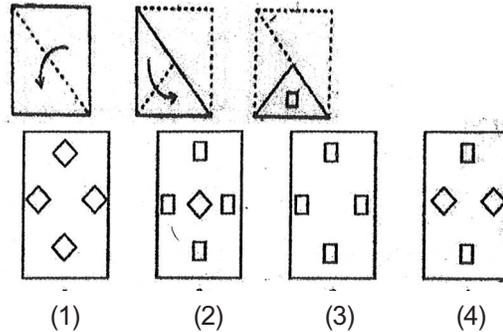
Answer (3)

48. Count the number of cubes inthe given figure
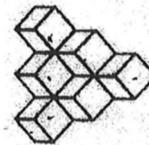
(1) 6　　　　　　　(2) 9

(3) 10　　　　　　(4) 11

Answer (3)

49. What number is opposite to 6, if four different positions of a dice are shown below
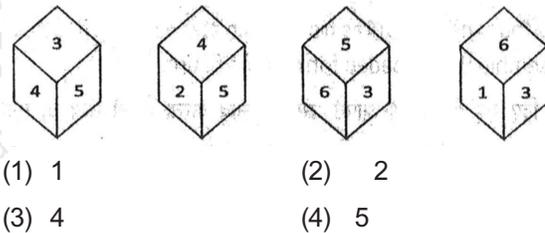
(1) 1　　　　　　　(2) 2

(3) 4　　　　　　　(4) 5

Answer (3)

50. A solid cube of each side 8 cms has been painted red, blue and green on pairs of opposite faces. It is then cut into cubical blocks of each side 2 cms. How many small cubes have three faces painted?
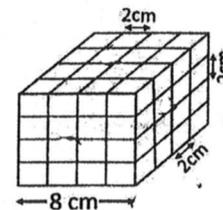
(1) 0

(2) 4

(3) 6

(4) 8

Answer (4)

PART-II : LANGUAGE TEST

Directions (Q.51 to Q.55) : Read the following passage and answer the questions based on it.

Gandhi without realising it, had found the secret of success. He began to look on every difficulty as an opportunity for service, a challenge which could draw out of him greater and greater resources of intelligence and imagination. In turning his back on personal profit or prestige in his work, he found he had won the turst and even love of white and Indian South Africans alike. More and more people from his own community began to entrust their legal work to him. In short time legal work to him. In short time he was a successful lawyer, dignified with westernised life style.

He brought his wife Kasturba and two sons to their new home and painfully they adjusted to the tortures of alien cloths and artificial manners. At first they objected bitterly, but Gandhi was unyielding. It was essential to look "civilized" that is, European. That was the price of success, and all of them had to pay for it.

But the political and soical repression of all Indian in South Africa, and especially the desperate condition of those who come as labourers on a system equivalent to legalised slavery, had made a deep impression on Gandhi. When the black plague broke out in the squalid ghetto of Johannesburg, the sick and dying were taken to an abandoned, quarrantined building where a heroric English nurse spend long hours alone caring for them. Many years later she related that at the height of epidemic Gandhi come to help. She warned him that it was plague, but he went straight to the sick. She saw him bending over a dying man covered with vermin. Gandhi tended to him and whispered. "He is my brother".

51. Gandhi found the secret of success in _____
    (1) personal profit.
    (2) prestige in his work.
    (3) every difficulty as an opportunity.
    (4) turning his back on personal profit or prestige in his work.

Answer (4)

52. Kasturba _____
    (1) was happy dressing in alien clothes.
    (2) did not agree to dress in alien clothes.
    (3) intially resisted to wear alien clothes and adopt artificial manners.
    (4) Could not adjust to alien clothes and artificial manners.

Answer (3)

53. Gandhi identified with _____
    (1) the Europeans
    (2) his family
    (3) the labourers who came from India
    (4) None of the above

Answer (3)

54. The Nurse was looking after _____
    (1) Plague patients.
    (2) Patients with infectious disease.
    (3) Sick and the dying Indians.
    (4) Indian labourers suffering from black plague.

Answer (3)

55. The man was dying due to _____
    (1) Vermin
    (2) black plague
    (3) ill treatment
    (4) squalid living conditions

Answer (2)

Directions (Q.56 to Q.60) : Read the following passage and answer the questions based on it.

It is a common belief that without money nothing is possible in the modern era. It is so because the MNCs (Multi National Companies) are spreading their wings in every field in India.

So, we have in our country all things from a pin to an aeroplane made by some foreign company. In the glitter of foreign company. In the glitter of foreign life, which is based on manipulation of money instead of real friendship or real love between human hearts, the Indians are losing their cultural shape to some extent. This is bringing about a number of changes in our living styles.

In the name of globalisation we are being sold foreign branded sweetened water in the form of cold drinks, sweet things like biscuits made of wheat, tinned fruits, vegetables, jams, concentrated fruit, juices, chocolates etc. All these things are produced in India. For that the foreign companies buy raw material at low rates in India, process it in India and then sell the manufactured products to the Indians at a very high price. Previously, the Britishers took the raw material from India, changed it into finished goods and sold it back to the Indians at exortbitant rates. Now, the foreigners need not take the raw material to their own countries when they can do the mischief on our own land and thus beat us in our own house.

56. Which common belief has got the hold of every Indian mind?

    (1) Money is the be all and end all of everything.

    (2) Balance between money and family is important.

    (3) Everything is useless.

    (4) Real friendship and love in human hearts make life worth living.

Answer (1)

57. Money is affecting the cultural shape of our society because

    (1) Human values appear cheap in face of glitter of money.

    (2) We have started to run after material gains.

    (3) We like to be manipulated by money.

    (4) Friendship cannot be easily bought.

Answer (3)

58. Globalisation means

    (1) We can tour the world.

    (2) Whole world is one big market.

    (3) Free exchange of ideas with anybody.

    (4) We becoem citizens of the world.

Answer (2)

59. How are foreign companies taking advantage of India?

    (1) They buy the raw material from India and sell them the finished products.

    (2) They buy the raw material, get things produced in India and sell finished products at high prices.

    (3) They buy raw material from India and sell finished products in their own countries only.

    (4) They buy raw material from India, get things produced in India and sell the finished product in other countries.

Answer (2)

60. How did the foreign companies and the Britishers differ?

    (1) Foreign companies sold products in India whereas Britishers did not.

    (2) Foreign companies gave jobs to Indians but Britishers did not do so.

    (3) Foreign companies bought the raw material from India and produced the finished products here only whereas Britishers took the raw material to their own country for production.

    (4) Britishers liked Indian raw material but not the finished goods and foreign companies like every product of India.

Answer (3)

Directions (Q.61 to Q.65) : Read the following passage and answer the questions based on it.

Crime has become an inseparable part of our society. But this doesn't mean that we can allow them, to impact our daily lives and create darkness even on the brightest days. Eliminating crime is must and harsh punishments are one of the effective ways to reduce crime. It stands especially true for the people who commit crime just for fun. The concept of punishment is based on theories.

The theory in which goal of punishments is to deter the future crime is known as utilitarian theory. Deterrence is the objective of harsh punishments as it creates an aversion for the possible results of criminal actions. It is justified only when the harm that punishment given to criminal. If it doesn't detter, it adds to the human suffering.

However, utilitarian theory believes that punishment may or may not have deterrent effect.

