

Combined Defence Services Exam October 2000

ENGLISH

SPOTTING ERRORS

Directions (Qs. 1 to 15) : In this section, a number of sentences are given. These sentences are in three separate parts labelled as (a), (b) and (c). Read each sentence to find out whether there is an error in any part. No sentence has more than one error. When you find an error in any one of the parts (a), (b) or (c), indicate your response. You may feel that there is no error in a sentence. In that case, letter (d) will signify a 'No error' response.

You are to indicate only one response for each item. (If you indicate more than one response, your answer will be considered wrong.) Errors may be in grammar, word usage or idioms. There may be a word missing or there may be a word which should be removed.

You are not required to correct the error. You are required only to indicate your response.

1. There are a number of reasons (a)/ I do not like him, (b)/ but his selfishness is intolerable. (c)/ No error. (d)

2. I have read an interesting book yesterday (a)/ and underlined the new words (b)/ which are simple but effective. (c)/ No error. (d)

3. He cannot be trusted (a)/ with important secret informations; (b)/

otherwise I would have made him my assistant. (c)/ No error. (d)

4. Is there further reasons (a)/ you can give me for your failure (b)/ to do as you promised ? (c)/ No error. (d)

5. During the final minutes of his speech (a)/ the speaker requested to (b)/ the audience to have patience. (c)/ No error. (d)

6. He is running temperature since last Friday (a)/ and doctors suspect (b)/ that he is down with typhoid. (c)/ No error. (d)

7. Travel agents around the world have come to rely on computers (a)/ to book seats in air flights or rooms in hotels, (b)/ either today or a year from now. (c)/ No error. (d)

8. She expressed her gratitudes, (a)/ to all those, (b)/ who had supported her. (c)/ No error (d).

9. When the meeting was over, (a)/ he was very tired (b)/ so that he went home immediately. (c)/ No error. (d)

10. Modern man must pull himself off together (a)/ and act his part in life (b)/ as God's own most favourite creature. (c)/ No error. (d)

11. There would be fewer follies, (a)/ and happiness and good feeling all round (b)/ if we applied the scientific attitude for all our affairs.(c)/ No error. (d)

12. Meera told to the teacher (a)/ that she couldn't come for the rehearsals (b)/ the next day. (c)/ No error. (d)

13. I am told that Anjali has been (a)/ suffering from fever (b)/ since ten days. (c)/ No error. (d)

14. The armed forces have been working around the clock (a)/ to bring a semblance of normality (b)/ in the flood-affected areas. (c)/ No error. (d)

15. Just when Alfred Nobel's discoveries were beginning to bring him rewards, (a)/ which were to make him one of the richest man of his day, (b)/ an anti-Nobel campaign was started in France. (c)/ No error. (d)

SENTENCE IMPROVEMENT

Directions (Qs. 16 to 30) : Look at the underlined part of each sentence. Below each sentence are given three possible substitutions for the underlined part. If one of them (a), (b) or (c) is better than the underlined part, indicate your response against the corresponding letter (a), (b) or (c). If none of the substitutions improves the sentence, indicate (d) as your response. Thus a 'No improvement' response will be signified by the letter (d).

16. More he gets, more he wants.

- (a) The more he gets, the more
- (b) The more he gets, more
- (c) More gets, the more
- (d) No improvement

17. We had a grand party and we enjoyed very much.

- (a) Enjoyed very much
- (b) We enjoyed ourselves very much.
- (c) Enjoyed much
- (d) No improvement

18. All this has been done with a view to improve the living conditions of the poor.

- (a) To improving
- (b) Of improving
- (c) For improving
- (d) No improvement

19. Let's go for a picnic, shouldn't we ?

- (a) Won't (b) Shan't
- (c) Shall (d) No improvement

20. If I have the money, I should have bought this house.

- (a) Had (b) Would have
- (c) Should have (d) No improvement

21. If you are told of a downright lie about goods to induce you to buy them, you may have a remedy.

- (a) About a downright lie
- (b) A downright lie
- (c) Downright lie
- (d) No improvement

22. His father forbade him about entering politics.

- (a) From (b) On
- (c) To (d) No improvement

23. To some extent, every child takes after his father.

- (a) Upon (b) For
- (c) Off (d) No improvement

24. The boss said, "I shall look at the matter".

- (a) About (b) In
- (c) Into (d) No improvement

25. I did nothing but laughed.

- (a) Laughing (b) Laugh
- (c) Laughed aloud (d) No improvement

26. The highest recorded speed of shorthand under championship conditions, is 300 words per minute.

- (a) In (b) For
- (c) With (d) No improvement

27. There were many petty Rajput Kingdoms in India prior than the coming of the Mohammadans.

- (a) Prior from (b) Prior up to
- (c) Prior to (d) No improvement

28. Until the last twenty-eight years, he has been working in various units of this plant.

- (a) For (b) Since
(c) During (d) No improvement

29. I hope you will be able to steer ahead of the anti-social elements.

- (a) Steer out (b) Steer free
(c) Steer clear (d) No improvement

30. Had Alizee been well, she could participate in the competition.

- (a) Would participate
(b) Would have participated
(c) Will have participated
(d) No improvement

SYNONYMS

Directions (Qs. 31 to 40) : In this section, you find a number of sentences, parts of which are underlined. You may also find only a group of words which is underlined. For each underlined part, four words/phrases (a), (b), (c) and (d) are listed below. Choose the word/phrase nearest in meaning to the underlined part.

31. He could rise to this stature because of his invincible courage.

- (a) Inviolable
(b) Unmanageable
(c) Unbeatable
(d) Immeasurable

32. Though he is a teacher, his speech lacks distinctness.

- (a) Clarity (b) Precision
(c) Distinction (d) Fluency

33. The judge was both a judicious and impartial man.

- (a) Judicial (b) Wise
(c) Intelligent (d) Kind

34. Reading fiction is an absorbing, creative and entertaining hobby.

- (a) A concentrating
(b) An engrossing

- (c) A fascinating
(d) An enriching

35. The perspicuity of the lawyer's arguments was remarkable.

- (a) Logic (b) Precision
(c) Lucidity (d) Profundity

36. A man of unsound mind, he was exonerated from all responsibility for his actions.

- (a) Exculpated (b) Prevented
(c) Excused (d) Liberated

37. He is known to be a prolific writer.

- (a) Versatile (b) Productive
(c) Great (d) Powerful

38. He tried to alleviate the sufferings of his neighbour.

- (a) Abate (b) Dissipate
(c) Remove (d) Relieve

39. Her evidence totally refuted the charges.

- (a) Refused (b) Denied
(c) Disproved (d) Repelled

40. If a leader wants to be popular he should master the art of being civil to everyone.

- (a) Polite (b) Civilised
(c) Friendly (d) Obedient

ANTONYMS

Directions (Qs. 41 to 50) : In this section, each item consists of a word or a phrase which is underlined in the given sentence. It is followed by four words or phrases (a), (b), (c) and (d). Select the word or phrase which is closest to the opposite in meaning of the underlined word or phrase.

41. The professor had to share a hotel room with a garrulous tax collector.

- (a) Dumb (b) Speechless
(c) Tongue-tied (d) Silent

42. It was fortuitous that I met her in that party.

- (a) Unlucky (b) Bad
(c) Distressing (d) Abominable

43. He is zealous only in the initial stages of a project.

- (a) Absent-minded (b) Distraught
(c) Inattentive (d) Indifferent

44. The climate in the north of Europe is really dreadful.

- (a) Pleasant (b) Amiable
(c) Comfortable (d) Gratifying

45. He glanced through the letter perfunctorily.

- (a) Nicely (b) Ceremoniously
(c) Carefully (d) Particularly

46. It is not difficult to take note of his immaculate style of writing.

- (a) Stained (b) Uneven
(c) Impure (d) Flawed

47. He is very fastidious about his choice of food.

- (a) Sloppy (b) Thoughtless
(c) Careless (d) Indiscreet

48. However hard you may try to mitigate his problems, you will not succeed.

- (a) Augment (b) Increase
(c) Expand (d) Enlarge

49. Genuine jewellery is available only in this shop.

- (a) False (b) Cheap
(c) Imitation (d) Duplicate

50. His speech was full of frequent facetious remarks.

- (a) Stupid (b) Grave
(c) Dull (d) Sarcastic

SELECTING WORDS—SIMPLE SENTENCES

Directions (Qs. 51 to 60) : In these questions, each of the sentences has a blank space and four words are given after the sentence. Select the word from the alternatives (a), (b), (c) and (d) that you consider most appropriate for the blank space.