Retributive theory focuses on the past actions of criminal. The moral blame is assigned to criminal and his future conduct doesn't form a base for deciding punishment. In it, punishment is must and justified as criminals have committed an immoral act and deserve harsh punishment. It basically follows the concept of an eye for an eye. The emphasis is on the moral connection between guilt and punishment. Punishment is seen as a question of accountability and responsibility. Criminals pay their debt in form of punishment. Retributive theory advocates harsh punishment and they argue that it reduces crime as no matter what. Some people don't learn easy lessons. If they are treated with sympathy, they take it as a weakness of society.

61. The main idea of the passage is to

    (1) describe crime and teach people to live with it.

    (2) explain the theories of punishment.

    (3) have a deterrent effect on criminal minds.

    (4) make people aware of different theories for mitigating crime.

Answer (2)

62. Utilitarian theory advocates

    (1) giving harsh punishment so that in future crime is not committed.

    (2) punishment cannot stop crime.

    (3) to understand the behaviour pattern of criminals.

    (4) to ehance the positive outcomes of punishment.

Answer (1)

63. The focus of Retributive theory is on
(1) giving same pain and punishment to the criminals which they have given to others.
(2) creating an aversion for the possible results of criminal actions.
(3) giving appropriate punishment to the criminal.
(4) teaching them to be vindictive and full of vengenace.

Answer (3)

64. The effect of crime on daily life is that
(1) people have lost their peace of mind.
(2) crime is equated at par with fun.
(3) Society try to eliminate crime through punishment.
(4) it impacts daily life and creates darkness on the brightest days.

Answer (4)

65. Gun culture is prevalent in America. We keep reading about incidents of any crazy guy who catches hold of gun and indiscriminately opens fire and kills many people without any rhyme or reason. In scuh instances punishment should be decided by.
(1) Understanding the background of the attacker.
(2) correcting him morally first.
(3) making him suffer the way he made offers.
(4) making him understand the severity of his actions and the sorrow that he has brought on others.

Answer (1)

Directions (Q.66 to Q.67) : Read the following passage and answer the questions based on it.

The first and last sentences are given choose. The right order in which the sentences(PQR) should appear to complete the paragraph.

66. S.1. Computers have become an in integral part of our lives as they offer us just anything under the
S.2
S.3
S.4
S.5 Excessive use of computer is causing innumerable problems related to health so it should be used judicioulsy.

P - Modern children easily get hooked on them especially because of the games.

Q - No doubt they have made lives easier but not without a price.

R - From banking shopping, entertainment, knowledge, you name it and you have access to it.
Choose from the options given below
(1) RPQ (2) PQR
(3) QPR (4) RQP

Answer (1)

67. S.1 The means used to achieve ends are important as the end itself.
S.2
S.3
S.4
S.5 Therefore success without values is unreprehensible and can never acquire societal approval.

P - Success achieved through dishonesty is illegal and gets disrepute rather than praise.

Q - Using unfair means to get what you want is in a way succeeding in your endeavour but cannot be approved.

R - It is an easy way out to succed and makes one compromise not only with learning gained in the process of achieving ones good but also with ones integrity.
Choose from the options given below
(1) RPQ (2) QRP
(3) PQR (4) RQP

Answer (3)

Directions (Q.68 to Q.69) : The following questions have the second sentence missing. Choose the appropriate sentence from the given options to complete it.

68. A. In most of the villages in India people are poor so are illiterate also
B.
C. Thus, they are unable to extricate themselves out of this miserable life.
(1) They are superstitious, backward and believe in witches, wizards and ghosts.
(2) They consume alcohol, tobacco and also narcotics.
(3) Many people in villages live is small houses made of mud.
(4) Village life is slow paced and full of leisure.

Answer (1)

69. A. Hostel life is larger than family life
B.
C. One gets the lessons of mutual help and team-spirit.
(1) The strict discipline of hostel detaches them from real life.
(2) It is a popular place for enjoying adventure.
(3) There is always some kind of activity going on.
(4) One can learn to live together with firends in good as well as bad times.

Answer (4)

Directions (Q.70 to Q.79) : Fill in the blanks with the most appropriate option from given alternatives

70. Msot of the migrants from Pakistan and Bangladesh have settled in _____.
    (1) the outskirts of Delhi
    (2) and around of Delhi
    (3) the Posh areas in Delhi
    (4) hub of Delhi

Answer (1)

71. The direction we take _____the rest of our Journey through life
    (1) decide   (2) determines
    (3) directs   (4) revolves

Answer (2)

72. He wears eyeglasses with_____ lenses
    (1) square   (2) improper
    (3) thick   (4) unusual

Answer (3)

73. When a child is working on a computer one _____ to think he is engaged in serious work.
    (1) forced   (2) tends
    (3) believed   (4) envisage

Answer (2)

74. The poet_____to convey that there is a generation gap between father and son
    (1) unable   (2) wishes
    (3) regards   (4) perceives

Answer (2)

75. Every day they would_____and much everything i slight
    (1) drink   (2) swallow
    (3) chomp   (4) crash

Answer (3)

76. The_____Son needs to realize that his father loved him
    (1) intelligent (2) smart
    (3) thoughtful   (4) prodigal

Answer (3)

77. Childhood is a lost_____hidden in some forgotten place
    (1) opinion   (2) thought
    (3) feeling   (4) memory

Answer (4)

78. Water has made our earth colourful_____with life of a vast variety
    (1) vibrate   (2) pulsating
    (3) jubilant   (4) delightful

Answer (3)

79. The Japanese and the Hawaiians _____eating sea plants but it is not so in other countries where it si used as manure
    (1) adored   (2) abhor
    (3) relish   (4) enjoy

Answer (4)

Directions (Q.80 to Q.85) : Select the meaning of the underlined phrase/idioms.

80. All the politicians are chips of the same block
    (1) alike   (2) different
    (3) patriotic   (4) full of loyalty

Answer (1)

81. My neighbour always threatens me with dire consequences if I do not submit to his aggressive behaviour
    (1) unfair results   (2) misunderstanding
    (3) indecisive results (4) restoring faith

Answer (3)

82. Shagun is always boasting about his achievement where as it is just a case of empty vesselsl making a lot of noise
    (1) self praise
    (2) to glorify others
    (3) behaving in a strange way
    (4) always picking up a fight

Answer (1)

83. Though the car looks good but it is not worth a dime
    (1) expensive   (2) very cheap
    (3) not in good condition (4) completely wrecked

Answer (2)

84. Her imagination plays havoc as idle mind is a devils workshop
    (1) to over think   (2) remain absentminded
    (3) lost in thought   (4) today-dream

Answer (1)

85. I am at my wits end as I did not prepare for exam in time.
    (1) impatient
    (2) to feel completely at loss
    (3) helpless
    (4) make sense

Answer (3)

Directions (Q.86 to Q.93) : In the following passage there are some numbered blanks.

Fill in the blanks by selecting the most appropriate word for each blank from the given options.

The rain gets (86)_____over the land and the sea. The vapours go to the (87)_____and take the (88) _____of clouds. These clouds have the (89)_____which form the (90)_____on the earth. Therain (91)_____on the earth to wash and (92)_____ the dry and (93)_____things.

86.
(1) constructed   (2) cascade
(3) formed   (4) manufactured

Answer (3)

87.
(1) Planet   (2) moon
(3) heaven   (4) hell

Answer (3)

88.
(1) Shape   (2) Shadow
(3) Shade   (4) From

Answer (3)

89.
(1) droplets   (2) waves
(3) atoms   (4) dust layers

Answer (1)

90.
(1) dust   (2) wind
(3) water   (4) rain

Answer (4)

91.
(1) ascends   (2) descends
(3) jumps   (4) grows

Answer (2)

92.
(1) rinse   (2) spray
(3) bathe   (4) throttle

Answer (3)

93.
(1) hungry   (2) latent
(3) thirsty   (4) motionless

Answer (2)

Directions (Q.94 to Q.97) : Select the most appropriate option to fill in the blanks from the given alternatives

94. All over India gender discrimination is still _____ which causes harassment of all kinds for women.
(1) rampant   (2) emergent
(3) apparent   (4) developed

Answer (3)

95. What marked Bismillah Khan was his simplicity and _____ for riches that come with musical fame.
(1) greed   (2) disregard
(3) gradeur   (4) illusion

Answer (3)

96. The institute had trained the students not just in trade but had also _____ to develop intelligence and moral character in them.
(1) made an effort   (2) aspired
(3) endeavoured   (4) assisted

Answer (3)

97. It was sheer courage and an optimistic attitude which helped the Voyagers survive the _____experience at sea.
(1) unusual   (2) Impenetrable
(3) tumultous   (4) hazardous

Answer (3)

Directions (Q.98 to Q.100) : Choose the antonym of the underlined word from the four alternative given

98. Each one on the Wave walker contributed in battling death by not revealing their anxiety and fear.
(1) submerging
(2) concealing
(3) hiding
(4) providing

Answer (2)

99. Mouse is a suitable model for conducting reasearch related to human body
(1) insuitable   (2) unsuitable
(3) nonsuitable   (4) imsuitable

Answer (2)

100. Inhuman and squalid condition of the hospital was unbearable
(1) clean   (2) slopy
(3) repulsive   (4) sordid

Answer (1)

PART-III : SCHOLASTIC APTITUDE TEST (SAT)

101. This diagram shows the process of

(1) Binary Fission (2) Multiple fission

(3) Regeneration (4) Budding

Answer (3)

Sol. It is regeneration as the lost parts are regenerated to form a new organism

102. The Gene which control the blood group represented by the letter
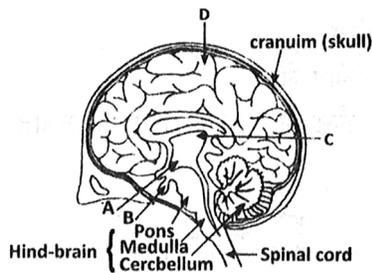
(1) B (2) E

(3) I (4) O

Answer (3)

103. Person who are infected with .... can donate eyes

(1) AIDS (2) Diabetes

(3) Hepatitis B or C (4) Rabies

Answer (2)

Sol. Diabetes is a non-communicable disease

104. Which part of brain shows pituitary gland?

(1) B (2) C

(3) D (4) A

Answer (1)

105. The hormone which promote cell division in plants is ......

(1) Gibberellins (2) Abscisic acid

(3) Cytokinins (4) Auxins

Answer (3)

106. Which one of the following is a type of nutrition in Amoeba?

(1) Holozoic (2) Autotrophic

(3) Parasitic (4) Saprophytic

Answer (1)

Sol. It engulfs food particles by pseudopodia formation

107. ...... transports products of photosynthesis from the leaves where they are synthesised to other parts of the plant

(1) Xylem (2) lymph

(3) nephrons (4) phloem

Answer (4)

Sol. Phloem is a vascular tissue responsible for transport of food materials in plants.

108. Which of the following is a biotic components of an ecosystem?

(1) Living organisms (2) Temperature

(3) Soil and minerals (4) All of the above

Answer (1)

Sol. Rest all are abiotic components.

109. .... is a dark muscular diapharagm that controls the size of the pupil

(1) cornea (2) retina

(3) iris (4) Crystalline lens

Answer (3)

Sol. It consists of circular and radial muscles that contract and relax alternately to change the size of pupil in response to exposure to different intensities of light.

110. Which part of neuron shows Dendrite?
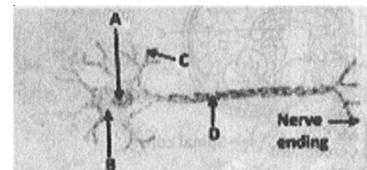
(1) D (2) B

(3) B (4) A

Answer (2)

111. Which part of the cell is also termed as 'suicide bags of the cell'?

(1) Ribosomes (2) Golgi bodies

(3) Lysosomes (4) Mitochondria

Answer (3)

Sol. The lysosomes contain hydrolases that digest dead or old cell organelles.

112. Which tissue of the following coconnects bone and muscle?

(1) Ligament (2) Cartilage

(3) Areolar Tissue (4) Tendon

Answer (4)

113. Which of the following is correct order for classification of animals

   (1) Kindgom, Phylum, Class, Order, Family, Genus, Species

   (2) Kingdom, Phylum, Order, Class, Genus, Family, Species

   (3) Kingdom, Class, Order, Phylum, Genus, Family, Species

   (4) Kingdom, class, Genus, Phylum, Family, Order, Species

Answer (1)

114. What factors could lead to the rise of new species?

   (1) Natural selection

   (2) Genetic drift

   (3) Acquisition of traits during life time

   (4) All of above

Answer (4)

Sol. All the listed factors lead to evolution of organisms.

115. White silver chloride turns .... in sunlight.

   $2AgCl(s) \xrightarrow{Su-nli-gh-t} 2Ag(s) + Cl_2(g)$

   (1) Grey   (2) Brown

   (3) Blue   (4) Green

Answer (1)

Sol. On placing AgCl crystal in sunlight it slowly acquires grey colour.

116. Which one of the following is not an organic acid?

   (1) Citric acid   (2) Formic acid

   (3) Carbonic acid   (4) Carboxylic acid

Answer (3)

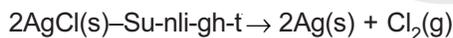**Sol.** Carbonic acid is inorganic carbon acid and has formula H_2CO_3

117. What type of reactionis this?

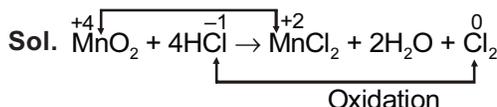 $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

   (1) Redox reaction

   (2) Displacement reaction

   (3) Double displacement reaction

   (4) Decomposition reaction

Answer (1)

Redox reaction

Reduction

Sol. $\overset{+4}{Mn}O_2 + 4H\overset{-1}{Cl} \rightarrow \overset{+2}{Mn}Cl_2 + 2H_2O + \overset{0}{Cl_2}$

Oxidation

118. The atmosphere of Venus is made up of thick white and yellowish clouds of ......

   (1) Acetic acid   (2) Sulphuric acid

   (3) Nitric acid   (4) Hydrochloric acid

Answer (2)

Sol. Venus clouds are thick and are composed of sulphur dioxide and droplets of sulphuric acid.

119. Aqua regia is a highly corrosive, fuming liquid. It is one of the few reagents that is able to dissolve ......

   (1) Platinum   (2) Gold

   (3) Both 1 and 2   (4) Neither 1 or 2

Answer (3)

Sol. When 3 parts of conc HNO_3 and one part of conc HCl is mixed aqua regia is formed is used for dissolving noble metals such as gold and platinum.

120. .... is a non-metal but is is lustorous

   (1) Carbon   (2) Sulphur

   (3) Bromine   (4) Iodine

Answer (4)

Sol. Iodine is slightly lustrous non-metal.