51. The fertility of the land is barely sufficient to _____ twelve people to the acre.

- (a) Revive (b) Raise
(c) Sustain (d) Help

52. Beggars are unable to _____ their power of choice as they are denied any alternative.

- (a) Exercise (b) Select
(c) Declare (d) Prove

53. Poetry is the _____ of deep and intense feelings of human heart.

- (a) Spurt (b) Outcome
(c) Flow (d) Outpouring

54. What we considered a luxury at one time has now become _____.

- (a) Indispensable (b) Necessary
(c) Fashionable (d) Stylish

55. It requires a man of _____ to complete this challenging task.

- (a) Means (b) Determination
(c) Fame (d) Riches

56. But during famine, death had no purpose, no logic, no necessity, it is the result of man's incompetence and _____.

- (a) Indulgence (b) Waywardness
(c) Callousness (d) Injustice

57. There is an emphasis on truth, a dependence on it, _____ for it, in these early adventures of the Indian mind.

- (a) A craze (b) A passion
(c) A desire (d) A regard

58. He is very obedient, even _____, to his superior officer.

- (a) Servile (b) Polite
(c) Obliging (d) Indulgent

59. An announcement was being made at distance and I could not _____ a single word.

- (a) Cipher (b) Decode
(c) Distinguish (d) Decipher

60. I cannot make _____ what she wants.
(a) Up (b) For (c) It (d) Out

COMPREHENSION

Directions (Qs. 61 to 90) : In this section, you have six short passages. After each passage you will find several questions based on that passage. First, read Passage I and answer the questions based on it. Then go on to the next passage.

PASSAGE I

I consider myself something of an authority on apologies, because a quick temper has provided me with plenty of opportunities to make them. In one of my earliest memories, my mother is telling me, "Don't look at the ground when you say, 'I'm sorry'. Hold your head up and look the person in the eye, so he'll know you mean it".

My mother thus conveyed the first principle of successful apology : it must be direct. You must never pretend to be doing something else. You do not leaf through a sheaf of correspondence while apologising to a subordinate after blaming her for a mistake that turned out to be your fault. You do not apologise to a hostess, whose guest of honour you insulted, by sending flowers the next day without mentioning your bad behaviour.

61. According to the author's mother, the best way to apologise is
- (a) To say 'sorry' while looking at the ground
 - (b) To look the person in the eye, even if you don't say 'sorry'
 - (c) While saying 'I'm sorry' look the person in the eye

- (d) To hold your head up and avoid looking at the person

62. The successful way of apology is that it

- (a) Should not be mixed up with other activities.
- (b) Could be made casually even when you are busy
- (c) Should be hinted at indirectly to the person concerned
- (d) Could be made seriously while doing other activities

63. You should apologise for your bad behaviour at a party by sending

- (a) Flowers to the guest of your hostess
- (b) Flowers to your hostess at your leisure
- (c) Flowers to your hostess with a note of apology
- (d) Only a note of apology the next day

64. The phrase 'leaf through a book' means to

- (a) Copy from a book
- (b) Turn over the pages of a book quickly
- (c) Read a book seriously
- (d) Turn over a new leaf

65. The author considers himself to be an authority on apologies because

- (a) His mother trained him how to apologise
- (b) He has read many books on how to apologise
- (c) He has apologised many a time
- (d) He has been offered apologies in many ways

PASSAGE II

Drug addicts in some countries form small groups, the customs of which may be unknown to outsiders. They often speak a language that is so full of

expressions and words created by themselves that their speech has become unintelligible to those that are not living, or in some way associated, with them. It is amazing to find that, to understand some of today's so-called pop music, one requires some acquaintance with the peculiar language of those enslaved to drugs. A great part of the vocabulary is international with a preponderance of American terms or corruptions of these. This makes it easy for those in search of drugs in a country not their own to communicate with those that have some to dispose of.

66. We learn from the passage that

- (a) All pop singers like drugs
- (b) Many pop musicians often use the code language of drug addicts
- (c) Pop music is understood by drug users only
- (d) All drug users compose music

67. The drug users' speech is unintelligible to others because

- (a) It is incoherent
- (b) The use of drugs has affected their pronunciation
- (c) Their language has peculiar words and expressions
- (d) They communicate only among themselves

68. Drug addicts

- (a) Get easily assimilated in the society in which they live
- (b) Have their own culture
- (c) Imitate American culture
- (d) Are cultural revolutionaries

69. The international nature of their vocabulary helps drug addicts to

- (a) Buy drugs from one another with ease
- (b) Get to know one another better
- (c) Pass for Americans
- (d) Conceal their nationalities

70. According to the passage, it is wrong to conclude that

- (a) Drug users have evolved a language
- (b) Drug users form small groups
- (c) Some drug users travel outside their own countries
- (d) All drug addicts are Americans

PASSAGE III

Education is for life, not merely for a livelihood. So long as we are unmindful of this truth, the quality of our educational curriculum as well as that of our teachers and students is likely to remain inadequate. It is not enough for a society to have experts. It needs human beings who can think, feel and act generously, the kind of people who cannot be replaced by computers and robots. The great fault of our present age is its emphasis on efficiency at the cost of humanity.

71. When the author says that education is for life rather than for a livelihood, he means to say that

- (a) Education is a generally useful thing in life
- (b) The primary purpose of education is to train people to be proper human beings
- (c) Education is useful for earning a living
- (d) Education can enable one to become rich

72. The author says that it is not enough for a society to have experts because

- (a) Experts are egocentric
- (b) Experts do not have an overall view of things because of their being highly specialised
- (c) Along with efficiency, educated people need to be sympathetic and sensitive to the needs of society
- (d) Experts are highly eccentric people

73. The author is critical of the present education system because it

- (a) Overemphasizes efficiency
- (b) Neglects social sciences
- (c) Is science-oriented
- (d) Is obsessed with computers

74. Proper human beings cannot be replaced by computers and robots because

- (a) Computers and robots are non-human
- (b) Computers and robots react mechanically
- (c) Only human beings can have specialised knowledge
- (d) Only proper human beings can think creatively and act generously

75. The main idea of the author in this passage is that

- (a) Educated people should be sympathetic towards human suffering
- (b) Education should emphasize improvement in quality of life rather than efficiency
- (c) Specialisation improves efficiency
- (d) To attain efficiency is the only goal of education

PASSAGE IV

Grandchildren at university now — how time passes !

I wonder if they—or anyone else—would be interested in what student life was like in the '30s? Well, here goes

The academic part of a student's life doesn't change all that much through the generations, but the style of social life has changed. (For better or worse—who are we to say ?) The 'English Lit.' more properly, Edinburgh University English Literature Society, met on Tuesday evenings in the Non Soc Hall, which is roundabout where the student shop is now. It was called the Non Soc

Hall because the meetings there were of Non-Associated Societies—the Associated Societies being high-and-mighty affairs with a long history, such as the Dialectic, Philomathic and Diagnostics, which, in those days, certainly didn't admit women.