121. .... plants are one of the most efficient convertors of sunlight into chemical energy

   (1) Jatropha   (2) Sugarcane

   (3) Cotton   (4) Sunflower

Answer (2)

122. The head of a soap molecule is known as ....

   (1) Hydrocarbon   (2) Hydrophobic

   (3) Hydrogen Carbonate   (4) Hydrophilic

Answer (4)

123. Esters are formed by the combination of

   (1) Alcohol + Aldehyde

   (2) Crboxylic Acid + Alcohol

   (3) Carboxylic Acid + Aldehyde

   (4) Alcohol + Aldehyde

Answer (2)

Sol. It is an Esterification reaction.

   Carboxylic acid + Alcohol $\xrightarrow{H^+}$ Ester + H_2O
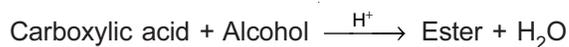
124. .... was the element which was discovered later and replaced Ekaaluminum.

   (1) Scandium   (2) Gallium

   (3) Germanium   (4) Silicon

Answer (2)

Sol. Eka Aluminium was the name given by Mendeleev for then unknown element Gallium.

125. An isotope of .... is used in the treatement of cancer

    (1) Cobalt (2) Iodine

    (3) Uranium (4) Chlorine

Answer (1)

Sol. Cobalt-60 is used.

126. Face cream is an example of ....

    (1) Aerosol (2) Emulsion

    (3) Foam (4) Gel

Answer (2)

Sol. Face cream is an example of a colloidal solution (Emulsion) in which both dispersed phase and dispersion medium are liquids

127. For spherical mirrors of small apertures, the radius of curvature is found to be .....

    (1) Equal the focal length

    (2) Twice the focal length

    (3) Thrice the focal length

    (4) There is no relation between them

Answer (2)

Sol. For spherical mirrors of small aperature,

$$f = \frac{R}{2} \text{ (where R = radius of curvature \& f = focal length)}$$

R = 2f

128. A convex mirror used for rear-view on an automobile has a radius of curvature of 3.00 m. If a bus is located at 5.00 m from this mirror, find the size of the image

    (1) 0.32 m (2) 0.23 m

    (3) 0.87 m (4) 1.15 m

Answer (No option)

Sol. $f = \frac{R}{2} = \frac{3}{2} m$

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{2}{3} - \left(\frac{-1}{5}\right)$$

$$\frac{1}{v} = \frac{2}{3} + \frac{1}{5}$$

v = 1.15 m

We cannot find out size of image unless the size of object is not given so data is insufficient

129. The net power (P) of three lenses having powers P1, P2 and P3 placed in contact is given by

    (1) P = P1 × P2 × P3

    (2) P = P1 + P2 + P3

    (3) 1/P = 1/P1 + 1/P2 + 1/P3

    (4) P = (P1 + P2 + P3)/3

Answer (2)

Sol. Theory based

130. Two wires that are made up of two different materials whose specific resistance are in the ratio 2 : 3, length in ratio 3 : 4 and area in 4 : 5. The ratio of their resistance is

    (1) 6 : 5 (2) 6 : 8

    (3) 5 : 8 (4) 1 : 2

Answer (3)

Sol. $R = \frac{\rho l}{A}$

Where ρ = specific resistance

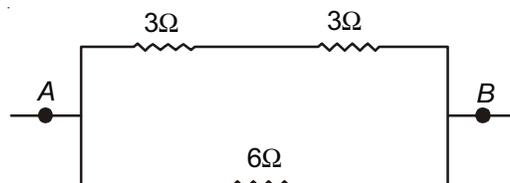l = length of wire

A = area of cross-section of wire

$$R_1 = \frac{\rho_1 l_1}{A_1}$$

$$R_2 = \frac{\rho_2 l_2}{A_2}$$

$$R_1 : R_2 = \frac{\rho_1 l_1}{A_1} \times \frac{A_2}{\rho_2 l_2}$$
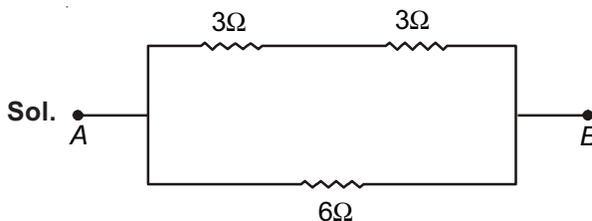
= 5 : 8

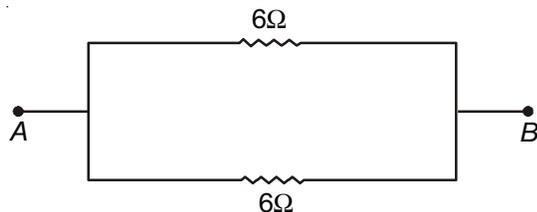131. The equivalent resistance between the points A and B in the circuit as shown in the figure below is

    (1) 3 (2) 13

    (3) 6 (4) 1/3
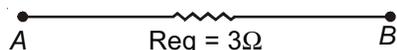
Answer (1)

Sol.

(Since 3Ω and 3Ω are in series)

6Ω

A   B

6Ω

and ($6Ω$ and $6Ω$ are in parallel)

A   Req = 3Ω   B

132. What is the unit of resistivity

(1) $Ωm^2$　　　　　　(2) $Ωm^{-1}$

(3) $Ωm^{-2}$　　　　　(4) $Ωm$

Answer (4)

Sol. $R = \dfrac{\rho l}{A}$

$\rho = \dfrac{RA}{l} = \dfrac{Ωm^2}{m}$

$= Ωm$

133. 100 J of heat are produced each second in a $4Ω$ resistance. Find the potential difference across the resistor

(1) 400V　　　　　　(2) 10V

(3) 20V　　　　　　　(4) 25V

Answer (3)

Sol. $P = \dfrac{V^2}{R}$

[∵ P = power, V = potential difference, R = Resistance]

Given : P = 100 J/s

R = $4Ω$

V = 20 volt

134. Two bulbs are marked 100W, 220V and 50W, 110V. Calculate the ratio of their resistances.

(1) 2 : 1　　　　　　(2) 1 : 2

(3) 3 : 4　　　　　　(4) 1 : 3

Answer (1)

Sol. $P = \dfrac{V^2}{R}$

$R = \dfrac{V^2}{P}$

$R_1 = \dfrac{V_1^2}{P_1}$

$R_2 = \dfrac{V_2^2}{P_2}$

$R_1 : R_2 = \dfrac{V_1^2}{P_1} \times \dfrac{P_2}{V_2^2} = \dfrac{(220)^2}{100} \times \dfrac{50}{(110)^2} = 2 : 1$

135. An induced current is produced when a magnet is moved into a coil. The magnitude of induced current does not depend on

(1) The speed with which the magnet is moved

(2) The resistivity of the wire of the coil

(3) The number of turns of the coil

(4) The strength of the magnet

Answer (3)

Sol. Taking area of crossection of coil as constant then

If we increase no. of turns by n times then flux will increase n times, thus the induced emf will increase n times

But the resistance of coil will also increase n times, because length of the wire in which current flows, will increase n time

$i = \dfrac{\text{emf induced}}{R} = \dfrac{n\varepsilon}{nR} = \dfrac{\varepsilon}{R} = \text{constant}$

136. A strong smelling substance called ethyl mercaptane which is added to LPG cylinders to help in the detection of gas leakage has the chemical formula as