76. The author of the passage feels nostalgic because

- (a) He doesn't belong to the present generation
- (b) He represents the past generation
- (c) He is conscious of time passing swiftly
- (d) Things have changed since he was a student

77. The author observes that the academic life of a university

- (a) Changes faster than the social life
- (b) Does not change as fast as the social life
- (c) Does not change because of a generation gap
- (d) Changes abruptly after a long gap

78. When the author was a student at Edinburgh, English Literature Society used to meet

- (a) Where it meets even now
- (b) Where the Dialectic Society used to meet
- (c) Near the place the student shop is located now
- (d) Where the Diagnostic Society meets now

79. The English Literature Society was considered to be a Non-Associated Society because

- (a) Its activities were deemed to be insignificant
- (b) It refused to be associated with any other society
- (c) It was an exclusive society of the Department of English
- (d) It indulged in unconventional literary movements

- 80.** The membership of the Associated Societies was
- (a) Open to all students
 - (b) Restricted to students of History
 - (c) Restricted to students of Psychology
 - (d) Open to only men

PASSAGE V

Martin Luther King's active career extended from 1957 to 1968. During this brief career he led numerous protest demonstrations in the South as well as in the North of the USA. He challenged the moral complacency of America and fought for the rights of the Negro. He hated the eye-for-an-eye method like Gandhiji and fought with the weapon of non-violence—a weapon, said King, that 'cuts without wounding and ennobles the man who wields it. It is a sword that heals'. And he raised a vast army. It was an army that would move but not maul. It was an army to storm bastions of hatred, to lay siege to the fortress of segregation, to surround symbols of discrimination. It was an army whose allegiance was to God and whose strategy and intelligence were the eloquently simple dictates of conscience. His creed of non-violence was criticised and challenged by 'Black Power' militants who would not renounce the use of violence to achieve their goals. Nevertheless, his faith in non-violence never wavered.

- 81.** The similarity between Martin Luther King and Gandhiji was that both
- (a) Fought for the rights of the Negroes
 - (b) Fought for the rights of untouchables
 - (c) Were demagogues
 - (d) Had firm faith in non-violence

- 82.** Martin Luther's army
- (a) Invaded the seats of White power and authority
 - (b) Sieged the fortress of White pride and glory
 - (c) Evolved a strategy to overthrow the White regime and replace it by a Black regime
 - (d) Fought against hatred, segregation and all kinds of discrimination

- 83.** Martin Luther King appealed to the conscience of White Americans by
- (a) Preaching against them
 - (b) Highlighting their discriminatory attitude towards the Blacks
 - (c) Questioning their self-righteousness
 - (d) Appealing to the international organisations against their exploitation

- 84.** The 'Black Power' militants
- (a) Were jealous of Martin Luther King's popularity
 - (b) Did not approve of Martin Luther King's commitment to non-violence
 - (c) Believed in a violent revolution
 - (d) Did not participate in the movement led by Martin Luther King

- 85.** The phrase 'move but not maul' refers to an army that would
- (a) Move forward and never look back
 - (b) Defeat the White forces in the battlefield
 - (c) Make the White forces surrender by overpowering them
 - (d) Appeal to the conscience of the White Americans without hurting them

PASSAGE VI

It was 7 a.m. on Sunday, June 4, 1944. Field Marshall Erwin Rommel, Commander-in-Chief of the German

Army Group B—guarding the occupied French Coast facing the English Channel—was travelling in a car next to the driver's seat. He was tired of waiting for the Allied invasion to begin.

Leaving on this particular dismal Sunday morning suited Rommel fine. The timing of the trip could not have been better for the weather was so bad that the Allies would not even think of a landing. Beside him on the seat was a cardboard box containing a pair of handmade grey-shade shoes, size 5½, for his wife Lucie-Maria. There was an especial and very human reason why he wanted to be with her on Tuesday, June 6. It was her birthday.

86. Rommel was

- (a) A famous German detective during the Second World War.
- (b) The Commander-in-Chief of the German army in occupied France
- (c) A war-weary old man
- (d) A German messenger during the war

87. Rommel was going back to Germany because

- (a) He was afraid of facing the Allies
- (b) He was bored with the war
- (c) He was annoyed with the weather in France
- (d) He was homesick and wanted to see his wife

88. Rommel considered June 4, the best time to leave because

- (a) The weather conditions ruled out an Allied invasion
- (b) All his junior Generals were present there
- (c) By then the enemy was not ready for the attack
- (d) He had to consult Hitler

89. The contents of the cardboard box had for Rommel

- (a) Strategic importance
- (b) Great monetary significance
- (c) Sentimental value
- (d) Not much value

90. Rommel was keen to be with his wife on that day because it was

- (a) Their wedding day
- (b) Her birthday
- (c) Their son's birthday
- (d) Hitler's birthday

ORDERING OF WORDS IN A SENTENCE

Directions (Qs. 91 to 100) : In each of the following items, some parts of the sentence have been jumbled up. You are required to rearrange these parts, labelled as P, Q, R and S, to produce the correct sentence. Choose the proper sequence from the given alternatives (a), (b), (c) and (d).

91. The only time when this dynamic cricketer (P)/ was on the 1979 tour of England (Q)/ failed with the bat (R)/ the tag of an all-rounder did not fit him (S)

The proper sequence should be

- (a) S P R Q
- (b) P R S Q
- (c) S R P Q
- (d) S Q P R

92. Kapil left in an aeroplane (P)/ after reading a sailing magazine (Q)/ had decided (R)/ to build his own boat nine years earlier (S)

The proper sequence should be

- (a) P R Q S
- (b) R S Q P
- (c) R Q P S
- (d) P S R Q

93. When it becomes an honour of a lifetime (P)/ in recognition of their great performance (Q)/ illustrious personalities (R)/ win an award (S)

The proper sequence should be

- (a) R P Q S
- (b) P Q R S
- (c) Q R S P
- (d) R S Q P

94. The newspaper reported that according to one estimate (P)/ and many of them assume epidemic proportions (Q)/ most illnesses in India (R)/ are related to water-borne diseases (S)

The proper sequence should be

- (a) P R Q S (b) P R S Q
(c) R Q S P (d) R Q P S

95. The zoologist says that having been bitten by them once (P)/ trembled to make a second attempt at catching (Q)/ the snakes (R)/ the snake-charmers (S)

The proper sequence should be

- (a) P R Q S (b) S Q P R
(c) R P Q S (d) P S Q R

96. If you had told me I would not have given it to you (P)/ that you had already (Q)/ bought this book (R)/ as a birthday present (S)

The proper sequence should be

- (a) Q R P S (b) P Q R S
(c) S P Q R (d) S R Q P

97. All precautionary measures were taken to prevent the capture of booths (P)/ during the election (Q)/ by the Government (R)/ by the terrorists (S)

The proper sequence should be

- (a) S P R Q (b) Q S P R
(c) R P S Q (d) R Q S P

98. The Government has assured the people that in the Kargil operation (P)/ who have sacrificed their lives (Q)/ will be properly looked after (R)/ the families of all those soldiers (S)

The proper sequence should be

- (a) P S R Q (b) S Q P R
(c) S R Q P (d) S P R Q

99. All through collecting and storing up food (P)/ the long warm summer days (Q)/ an ant was very busy (R)/ for the winter (S)

The proper sequence should be

- (a) S R Q P (b) Q P S R
(c) Q R P S (d) R S Q P

100. Standing carelessly with his sword, (P)/ the fat major (Q)/ held horizontally behind him and with his legs far apart (R)/ looked after the receding horseman and laughed (S)

The proper sequence should be

- (a) P Q R S (b) Q P R S
(c) P Q R S (d) P R S Q

ORDERING OF SENTENCES

Directions (Qs. 101 to 105) : In the following items, each passage consists of six sentences. The first and the sixth sentences are given in the beginning. The middle four sentences in each item have been removed and jumbled up. These are labelled P, Q, R and S. You are required to find out the proper sequence of these four sentences from the given alternatives (a), (b), (c) and (d).