(1) C_2H_5SH　　　　　(2) C_2H_5CHO

(3) C_2H_5OH　　　　　(4) C_2H_5COOH

Answer (1)

Sol. Theory based

137. The aviation fuel which is used in the engine of jet aeroplanes is very close to

(1) Diesel　　　　　　(2) Natural Gas

(3) Petrol　　　　　　(4) Kerosene

Answer (4)

Sol. Theory based

138. The unit of solar constant is

(1) kWh　　　　　　(2) kW/m

(3) kW/m^2　　　　　(4) kW/m^3

Answer (3)

Sol. Theory based

139. The flaws like internal cracks etc. in the metal blocks are detected by using _____

(1) Reverberation　　　(2) Ultrasound

(3) Infrasound　　　　(4) Eco location

Answer (2)

Sol. Theory based

140. A person standing at a certain distance from a wall produces a loud sound. He hears the echo of the sound after 1.8s. Calculate the distance between the wall and the observer if the velocity of sound in air is 340 m/s

(1) 612m   (2) 306m

(3) 377.7m   (4) 755.4m

Answer (2)

Sol. Total time taken by sound to reach the observer is

$\dfrac{2d}{v}$ ($\because$ where d is distance between observer and wall and v is the speed of sound)

$t = \dfrac{2d}{v}$

d = 306 m

141. Arrange the following states in ascending order of pupulation densely.

I. Assam   II. Nagaland

III. Tripura   IV. Mizoram

(1) I, II, III, IV,   (2) II, IIII, IV, I

(3) IV, II, III, I   (4) IV, I, II, III

Answer (3)

142. Match lits I Animals / plants with list II category or existence and select the answer using the codes given below.

List-1 (Animals/plants list II (category of existence)

I. Black bulk   A. Extinct

II. Asiatic elephant   B. Rare

III. Andaman Pig   C. Endangered

IV. Himalayan brown bear D. Vulnerable

V. Pink head duck   E. Endemic

(1) I-B, II-C, III-A, IV-D, V-E

(2) I-C, II-B, III-D, IV-E, V-A

(3) I-C, II-D, III-E, IV-B, V-A

(4) I-E, II-D, III-B, IV-A, V-B

Answer (3)

143. Find out the incorrect statement with respect to Black soil

(1) Black soil is well known for its capacity to hold moisture

(2) Black soil is rich in phosphoric content

(3) Black soils is sticky when wet and difficult to work

(4) Deep crack in black soil helps in the proper aeration of the soil

Answer (2)

144. Which type of drainage patterns is formed when the river channel follows the slope of the terrain?

(1) Radial   (2) Rectangular

(3) Trellis   (4) Dendritic

Answer (4)

145. Contour lines represent _____.

(1) Areas recording same amount or rainfall

(2) Areas having same degree of temperature

(3) Areas having same height above mean sea level

(4) Aereas showing same pressure

Answer (3)

146. Tropic of cancer passs through _____ state

(1) Mizoram   (2) Bihar

(3) U.P.   (4) Nagaland

Answer (1)

147. Arrange the following Sanctuaries/National parks of India from North to Southdirection.

I. Bandipur

II. Sariska

III. Dachigam

IV. Periyar

(1) I   IV   III   II

(2) III   IV   II   I

(3) III   II   I   IV

(4) I   III   II   IV

Answer (3)

Sol. Bandipur – Karnataka

Sariska – Rajasthan

Dachigam – Kashmir

Periyar – Kerala

148. Sivasamudram waterfall is formed by _____ river

(1) River Kaveri   (2) River Tapti

(3) River Narmada   (4) River Godavari

Answer (1)

149. Which of the following statement is

(1) It grows well in hot climate with temperature of 25ºC

(2) The major sugarcane producing states are Himachal and Haryana

(3) It is a tropical as well as subtropical crop, grows well in hot and humid climate

(4) Indian is the first largest producer of sugarcane

Answer (3)

150. Which of the following industries, uses bauxite as a raw material?

   (1) Aluminium   (2) Cement

   (3) June   (4) Steel

Answer (1)

151. Which of the following is not a non-ferrous mineral?

   (1) Bauxite   (2) Copper

   (3) Zinc   (4) Manganes

Answer (4)

152. Which of the following mountain peak does not lie in India?

   (1) Namcha Barua   (2) Nanda Devi

   (3) Annapurna   (4) Kamet

Answer (1)

Sol. (1) Namcha Barwa is in Tibet region

153. In the context of France, Taille was _____

   (1) Diect tax levied by the state

   (2) A tax levied by the church

   (3) The tax levied on the articles of everyday consumption

   (4) None of these

Answer (1)

154. Find out the incorrect statements with regard to Rowlatt Act.

   I.   Rowlatt Act was passed in 1919

   II. The act allowed detention of political prisoners without trial for 4 years

   III. The act was passed with the consent of Indian members

   IV. The act allowed detention of political prisoners without trial for two years

   (1) Only I and II   (2) Only III and IV

   (3) Only II and III   (4) Only I and IV

Answer (3)

155. Which of the following constinent was discovered by Christophe's Columbus?

   (1) America   (2) Africa

   (3) Europe   (4) Asia

Answer (1)

156. Which of the following state lead the unification of Germany?

   (1) Rhineland   (2) Hanover

   (3) Prussia   (4) Brunswick

Answer (3)

157. Who was the founder of the Hoa Hao movement?

   (1) Phan Boi Chau   (2) Huyunh Phu So

   (3) Liang   (4) Phanchu

Answer (2)

158. Which of the following style of education was provided by Tonkin Free School (1907)

   (1) Chinese   (2) French

   (3) Western   (4) Vietnamese

Answer (3)

159. James Hargreaves devise _____

   (1) Spinning Jenny   (2) Steam engine

   (3) Spinning wheel   (4) Printing machine

Answer (1)

160. Which of the following pair of Author and Novel is correctly matched

   (1) Srinivas _____ Indulekha

   (2) Bankimchander – Durgesh Chhattopadhyaya – Nandini

   (3) DevkiNandan khatri – Godan

   (4) O. Chander Meno - Pariksha Guru

Answer (2)

161. The Russian Parliament was called as

   (1) Reichstag   (2) National Assembly

   (3) House of commons   (4) Duma

Answer (4)

Sol. Reichstag – Germany

   National Assembly - France

   House of commons – U.K.

   Duma - Russia

162. Hitler's ideology related to the geopolitical concept of Lebensraum, or living space implied:

   (1) There was no equalty between people, but only a racial hierarchy

   (2) Only those species survived on earth that could adapt themselves to changing climatic conditions

   (3) New territories had to be acquired for settlement to increase the area of the mother country

   (4) An exclusive racial community of pure Germans to be created by physically eliminating all those who were seen as undesirable

Answer (3)

163. Kalangan Community of Java were

   (1) Spinners   (2) Shifting cultivators

   (3) Potters   (4) Cattle Herders

Answer (2)

164. Which of the following forest communities is wrongly mathced

(1) Santhals _____ Jharkhand

(2) Oraon _____ Nagaland

(3) Gonds _____ Chhattisgarh

(4) Khasas _____ Himachal

Answer (2)

165. Which of the following State fall in the category of holding together federations?

(1) Switzerland   (2) Ausralia

(3) US   (4) Spain

Answer (4)

166. Match list 1 with list II and select the answer using the order given below the list

List 1		List 2
I.	Pressure group	A. Assam Gan Parishad
II.	Long term Movement	B. Fertilizer dealing association
III.	Single issue movement	C. Women movement
IV.	Political party	D. Narmada Bachao Andolan

(1) I-C, II-D, III-A, IV-B   (2) I-B, II-C, III-D, IV-A

(3) I-B, II-D, III-C, IV-A   (4) I-C, II-C, III-B, IV-A

Answer (2)

167. Which of the following union territory has its own Assembly?

(1) Chandigarh   (2) Lakshaweep

(3) Puducherry   (4) Daman and diu

Answer (3)

Sol. Delhi, Puducherry are union territory has its own Assembly

168. In which of the following country the participation of women in public life is highest

(1) Denmark   (2) Estonia

(3) Slovakia   (4) Norway

Answer (4)

Sol. In Nordic Countries Sweden, Norway and Finland

169. How long can the Rajya Sabha delay the money bill passed by the loksabha

(1) 7 days   (2) 20 days

(3) 25 days   (4) 14 days

Answer (4)

170. By which constitutional amendment two words 'secular' and 'Socialist' were added in the preamble of the Indian constitutions

(1) 44th   (2) 80th

(3) 42nd   (4) 52nd

Answer (3)

171. In which year South Africa becomes a democratic country

(1) 26 April 1995   (2) 26 May 1996

(3) 26 April 1994   (4) 25 April 1996

Answer (3)

172. Which of the following statement about Kosovo is correct?

(1) Before partition, Kosovo was a province of Russia

(2) There were majority of the Albanian people in this province

(3) Massacre of serbs took place

(4) Albanian nationalist Milosevic had won the election

Answer (2)

173. Infant mortality refers to the death of a child before completing the age of _____

(1) 1 year   (2) 2 year

(3) 3 year   (4) 5 year

Answer (1)

174. Which organization carries out survey for determining the poverty line?

(1) NSSO   (2) CSO

(3) Planning commission (4) None of the above

Answer (1)

175. The price announced by the Government before the sowing season is called

(1) Minimum price   (2) Support price

(3) Market price   (4) Issue price

Answer (2)* doubtful

176. Which of the following group of countries has better performance in terms of human developent than India?

(1) Bhutan, Srilanka, Nepal

(2) Pakistan, Bangladesh, Srilanka

(3) Srilanka, Indonesia, Cuba

(4) Ghana, Kenya, Bangaladesh

Answer (3)

177. What do you mean by collateral?

(1) It is the total sum of money with a person

(2) It is things kept in the locker

(3) It is guarantee given by the borrower to the lender

(4) It is the security to a lender until the loan is repaid

Answer (3)

178. Right to choose, Right to seek redressal, Right to represent and Right to be informed are

(1) Fundamental Rights   (2) Consumer rights

(3) Fundamental duty   (4) Consumer Movement

Answer (2)

179. In India who directly controls the 'Monetary policy'

(1) Finance department of India

(2) Reserve bank of India

(3) State bank of India

(4) Prime Minister of India

Answer (2)

180. On the basis of ownership types of economy are

(1) Capitalistic, socialistic, Developed-Economy

(2) Socialistic, Mixed, Developing-Economy

(3) Capitalistic, Socialistic, Mixed-Economy

(4) Mixed, Developed, Developing-Economy

Answer (3)

181. If $\left(\sqrt[3]{2}\right)^{12}\times\left(\sqrt{5}\right)^{8}=[(2\times5)^2]^x$ then the value of x is _____

(1) 4   (2) 2

(3) 10   (4) 12

Answer (2)

Sol. $\left(\sqrt[3]{2}\right)^{12}\times\left(\sqrt{5}\right)^{8}=[(2\times5)^2]^x$

$\Rightarrow (2^{1/3})^{12}\times(5^{1/2})^8=[(2\times5)^2]^x$

$\Rightarrow 2^{12/3}\times5^{8/2}=(2\times5)^{2x}$ [using $(a^m)^n = a^{mn}$]

$\Rightarrow 2^4\times5^4=(2\times5)^{2x}$

$\Rightarrow (2\times5)^4=(2\times5)^{2x}$

$\Rightarrow 4 = 2x$

$\Rightarrow x = 2$

182. The average of 9 numbers is 18.

If the average of first five numbers is 19 and the average of last 5 numbes is 17, find the 5th number

(1) 16   (2) 20

(3) 18   (4) 22

Answer (3)

Sol. Let x_1, x_2, x_3, ..., x_8, x_9 be the numbers

$\dfrac{x_1 + x_2 + x_3 + x_4 + x_5}{5} = 19$

$\Rightarrow x_1 + x_2 + x_3 + x_4 + x_5 = 95$ ....(i)

$\dfrac{x_5 + x_6 + x_7 + x_8 + x_9}{5} = 17$

$\Rightarrow x_5 + x_6 + x_7 + x_8 + x_9 = 85$ ....(i)

$\dfrac{x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9}{9} = 18$

$\Rightarrow x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 = 162$ .... (iii)

Adding equations (i) and (ii) and then subtracting equation (iii) from it, we get

$x_5 = 18$

183. In $\Delta PQR, PQ = PR$ and X is the midpoint of PQ. XY is parallel to QR and meets PR at point Y. What kind of triangle is PXY?

(1) Isosceles   (2) Scelene

(3) Equilateral   (4) Right triangle

Answer (1)
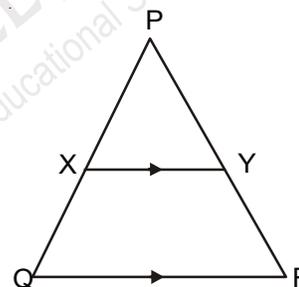
Sol.

X is mid point of PQ and XY || QR

$\therefore$ PY = YR [By converse of mid point therorem]

PQ = PR

$\Rightarrow \dfrac{1}{2}PQ = \dfrac{1}{2}PR$

$\Rightarrow$ PX = PY

Thus ΔPXY is isosceles

184. If α,β are roots of polynomial $3x^2 + 6x + K$ such that $\alpha^2 + \beta^2 + \alpha\beta = \dfrac{8}{3}$, then find the value of K.

(1) –8   (2) 8

(3) –4   (4) 4

Answer (4)

Sol. α, β are zeroes of $3x^2 + 6x + k$

$\therefore \quad \alpha + \beta = -\dfrac{6}{3}$

$\alpha\beta = \dfrac{k}{3}$

$\alpha^2 + \beta^2 + \alpha\beta = \dfrac{8}{3}$

$\Rightarrow (\alpha + \beta)^2 - \alpha\beta = \dfrac{8}{3}$

$\Rightarrow (-2)^2 - \dfrac{k}{3} = \dfrac{8}{3}$

$\Rightarrow 4 - \dfrac{k}{3} = \dfrac{8}{3}$

$\Rightarrow \dfrac{k}{3} = \dfrac{4}{3}$

$\Rightarrow k = 4$

185. If $x^2 - 5x + 1 = 0$ then the value of $x^5 + \dfrac{1}{x^5}$ is _____

(1) 2025   (2) 2725

(3) 2225   (4) 2525

Answer (4)

Sol. $x^2 - 5x + 1 = 0$

Dividing above equaton by x

$x - 5 + \dfrac{1}{x} = 0$

$\Rightarrow x + \dfrac{1}{x} = 5 \quad ..... \text{(i)}$

squaring equation (i)

$x^2 + \dfrac{1}{x^2} + 2 = 25$

$\Rightarrow x^2 + \dfrac{1}{x^2} = 23 \quad ...\text{(ii)}$

squaring equation (ii)