101.

S₁ : The discovery of radioactivity was the foundation stone of atomic research.

S₆ : It is a thought well worth serious consideration.

P : This higher value it has because it has brought relief and cure to many suffering persons.

Q : Today, because of its rarity radium is one of the most commercially valuable elements in the world.

R : One might claim that in radium alone atomic research has given us something capable of saving more lives than the atomic bombs have destroyed.

S : But it has a higher value than pounds, shillings and pence.

The proper sequence should be

- (a) R S P Q (b) Q S P R
(c) P S R Q (d) S R P Q

102.

S₁ : The object of advertisement, of course, is to present goods in the most favourable light possible.

S₆ : They correct the distortion and so help the consumer to come to a reasonable decision.

P : The shopper must expect to get only a one-sided view from an advertisement.

Q : Advantages are paraded, but drawbacks are not mentioned.

R : This is why the independent reports of goods which are made in newspapers and magazines are so valuable.

S : For a more balanced picture he must make his own enquiries.

The proper sequence should be

- (a) S Q P R (b) R S P Q
(c) Q P S R (d) Q P R S

103.

S₁ : In what ways does mass production differ from the older methods of manufacture ?

S₆ : He would have been ashamed if any serious fault had appeared in his work.

P : He was proud of the fruits of his labour.

Q : He put into his work all his skill, all his experience.

R : His reputation, his standing among his fellows, depended on his skill and on his character.

S : Formerly a craftsman, or skilled workman, often made the whole of an article himself by hand.

The proper sequence should be

- (a) S P Q R (b) S Q P R
(c) Q P R S (d) P S Q R

104.

S₁ : Ants seem to be able to do everything but think.

S₆ : All the work it does is done for the community.

P : An ant has very little individuality and is not beset by any anti-social urges or desires as men and women so often are.

Q : When an individual ant is subjected to any kind of intelligence test it generally comes out of it rather badly.

R : Any food an ant finds is shared and it will unhesitatingly sacrifice itself if the nest is threatened.

S : There are no equivalents of police in an ant's nest because there would be nothing for them to do.

The proper sequence should be

- (a) Q P S R (b) P Q R S
(c) Q R S P (d) S P R Q

105.

S₁ : Now Kannan shook the box, held the slit up to light and tried to find out how much it contained.

S₆ : After a while he put it down and looked about for something with which to widen the slit.

P : The blacksmith had made a good job of it—the slit was exactly of the thickness of a coin, which could go one way through it.

Q : But not one coin came out of it.

R : He held the box upside down and shook it violently till he felt deaf with the clanging of coins.

S : No power on earth could shake a coin out of it again.

The proper sequence should be

- (a) P Q R S (b) R Q P S
(c) P S R Q (d) S P Q R

SELECTING WORDS

Directions (Qs. 106 to 120) : In the following passage, you are given blank spaces marked 106 to 120. Against each of these numbers below the passage a choice of three words marked (a), (b) and (c) is suggested to replace the respective blank space in the passage. Choose the best word from these three and indicate your choice.

On a stormy night, in the tempestuous times of the French Revolution, a young man was returning to his lodgings, at a late hour, across the old part of Paris. The lightning ...(106)... and loud claps of thunder rattled ...(107)... the lofty, narrow streets—but I ...(108)... first tell you something about ...(109)... young man. Gottfried Wolfgang had studied for ...(110)... time at Gottingen, but being of a ...(111)... nature, he had wandered into those ...(112)... and speculative doctrines which had ...(113)... most other German students too. His ...(114)... life, his intense application, and the ...(115)... nature of his studies had ...(116)... on his mind and body. His imagination was ...(117)... His health too was ...(118)... He had been indulging in ...(119)... speculations on spiritual essences until he had an ...(120)... world of his own around him.

106. (a) glistened (b) gleamed
(c) glimmered
107. (a) on (b) off
(c) through
108. (a) might (b) should
(c) could
109. (a) a (b) that
(c) this
110. (a) a brief (b) a little
(c) some

111. (a) practical (b) visionary
(c) dreaming
112. (a) earthy (b) mundane
(c) wild
113. (a) swayed (b) fascinated
(c) tempted
114. (a) private (b) solitary
(c) quiet
115. (a) singular (b) eccentric
(c) idiosyncratic
116. (a) effected (b) resulted
(c) told
117. (a) declined (b) diseased
(c) deceased
118. (a) impaired (b) reduced
(c) weakened
119. (a) imaginative (b) creative
(c) fanciful
120. (a) impressive (b) ideal
(c) idealistic

- immediately'. 'So' is wrongly placed in part 'c'. It should better be placed in part 'b'. So, we should mark only that part where 'so' is wrongly placed.
10. (c) : It should be 'as God's most favourite creature'. 'Own' is redundant here
11. (c) : It should be 'if we applied the scientific attitude to all our affairs'
12. (a) : It should be 'Meera told her teacher'
13. (c) : It should be 'for ten days'
14. (a) : It should be 'The armed forces have been working round the clock'
15. (b) : It should be 'which were to make him one of the richest men of his day'
16. (a) 17. (b) 18. (a) 19. (d)
 20. (a) 21. (b) 22. (a) 23. (d)
 24. (c) 25. (b) 26. (a) 27. (c)
28. (a) 29. (c) 30. (b) 31. (c)
 32. (a) 33. (b) 34. (b) 35. (c)
 36. (a) 37. (b) 38. (d) 39. (c)
 40. (a) 41. (c) 42. (a) 43. (d)
 44. (a) 45. (c) 46. (d) 47. (c)
 48. (a) 49. (c) 50. (c) 51. (c)
 52. (a) 53. (d) 54. (b) 55. (b)
 56. (c) 57. (b) 58. (c) 59. (c)
 60. (d) 61. (c) 62. (a) 63. (d)
 64. (b) 65. (c) 66. (b) 67. (c)
 68. (b) 69. (a) 70. (d) 71. (b)
 72. (c) 73. (a) 74. (d) 75. (b)
 76. (a) 77. (b) 78. (c) 79. (d)
 80. (d) 81. (d) 82. (d) 83. (b)
 84. (c) 85. (d) 86. (b) 87. (d)
 88. (a) 89. (c) 90. (b) 91. (d)
 92. (c) 93. (d) 94. (b) 95. (d)
 96. (a) 97. (c) 98. (b) 99. (c)
 100. (b) 101. (b) 102. (c) 103. (b)
 104. (a) 105. (b) 106. (b) 107. (b)
 108. (b) 109. (b) 110. (b) 111. (b)
 112. (c) 113. (b) 114. (b) 115. (c)
 116. (c) 117. (b) 118. (a) 119. (c)
 120. (b)

GENERAL KNOWLEDGE

1. The total surface area of the earth is
- (a) 510 million sq km
 (b) 610 million sq km
 (c) 710 million sq km
 (d) 810 million sq km
2. Consider the following statements regarding the Arab conquest of Sindh :
1. It did not prove to be permanent
 2. It was adequately supported by the Caliphs.
 3. It lasted for about three centuries.
 Which of these statements are correct ?
- (a) 1, 2 and 3
 (b) 1 and 2
- (c) 2 and 3
 (d) 1 and 3
3. Match List I with List II and then select the correct answer using the codes given below the Lists :
- | <i>List I</i> | | <i>List II</i> | |
|-------------------------|--------|------------------|--|
| <i>(Active volcano)</i> | | <i>(Country)</i> | |
| A. Etna | | 1. Hawaii | |
| B. Mauna Loa | | 2. Java | |
| C. Fujiyama | | 3. Sicily | |
| D. Merapu | | 4. Japan | |
| | A B | C D | |
| (a) | 3 1 | 2 4 | |
| (b) | 1 3 | 2 4 | |
| (c) | 1 3 | 4 2 | |
| (d) | 3 1 | 4 2 | |

4. Consider the following statements regarding the Vijayanagar empire :

1. It was named after the city of Vijayanagara
2. Krishnadeva Raya was the greatest of all the Vijayanagar rulers
3. Kings of Vijayanagar ruled on behalf of Shaivite deity Virupaksha
4. Vijayanagar empire successfully resisted the march of the Delhi Sultans to the South

Which of these statements are correct ?

- (a) 1 and 3
- (b) 1, 2 and 4
- (c) 1, 2 and 3
- (d) 2, 3 and 4

5. 'Mansar lake' is located in

- (a) Jammu and Kashmir
- (b) Himachal Pradesh
- (c) Punjab
- (d) Uttar Pradesh

6. Who among the following Hindu religious teachers was called to the Ibadat Khana of Emperor Akbar ?

- (a) Hari Vijaya Suri
- (b) Purushottama
- (c) Banuchandra Upadhyaya
- (d) Vijaya Sen Suri

7. The largest source of Foreign Direct Investment in India is

- (a) Germany
- (b) Japan
- (c) Mauritius
- (d) Italy

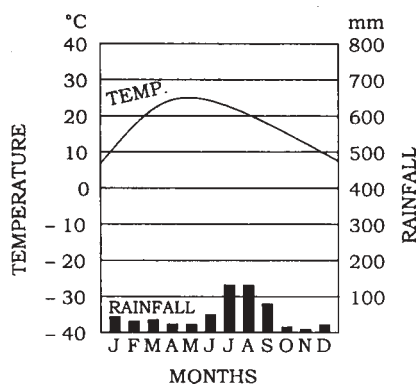
8. The headquarters of World Trade Organisation are in

- (a) Montreal
- (b) Seattle
- (c) Geneva
- (d) The Hague

9. Kishtwar town is situated on the banks of

- (a) Beas
- (b) Chenab
- (c) Jhelum
- (d) Ravi

10. The mean monthly temperature and rainfall of a city are plotted in the given diagram



The city in question is

- (a) Allahabad
- (b) Amritsar
- (c) Delhi
- (d) Jaipur

11. Match List I with List II and then select the correct answer using the codes given below the Lists :

List I (Chemical compound)	List II (Molecular formula)
A. Plaster of Paris	1. Ca(OH)_2
B. Slaked lime	2. CaCO_3
C. Gypsum	3. $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$
D. Mohr salt	4. CaO
E. Quicklime	5. $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
	6. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

	A	B	C	D	E
(a)	6	2	3	4	1
(b)	1	2	3	4	5
(c)	3	1	4	5	6
(d)	3	1	6	5	4

12. Shyok is a tributary of

- (a) Brahmaputra
- (b) Indus
- (c) Chenab
- (d) Sutlej

13. In 1998, the contribution of Agriculture Sector to the GDP of India was about

- (a) 37% (b) 30%
(c) 47% (d) 17%

14. Consider the following devices :

1. Moderator
2. Control rod
3. Shield
4. Electrostatic precipitator

Which of these devices are used in a nuclear power reactor ?

- (a) 1, 2, 3 and 4 (b) 1, 2 and 3
(c) 1 and 4 (d) 2, 3 and 4

15. A girl is swinging on a swing in a sitting position. How will the period of swing be affected if the girl stood up ?

- (a) The period will decrease
(b) The period will increase
(c) The period will remain the same
(d) The swinging will stop

16. According to the 1991 Census, the number of metropolitan towns then in India was

- (a) 18 (b) 23 (c) 28 (d) 33

17. Which one of the following awards is given for Agricultural Research ?

- (a) Dr. Homi Bhabha Award
(b) Borlaug Award
(c) Ramon Magsaysay Award
(d) Shanti Swarup Bhatnagar Award

18. If the volume occupied by one mole of a gas at normal temperature and pressure is 22.4 litres, then the volume occupied by 5.6 grams of nitrogen (Atomic weight = 14) at normal temperature and pressure will be

- (a) 2.24 litres
(b) 4.48 litres
(c) 11.2 litres
(d) 22.4 litres

19. The principle that distinguishes Jainism from Buddhism is the

- (a) Practice of the eight-fold path
(b) Rejection of the infallibility of the Vedas
(c) Belief in rebirth
(d) Attribution of a soul to all beings and things

20. Uranium Corporation of India Limited is situated in

- (a) Maharashtra
(b) West Bengal
(c) Bihar
(d) Rajasthan

21. The Indus Valley people were familiar with the use of

- (a) Tin, copper and iron
(b) Tin, lead and copper
(c) Copper and lead
(d) Copper alone

22. The venue of the first ever Afro-Asian Games to be held in 2001 is

- (a) Cape Town
(b) Dhaka
(c) New Delhi
(d) Singapore

23. Match List I with List II and then select the correct answer using the codes given below the Lists :

<i>List I</i>		<i>List II</i>	
A. Friedel-Crafts reaction	1. Acid chloride/ ketone		
B. Fermentation	2. Yeast/ethanol		
C. Sandmeyer's reaction	3. Aniline/ chlorobenzene		
D. Saponification	4. Oil/soap		
A	B	C	D
(a) 1	2	4	3
(b) 1	2	3	4
(c) 2	1	3	4
(d) 2	1	4	3

24. Match List I with List II and then select the correct answer using the codes given below the Lists :

<i>List I</i>		<i>List II</i>	
A. Ho Chi Minh	1. Founder of democracy movement in Myanmar		
B. Sun Yat-sen	2. First PM of Singapore		
C. Suu Kyi Aung San	3. Vietnam's revolutionary leader		
D. Lee Kuan Yew	4. First President of Republic of China		

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

25. The first Governor-General of India was appointed under the provisions of the Act of

- (a) 1773 (b) 1784
(c) 1833 (d) 1858

26. Match List I with List II and then select the correct answer using the codes given below the Lists :

<i>List I</i>		<i>List II</i>	
A. Chymotrypsin	1. Cellulose		
B. Polysaccharide	2. Endrin		
C. Rodenticide	3. Enzyme		
D. Dye	4. Fluorescein		

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

27. A bucket containing water is rotated in a vertical circle with high speed. At the highest point, when the bucket is upside down, the water will

- (a) Spill out slowly

- (b) Spill out at once
(c) Not spill out
(d) Be thrown out with high speed

28. Which one of the following Articles of the Constitution of India makes special provision for the State of Jammu and Kashmir ?

- (a) Article 356 (b) Article 360
(c) Article 368 (d) Article 370

29. Match List I with List II and then select the correct answer using the codes given below the Lists :

<i>List I</i>		<i>List II</i>	
A. 78 AD	1. Sack of Somnath Temple		
B. 476 AD	2. Birth of the astronomer Aryabhatta		
C. 1026 AD	3. Commencement of the Saka Era		
D. 647 AD	4. Death of Harshavardhana		

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

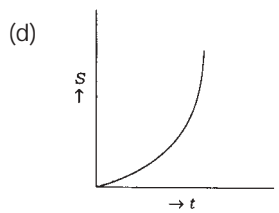
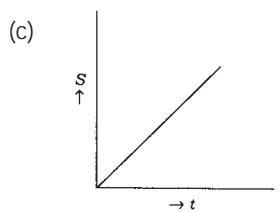
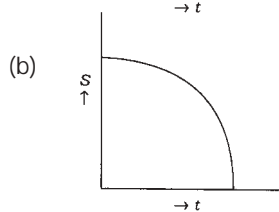
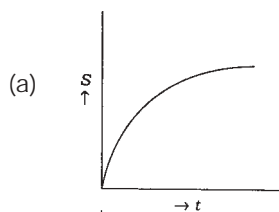
30. Which one of the following statements is correct ?