$x^4 + \dfrac{1}{x^4} + 2 = 529$

$x^4 + \dfrac{1}{x^4} = 527 \quad ....\text{(iii)}$

cubing equation (i)

$x^3 + \dfrac{1}{x^3} + 3(x)\left(\dfrac{1}{x}\right)\left(x + \dfrac{1}{x}\right) = 125$

$\Rightarrow x^3 + \dfrac{1}{x^3} + 3(5) = 125$

$\Rightarrow x^3 + \dfrac{1}{x^3} = 110 \quad ...... \text{(iv)}$

Now $\left(x^4 + \dfrac{1}{x^4}\right)\left(x + \dfrac{1}{x}\right) = \left(x^5 + \dfrac{1}{x^5}\right) + \left(x^3 + \dfrac{1}{x^3}\right)$

Substituting values from (i), (ii), (iii)

$(527)(5) = \left(x^5 + \dfrac{1}{x^5}\right) + 110$

$2635 - 110 = x^5 + \dfrac{1}{x^5}$

$2525 = x^5 + \dfrac{1}{x^5}$

186. If $\operatorname{cosec}\theta + \sin\theta = 2$, then the value of $\operatorname{cosec}^{50}\theta + \sin^{50}\theta$ is _____

(1) 2   (2) 100

(3) 0   (4) 50

Answer (1)

Sol. $\operatorname{cosec}\theta + \sin\theta = 2$

$\Rightarrow \dfrac{1}{\sin\theta} + \sin\theta = 2$

$\Rightarrow 1 + \sin^2\theta = 2\sin\theta$

$\Rightarrow \sin^2\theta - 2\sin\theta + 1 = 0$

$\Rightarrow (\sin\theta - 1)^2 = 0$

$\Rightarrow \sin\theta = 1$

$\Rightarrow \operatorname{cosec}\theta = 1$

$\therefore \quad \operatorname{cosec}^{50}\theta + \sin^{50}\theta = 1 + 1$

$\operatorname{cosec}^{50}\theta + \sin^{50}\theta = 2$

187. The sum of squares of two consecutive even numbers added by 4 is always divisible by _____

(1) 24   (2) 16

(3) 8   (4) 32

Answer (3)

Sol. Let the two consecutive even numbers be 2n and (2n +2) for some integer

$(2n)^2 + (2n+2)^2 + 4$

$= 4n^2 + 4n^2 + 8n + 4 + 4$

$= 8n^2 + 8n + 8$

$= 8(n^2 + n + 1)$

Thus always divisible by 8

188. If cosec 4x = sec 5x, then the value of sin 3x + cos 6x is _____

(1) 1   (2) 3

(3) 0   (4) –3

Answer (1)

Sol. cosec4x = sec 5x

As cosec and sec are complementary trigonometric ratios

$\therefore$ cosec 4x = cosec (90º–5x)

$\Rightarrow$ 4x = 90º − 5x

$\Rightarrow$ 9x = 90º

$\Rightarrow$ x = 10º

Thus sin3x + cos6x

= sin30º + cos60º

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

= 1

189. The ratio of radius of base to the height of the right circular cylinder is 1 : 2. If its volume is 2156 cm³, then its total surface area is _____

(1) 1024 cm²   (2) 924 cm²

(3) 874 cm²   (4) 1204 cm²

Answer (2)

Sol. Let radius be r cm and height be h cm

$\therefore$ r : h = 1 : 2

$\Pi r^2 h = 2156$

$\Rightarrow \Pi r^2 (2r) = 2156$

$\Rightarrow \dfrac{22}{7} \times 2r^3 = 2156$

$\Rightarrow r^3 = \dfrac{2156 \times 7}{22 \times 2}$

$\Rightarrow r^3 = 7 \times 7 \times 7$

$\Rightarrow r = 7, \therefore h = 14$

Total surface area = $2\pi r(r+h)$

Total surface area = $2 \times \dfrac{22}{7} \times 7(7+14)$

Total surface area = $2 \times \dfrac{22}{7} \times 7 \times 21$

Total surface area = 924 cm²

190. In the given figure, MP = 16, MQ = 10. The value of MO × MS is_____
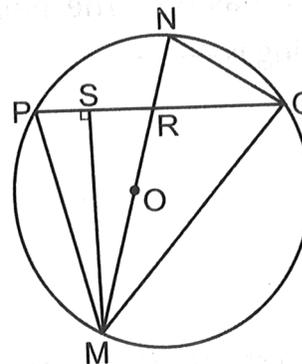
(1) 160   (2) 100

(3) 120   (4) 80

Answer (4)

Sol. In $\triangle MPS$ and $\triangle MNQ$

$\angle MSP = \angle MQN$ (90º each)

$\angle MPS = \angle MNQ$ (angles in same segment)

Thus $\triangle MPS \sim \triangle MNQ$ (By AA similarity)

$\Rightarrow \dfrac{MP}{MS} = \dfrac{MN}{MQ}$ (Ratio of corresponding sides of two similar triangles)

$\Rightarrow \dfrac{16}{MS} = \dfrac{2MO}{10}$

$\Rightarrow$ MO × MS = 80

191. The 7th term of an AP is 5 times the first term and its 9th term exceeds twice the 4th term by 1. The first term of the AP is ____

(1) 151   (2) –39

(3) 3   (4) –124

Answer (3)

Sol. A + (7–1)d = 5A

$\Rightarrow$ A + 6d = 5A

$\Rightarrow$ 4A – 6d = 0   ...(i)

A + (9–1)d = 2[A + (4–1)d] + 1

$\Rightarrow$ A + 8d = 2A + 6d + 1

$\Rightarrow$ A –2d +1 = 0   ....(ii)

solving (i) and (ii) we get

d = 2, A = 3

$\therefore$ first term = 3

192. Find the centre of circle passing through the points (1, 4) (–2, 6) and (3, 7)

(1) (1, 1)

(2) (0, 0)

(3) $\left(\dfrac{1}{2}, \dfrac{7}{2}\right)$

(4) $\left(\dfrac{1}{2}, \dfrac{13}{2}\right)$

Answer (4)

Sol. Let the coordinates of the centre be (x, y)

Thus $(x - 1)^2 + (y - 4)^2 = (x + 2)^2 + (y - 6)^2$

$\Rightarrow x^2 + y^2 - 2x - 8y + 17 = x^2 + y^2 + 4x - 12y + 40$

$\Rightarrow 6x - 4y + 23 = 0$ .... (i)

Also $(x + 2)^2 + (y-6)^2 = (x-3)^2 + (y-7)^2$

$\Rightarrow x^2 + y^2 + 4x - 12y + 40 = x^2 + y^2 - 6x - 14y + 58$

$\Rightarrow 10x + 2y - 18 = 0$ ....(ii)

Solving we get (i) and (ii)

$x = \dfrac{1}{2}$, $y = \dfrac{13}{2}$

Thus centre is $\left(\dfrac{1}{2}, \dfrac{13}{2}\right)$

193. The length of shadow of a building, when the sun's altitude is 60º, is 20 m less than what it was when it was 45º. The height of the building is _____

(1) 54.48m

(2) 47.32m

(3) 64.32m

(4) 57.48m

Answer (2)
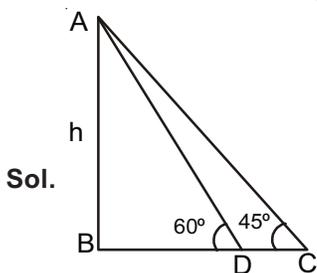
Sol.