- (a) CO is an acidic oxide
(b) NO is a neutral oxide
(c) N₂O₅ is a mixed oxide
(d) PbO₂ is a peroxide

31. The President of India can proclaim National Emergency

- (a) On the advice of the Council of Ministers
(b) On the advice of the Prime Minister
(c) On the advice of the leader of the ruling party or set of parties in power
(d) At his own discretion

32. Which one of the following graphs correctly represents the distance-time variation for a body released vertically downward from the top of a building ?



33. The founder of the Pala dynasty of Bengal was

- (a) Dharmapala (b) Gopala
(c) Devapala (d) Mahipala

34. A project has been taken up by BHEL Corporate R & D, Hyderabad for development and field-testing of 50 kW phosphoric acid fuel cell (PAFC) power plant in a chlor-alkali

industry in Kurnool where the fuel available is

- (a) Methane
(b) Ethylene
(c) Hydrogen
(d) Heavy water

35. ORT (oral rehydration therapy) is associated with the treatment of

- (a) Anaemia (b) Beriberi
(c) Cancer (d) Diarrhoea

36. In 1498, Vasco da Gama reached

- (a) Trivandrum (b) Cochin
(c) Calicut (d) Ratnagiri

37. Which one of the following places ranks second among the coldest places in the world ?

- (a) Dras (Jammu and Kashmir)
(b) Kullu (Himachal Pradesh)
(c) Manali (Himachal Pradesh)
(d) Itanagar (Arunachal Pradesh)

38. Which one of the following has been the main accusation against the software company Microsoft ?

- (a) Cheating shareholders
(b) Monopoly trade
(c) Tax evasion
(d) Funding political parties

39. The correct chronological order in which (1) V. P. Singh; (2) Chandra Shekhar; (3) Morarji Desai and (4) Charan Singh occupied the office of the Prime Minister of India is

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

40. The total sum of the goods and services produced within a country in a year minus depreciation is called the

- (a) Gross National Product
(b) Net National Product
(c) Gross Domestic Product
(d) Net Domestic Product

41. Which one of the following is not true of the Foreign Exchange Management Act, 1999 ?

- (a) Removal of quantitative restrictions on import of items
- (b) Introducing a new chapter for boosting export
- (c) Indian companies are at liberty to access AGR/GDR
- (d) There is no negative limit for FDI

42. Bacteria reproduce

- (a) Only sexually
- (b) Only asexually
- (c) Mostly sexually
- (d) Mostly asexually

43. Who among the following cricketers has not had the distinction of being the highest wicket taker at one time or another in Test cricket ?

- (a) Dennis Lillee
- (b) Imran Khan
- (c) Richard Hadlee
- (d) Courtney Walsh

44. While Venus is seen only for one to two hours either after sunset or before sunrise, Jupiter is seen for the whole night whenever it is visible in the sky. The reason for this is that

- (a) Venus is much smaller than Jupiter
- (b) Venus is much closer to the earth than Jupiter
- (c) The orbit of Venus is inside the earth's orbit whereas the orbit of Jupiter lies outside the orbit of the earth
- (d) Venus reflects lesser amount of sunlight than Jupiter

45. Man cannot digest cellulose. Herbivores, such as rabbits and cows, can. The most important reason for this is that

(a) They have very efficient grinding teeth

(b) They possess an enlarged section of the gut containing bacteria which break down the cellulose for them

(c) They produce the enzyme cellulase which digests the cellulose; humans do not make this enzyme

(d) Humans do not need to digest cellulose

46. Paraffin wax is obtained from

- (a) Petroleum
- (b) Coal
- (c) Animal fat
- (d) Vegetable oils

47. Which one of the following countries is not a part of the Horn of Africa ?

- (a) Somalia
- (b) Ethiopia
- (c) Eritrea
- (d) Rwanda

48. The details of Coronation ceremony are narrated in the

- (a) Vishnu Purana
- (b) Kenopanishad
- (c) Atharva Veda
- (d) Aitareya Brahmana

49. Carborundum is

- (a) Calcium carbide
- (b) Calcium carbonate
- (c) Silicon carbide
- (d) Silicon dioxide

Directions (Qs. 50 to 60) : These questions consist of two statements, one labelled as 'Assertion A' and the other labelled as 'Reason R'. You are to examine these two statements carefully and decide if the Assertion A and the Reason R are individually true and if so, whether the Reason is a correct

explanation of the Assertion. Select your answers to these items using the codes given below.

Codes :

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not a correct explanation of A

(c) A is true but R is false

(d) A is false but R is true

50.

Assertion (A) :

The snow line in the Western Himalayas is lower than that in the Eastern Himalayas.

Reason (R) :

Western Himalayas are at a higher latitude.

51.

Assertion (A) :

About seventy-five percent of the working population of the Aravalli mountain region is engaged in agriculture.

Reason (R) :

The greater parts of Aravallis receive scanty rainfall.

52.

Assertion (A) :

Sugarcane grows well in the hot and humid climate.

Reason (R) :

Its yield per unit area is the highest in Punjab.

53.

Assertion (A) :

Melting point of basic lava flowing out of a volcanic eruption is very low.

Reason (R) :

Basic lava is found in a liquid form and flows through a large distance before it solidifies.

54.

Assertion (A) :

The density of the large outer planets of the solar system is very low.

Reason (R) :

The large outer planets consist of substances like hydrogen, helium and hydrogen compounds.

55.

Assertion (A) :

A radioactive element ${}_{90}^{231}\text{X}$ on emitting a beta particle would form ${}_{91}^{231}\text{Y}$.

Reason (R) :

A neutron has turned into a proton in the process.

56.

Assertion (A) :

When copper wire is placed in a solution of silver nitrate, a thin layer of silver is deposited on it.

Reason (R) :

Copper is more electronegative than silver.

57.

Assertion (A) :

Sulphanilic acid exists as a zwitterion while *p*-amino benzoic acid does not.

Reason (R) :

SO_3H group is more acidic than COOH group and is capable of transferring its H^+ to the weak NH_2 group.

58.

Assertion :

Alauddin Khalji imposed curbs on the power of the nobility.

Reason (R) :

Nobles were against Alauddin at the time of his struggle with Jalaluddin.

59.

Assertion (A) :

Nearly one-half of the population of the world is found near the sea coasts up to a height of 100 metres above mean sea level (m.s.l.).

Reason (R) :

In these areas the land is levelled. Hence, occupations are easily available.

60.

Assertion (A) :

Gandhiji advocated setting up of small-scale industries in villages.

Reason (R) :

Small-scale industries would provide employment to rural population.

61. 'Dumping' in the context of international trade refers to

- (a) Exporting goods at prices below the actual cost of production
- (b) Exporting goods without paying the appropriate taxes in the receiving country
- (c) Exporting goods of inferior quality
- (d) Exporting goods only to re-import them at cheaper rates

62. Rainfall in the doldrums is of the nature of

- (a) Orographic precipitation
- (b) Natural precipitation
- (c) Frontal precipitation
- (d) Convectional precipitation

63. Consider the following events :

1. Siraj-ud-Daulah's invasion of the British factory at Kasimbazar
2. Black Hole Tragedy
3. Battle of Plassey
4. Treaty of Alinagar

The correct chronological sequence of these events is

- (a) 1, 2, 3, 4

(b) 1, 2, 4, 3

(c) 3, 4, 1, 2

(d) 3, 4, 2, 1

64. A ship met with an accident at 30°E and 35°N. The ship was sailing in the

- (a) Baltic Sea
- (b) Black Sea
- (c) Mediterranean Sea
- (d) Red Sea

65. 'AD VALOREM' means, according to

- (a) Weight
- (b) Number
- (c) Value
- (d) Volume

66. The record low rate of inflation in India up to financial year 1999-2000 was

- (a) 1.5 percent
- (b) 2.0 percent
- (c) 2.5 percent
- (d) 3.0 percent

67. The distance to which Television signals can reach is proportional to (h is the height of the TV transmitting tower)

- (a) $\frac{1}{h}$
- (b) \sqrt{h}
- (c) h
- (d) h^2

68. In April 2000, the World Bank announced the approval of 111 million dollars credit to Andhra Pradesh for improving the

- (a) Use of information technology in State administration
- (b) Opportunities for the rural poor of the State
- (c) Telecommunication network in the State
- (d) Public transport facilities in the State.

69. A person can lift readily, a bucket full of water from a well through a thick nylon rope but will be unable to do the same when he uses a thin multifibre metallic wire instead of the thick nylon rope.

This is because

- (a) The hand experiences greater force through the nylon rope than through the metal wire
- (b) The hand experiences less force through the nylon rope than through the metal wire
- (c) More pressure is exerted on the hand when the metal wire is used as compared to the pressure exerted when a nylon rope is used
- (d) Less pressure is exerted on the hand when the metal wire is used as compared to the force exerted when a nylon rope is used

70. Consider the following statements :

AIDS, the most dreaded disease of recent times, spreads through

1. Blood transfusion
2. Sharing the same toilets and rooms
3. Social kissing
4. Sexual contact

Which of the above statements are correct ?

- (a) 2, 3 and 4
- (b) 1, 3 and 4
- (c) 1 and 4
- (d) 1, 2 and 4

71. Late Ustad Zia Mohiuddin Dagar brought back the grandeur of

- (a) Tanpura
- (b) Rudra Veena
- (c) Sur Bahar
- (d) Chalo

72. According to the 73rd Constitution Amendment Act, in the event of

dissolution of a panchayat, elections are to be compulsorily held within

- (a) 2 months
- (b) 4 months
- (c) 6 months
- (d) 8 months

73. A dispute relating to the election of the President of India is decided by the

- (a) Election Commission
- (b) Chief Justice of India
- (c) Supreme Court
- (d) Parliament

74. Match List I with List II and then select the correct answer using the codes given below the Lists :

<i>List I</i>		<i>List II</i>	
A. Hangul		1. Kaziranga	
B. Tiger		2. Dachigam	
C. Indian lion		3. Sundarbans	
D. Rhinoceros		4. Gir Forest	
A	B	C	D
(a) 1	2	3	4
(b) 2	3	4	1
(c) 2	3	1	4
(d) 3	1	4	2

75. Which one of the following agencies has the power to declare any industrial unit as a potentially sick unit ?

- (a) BIFR
- (b) MRTPC
- (c) FICCI
- (d) IRBI

76. Consider the following statements :

The foreign exchange reserves of India consist of

1. Foreign currency assets held by the RBI
2. Gold holdings of the RBI
3. Special Drawing Rights

Which of these statements are correct

- (a) 1 and 3
- (b) 1 and 2
- (c) 2 and 3
- (d) 1, 2 and 3

77. Which one of the following is the characteristic vegetation of regions between the snow line and about 3000 metres above mean sea level of the Himalayan region ?

- (a) Thick forests of birch, fir, spruce and other trees
- (b) Forests of oak, deodar, chestnut and maple trees
- (c) A few dwarf shrubs
- (d) Forests of khair, sandalwood, palas and other trees

78. Match List I with List II and then select the correct answer using the codes given below the Lists :

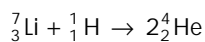
- | <i>List I</i> | <i>List II</i> |
|---------------|---|
| A. 1905 | 1. Transfer of capital from Calcutta to Delhi |
| B. 1911 | 2. Rowlatt Act |
| C. 1918 | 3. Appointment of Simon Commission |
| 4. 1927 | 4. Partition of Bengal |

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

79. India is a

- (a) Union of Federal States
- (b) Federal Union of States
- (c) Union of States
- (d) Union of States and Union Territories

80. In the nuclear reaction



the mass defect is 0.0186 amu, which in terms of energy would work out to

- (a) 0.278×10^{-11} eV
- (b) 0.278 MeV
- (c) 17.36 MeV
- (d) 27.8 MeV

81. Match List I with List II and then select the correct answer using the codes

given below the Lists :

- | <i>List I</i>
(Name of book) | <i>List II</i>
(Author) |
|-----------------------------------|----------------------------|
| A. <i>3001 : Final Odyssey</i> | 1. Steven Weinberg |
| B. <i>A Brief History of Time</i> | 2. Stephen Hawking |
| C. <i>The First Three Minutes</i> | 3. Carl Sagan |
| D. <i>Cosmos</i> | 4. Arthur C. Clarke |

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

82. The first Muslim ruler to introduce the system of price control was

- (a) Balban
- (b) Jalaluddin Khalji
- (c) Alauddin Khalji
- (d) Muhammad bin Tughlaq

83. Gandhiji believed that Satyagraha is a weapon of

- (a) The poor
- (b) The weak
- (c) The untouchables
- (d) None of these

84. Which one of the following States had a higher literacy rate than the rest according to the 1991 Census ?

- (a) Assam
- (b) Haryana
- (c) Karnataka
- (d) Sikkim

85. Alberuni came to India along with

- (a) Mahmud Ghazni
- (b) Muhammad bin Qasim
- (c) Muhammad Ghuri
- (d) Timur

86. If a wire of resistance 1 ohm is stretched to double its length, its resistance will become

- (a) $\frac{1}{4}$ ohm
- (b) $\frac{1}{2}$ ohm
- (c) 2 ohms
- (d) 4 ohms

87. In the year 1905, Gopal Krishna Gokhale founded the

- (a) Servants of India Society
- (b) Asiatic Society
- (c) Brahma Samaj
- (d) Bharat Sewak Samaj

88. The axis of rotation of the earth is tilted by 23.5° to the plane of revolution around the sun. The latitude of Mumbai is less than 23.5° whereas the latitude of Delhi is more than 23.5° . Which one of the following statements in this regard is correct ?

- (a) The sun can come overhead at both these places
- (b) The sun will never come overhead at either of these places
- (c) At Mumbai the sun can come overhead, but it will never do so at Delhi
- (d) At Delhi, the sun can come overhead, but it will never do so at Mumbai

89. In the context of exports, which one of the following pairs is not correctly matched ?

- (a) Cape Town : Wool and wine
- (b) Adelaide : Wheat and wool
- (c) Perth : Rice and corn
- (d) San Francisco : Fruits and wine

90. Which one of the following pairs is correctly matched ?

- (a) Zia-ud-din Barni : *Tarikh-i-Muhammadi*
- (b) Shams-i-Siraj Afif : *Tarikh-i-Feroze Shahi*
- (c) Ibn Batuta : *Fatwa-i-Jahandari*
- (d) Amir Khusro : *Tabqat-i-Nasiri*

91. India's economic planning cannot be said to be

- (a) Indicative
- (b) Imperative
- (c) Limited
- (d) Democratic

92. A new department has been established in Union Government for

- (a) Alleviation of urban poverty
- (b) Promotion of tribal art
- (c) Rural housing and rehabilitation
- (d) Drinking water supply

93. Ian Wilmut and his team of scientists at the Roslin Institute for Agricultural Sciences have developed a live mammal from a single cell derived from the udder tissue of a mother animal by transplanting its nucleus into an egg cell from which its own original nucleus was eliminated. Which one of the following statements in this regard is false ?

- (a) This is the first true clone of a mammalian species in the laboratory which has raised social and ethical issues in carrying out such research
- (b) Scientists believe that this research would finally lead to cloning of genes
- (c) The monkey used in this research was named Dolly
- (d) The research showed that totipotency is achievable in animals in the same manner as in plants

94. Which one of the following organisations has recently been set up by the Government of India to provide single-point interface between foreign investors and the government machinery ?