Let AB be the building of height h m

$\tan 45° = \dfrac{AB}{BC}$

$1 = \dfrac{h}{BC}$

$\therefore$ BC = h m

Thus BD = (h – 20)

$\tan 60° = \dfrac{h}{h - 20}$

$\sqrt{3} = \dfrac{h}{h - 20}$

$\Rightarrow h\sqrt{3} - 20\sqrt{3} = h$

$\Rightarrow h(\sqrt{3} - 1) = 20\sqrt{3}$

$\Rightarrow h = \dfrac{20\sqrt{3}}{\sqrt{3} - 1}$

$\Rightarrow h = \dfrac{20\sqrt{3}(\sqrt{3} + 1)}{(\sqrt{3} - 1)(\sqrt{3} + 1)}$

$\Rightarrow h = 10\sqrt{3}(\sqrt{3} + 1)$

$\Rightarrow h = 30 + 17.32$

$\Rightarrow h = 47.32$

$\therefore$ Height of building is 47.32 m

194. If $\dfrac{6^6 + 6^6 + 6^6 + 6^6 + 6^6 + 6^6}{2^6 + 2^6} \times \dfrac{5^6 + 5^6 + 5^6 + 5^6 + 5^6}{3^6 + 3^6 + 3^6} = 5^n$

then the value of n is _____.

(1) 6

(2) 0

(3) 12

(4) 7

Answer (4)

Sol. $\dfrac{6^6 + 6^6 + 6^6 + 6^6 + 6^6 + 6^6}{2^6 + 2^6} \times \dfrac{5^6 + 5^6 + 5^6 + 5^6 + 5^6}{3^6 + 3^6 + 3^6} = 5^n$

$\Rightarrow \dfrac{6(6^6)}{2(2^6)} \times \dfrac{5(5^6)}{3(3^6)} = 5^n$

$\Rightarrow \dfrac{6^7 \times 5^7}{2^7 \times 3^7} = 5^n$

$\Rightarrow 5^7 = 5^n$

$\Rightarrow n = 7$

195. In the given figures, the value of $\angle$ P X R is

(1) 85º

(2) 100º

(3) 95º

(4) 120º

Answer (3)

Sol. $\angle POQ = 110º$

$\angle OPQ = \angle OQP$ ($\because$ OP = OQ, radii)

$\angle OPQ + \angle OQP = 70º$ (angle sum property)

$\Rightarrow \angle OPQ = 35º$

In $\triangle OQR$

$\angle OPR + \angle POR + \angle ORP = 180º$

60º + 60º + $\angle ORP = 180º$

$\Rightarrow \angle ORP = 60º$

In $\triangle PXR$

$\angle PXR + \angle XPR + \angle PRX = 180º$

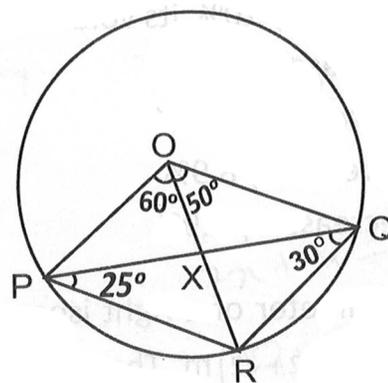$\Rightarrow \angle PXR + 25º + 60º = 180º$ ($\because \angle PRX = \angle ORP$)

$\Rightarrow \angle PXR = 95º$

196. If $x^m \cdot y^n = 7889$, where x and y are prime numbers, the value of x + y is _____

(1) 30
(2) 60
(3) 100
(4) 300

Answer (1)

Sol. $x^m.y^n = 7889$

$x^m.y^n = 7^3 \times 23^1$

$\therefore$ x and y are 7 and 23

thus x + y = 30

197. If $a = \dfrac{p-q}{p+q}, b = \dfrac{q-r}{q+r}, c = \dfrac{r-p}{r+p}$, then the value of $\dfrac{(1+a)(1+b)(1+c)}{(1-a)(1-b)(1-c)}$ is _____

(1) 1
(2) 0
(3) 121
(4) 11

Answer (1)

Sol. $a = \dfrac{p-q}{p+q}$

Thus $\dfrac{1+a}{1-a} = \dfrac{1 + \dfrac{p-q}{p+q}}{\dfrac{p-q}{p+q}}$

$\Rightarrow \dfrac{1+a}{1-a} = \dfrac{\dfrac{2p}{p+q}}{\dfrac{2q}{p+q}}$

$\Rightarrow \dfrac{1+a}{1-a} = \dfrac{p}{q}$

Similarly $\dfrac{1+b}{1-b} = \dfrac{q}{r}, \dfrac{1+c}{1-c} = \dfrac{r}{p}$

$\therefore \left(\dfrac{(1+x)(1+b)(1+c)}{(1-a)(1-b)(1-c)}\right) = \dfrac{p}{q} \times \dfrac{q}{r} \times \dfrac{r}{p} = 1$

198. If radius of a right circular cylinder is increased by 10% and height is decreased by 10%, its volume will

(1) Increase by 9.8%
(2) Decrease by 9.8%
(3) Increase by 8.9%
(4) Decrease by 8.9%

Answer (3)

Sol. Let initially radius be R and height be H

$\therefore$ Initial volume = $\Pi R^2 H$

New radius = R + 10 % of R = $\dfrac{11}{10}R$

New height = H – 10 % of $\dfrac{9}{10}$ = H

New volume = $\Pi \left(\dfrac{11}{10}R\right)^2 \left(\dfrac{9}{10}\right)H = \left(\dfrac{1089}{1000}\right)\Pi R^2 H$

% change in volume

$= \dfrac{\dfrac{1089}{1000}\Pi R^2 H - \Pi R^2 H}{\Pi R^2 H} \times 100\%$

% change in volume = 8.9% increase

199. The Perimeter of a right isosceles triangle is $(2+\sqrt{2})$ m. The length of its hypotenuse is _____

(1) 2m
(2) 4m
(3) $\sqrt{6}$ m
(4) $\sqrt{2}$ m

Answer (4)

Sol.

$x + x + \sqrt{2}x = 2 + \sqrt{2}$

$\Rightarrow 2x + \sqrt{2}x + 2 + \sqrt{2}$

$\Rightarrow x(2 + \sqrt{2}) = (2 + \sqrt{2})$

$\Rightarrow x = 1$

Thus lypotenuse is

$\sqrt{2}\,m$

200. A fraction becomes $\dfrac{5}{7}$ if 2 is added to both its numerator and denominator. If 4 is added to numerator and 3 is added to denominator, the fraction becomes $\dfrac{7}{8}$. Find the original fraction

(1) $\dfrac{8}{11}$

(2) $\dfrac{3}{5}$

(3) $\dfrac{5}{11}$

(4) $\dfrac{7}{9}$

Answer (2)

Sol. Let the original fraction be

$\dfrac{x}{y}$

$\dfrac{x+2}{y+2} = \dfrac{5}{7}$

$\Rightarrow 7x + 14 = 5y + 10$

$\Rightarrow 7x - 5y + 4 = 0$ ....(i)

$\dfrac{x+4}{y+3} = \dfrac{7}{8}$

$8x + 32 = 7y + 21$

$8x - 7y + 1$ ..... (2)

solving (i) and (ii) we get

$x = 3,\ y = 5$

Thus fraction is $\dfrac{3}{5}$

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