- (a) Foreign Investment Monitoring Agency
- (b) Foreign Investment Implementation Agency
- (c) Foreign Investment Monitoring Authority
- (d) Foreign Investment Implementation Authority

95. The largest postal network in the world is in

- (a) USA
- (b) China
- (c) India
- (d) Brazil

96. Polyethylene bags are harmful to the environment because they

- (a) Cannot be disposed of by burning
- (b) Cannot be recycled
- (c) Are water resistant
- (d) Are not biodegradable

97. As per Indian Constitution, in the event of any conflict between the Union laws and State laws,

- (a) The matter is referred to the Supreme Court
- (b) The State laws shall prevail
- (c) The Union laws shall prevail
- (d) The matter is referred to the Parliamentary Committee specifically constituted to resolve the dispute

98. Match List I with List II and select the correct answer using the codes given below the Lists :

<i>List I</i>		<i>List II</i>	
<i>(Disease)</i>		<i>(Deficient Vitamin)</i>	
A. Scurvy		1. Vitamin A	
B. Rickets		2. Vitamin B	
C. Night blindness		3. Vitamin C	
D. Beriberi		4. Vitamin D	
A	B	C	D
(a) 4	3	1	2
(b) 3	4	2	1
(c) 4	3	2	1
(d) 3	4	1	2

99. In baseball, the two opposing teams consist of

- (a) 10 players each
- (b) 9 players each
- (c) 8 players each
- (d) 7 players each

100. In Budget 2000-2001, the new scheme announced for uplift of the rural infrastructure is

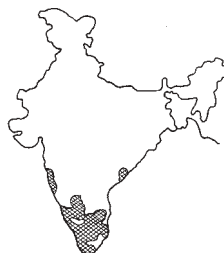
- (a) Grameen Vikas Yojana
- (b) Bharatiya Gramodaya Yojana
- (c) Pradhan Mantri Gramodaya Yojana

(d) Mahatma Gandhi Grameen Vikas Yojana

101. The British Prime Minister who declared his 'Communal Award' scheme to India in 1932 was

- (a) Winston Churchill
- (b) Clement Attlee
- (c) Ramsay McDonald
- (d) Neville Chamberlain

102.



The shaded area in the given map of India shows the distribution of

- (a) Coffee
- (b) Coconut
- (c) Groundnut
- (d) Tobacco

103. Consider the following seaports :

- 1. Chennai
- 2. Machilipatnam
- 3. Nagapattinam
- 4. Tuticorin

The correct sequence of these ports as one moves from north to south is

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

104. Biological Oxygen Demand (BOD) is a standard criterion for

- (a) Measuring oxygen levels in animals
- (b) Computing oxygen levels in forest ecosystems
- (c) Pollution assay in aquatic systems
- (d) Measuring oxygen levels in blood

105. Santhal was associated with

- (a) Tribal Rebellion
- (b) Non-Cooperation Movement
- (c) Salt Satyagraha
- (d) Indigo Revolt

106. 'Khamsin' is a hot and dry local wind experienced in

- (a) Iran (b) Egypt
(c) Niger (d) Saudi Arabia

107. Match List I with List II and then select the correct answer using the codes given below the Lists :

List I (District) List II (State)

- | | |
|--------------|-------------------|
| A. Anantapur | 1. Punjab |
| B. Bijapur | 2. Rajasthan |
| C. Bharatpur | 3. Karnataka |
| D. Ferozepur | 4. Andhra Pradesh |

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

108. The materials used for making vessels for cooking purposes should have

- (a) Low specific heat and high thermal conductivity
(b) Low specific heat and low thermal conductivity
(c) High specific heat and low thermal conductivity
(d) High specific heat and high thermal conductivity

109. Match List I with List II and then select the correct answer using the codes given below the Lists :

List I List II

- | | |
|------------------|----------------------|
| A. Pir Panjal | 1. Arunachal Pradesh |
| B. Dhauladhar | 2. Uttar Pradesh |
| C. Nag Tibba | 3. Jammu & Kashmir |
| D. Mishimi Hills | 4. Himachal Pradesh |

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

110. In a colour television set, the pictures of which one of the following sets of colours is superimposed to generate true colour picture ?

- (a) Red, green and blue
(b) Yellow, green and blue

- (c) Red, yellow and green
(d) Blue, yellow and red

111. If it is 6.00 a.m. at Greenwich, then it will be 11.00 a.m. at

- (a) 90°E (b) 60°E
(c) 75°E (d) 15°W

112. To ensure the early completion of selected irrigation and multipurpose projects, the Government of India launched a programme to provide Central loans to States. The programme in question is

- (a) Command Area Development Project
(b) Catchment Area Benefit Programme
(c) National Irrigation Development Project
(d) Accelerated Irrigation Benefit Programme

113.



The dots in the given map of India represent the location of

- (a) Bauxite deposits
(b) Copper deposits
(c) Lead deposits
(d) Manganese deposits

114. Consider the following budgetary features :

1. Bringing export income under tax net
2. Considerably higher allocation for defence
3. Cut in subsidy on fertilisers

Which of the above are reflected in the current year's Union Budget ?

- (a) 1 and 2 (b) 1, 2 and 3
(c) 1 and 3 (d) 2 and 3

66. (b) 67. (b) 68. (b) 69. (c)
 70. (c) 71. (b) 72. (c) 73. (c)
 74. (b)
 75. (a) : Board for Industrial & Financial Reconstruction.
 76. (d) 77. (a) 78. (b) 79. (c)
 80. (c) 81. (b) 82. (c) 83. (d)
 84. (d) : Assam (53.42%); Haryana (55.85%); Karnataka (56.04%); Sikkim (56.94%).
 85. (a) 86. (d) 87. (a) 88. (c)
 89. (c) 90. (b) 91. (b) 92. (a)
93. (c) 94. (d) 95. (b) 96. (d)
 97. (c) 98. (d) 99. (b) 100. (c)
 101. (c) 102. (b) 103. (b) 104. (c)
 105. (a) 106. (b) 107. (a) 108. (a)
 109. (b)
 110. (d) : Primary colours—Red, Blue and Yellow.
 111. (c) 112. (d) 113. (b) 114. (b)
 115. (d) 116. (b)
 117. (c) : Quarks make up large particles of protons and neutrons.
 118. (a) 119. (c) 120. (d)

ELEMENTARY MATHEMATICS

1. If $x = 4$, $y = 12$ and $x \propto y$, then
 (a) $4y = 3x$ (b) $x = 3y$
 (c) $y = 3x$ (d) $4x = 3y$
2. The missing number in the series 5, 13, 9, 17, 13, 21, is
 (a) 29 (b) 25 (c) 13 (d) 17
3. The compound interest for two years on a capital is Rs. two more than the simple interest for the same period. If the rate of interest is 5% per year, then the capital would be
 (a) Rs. 800 (b) Rs. 840
 (c) Rs. 880 (d) Rs. 882
4. An amount on compound interest becomes double in four years. It will become eight times in
 (1) 8 years (2) 12 years
 (3) 16 years (4) 20 years
5. Twenty litres of a mixture contains milk and water in the ratio of 5 : 3. If four litres of this mixture is replaced by four litres of milk, then the ratio of the milk to that of the water in the new mixture will be
 (a) 5 : 3 (b) 4 : 3
 (c) 7 : 3 (d) 2 : 3
6. $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}$ is equal to
 (a) $6\frac{2}{3}$ (b) $3\frac{1}{2}$ (c) 6 (d) 3
7. If a, b, c, \dots, x, y, z are 26 natural numbers, then the value of $(x - a)(x - b)(x - c) \dots (x - y)(x - z)$ is
 (a) 0 (b) 1 (c) 13 (d) 26
8. If $1^2 + 2^2 + 3^2 + \dots + 512^2 = m$, then $2^2 + 4^2 + 6^2 + \dots + 1024^2$ is equal to
 (a) $3m$ (b) $4m$ (c) m^2 (d) m^3
9. The expression $\frac{5\frac{5}{8}}{6\frac{7}{8}}$ of $\frac{6\frac{7}{11}}{9\frac{1}{8}} + \frac{8}{9} \left(2\frac{3}{11} + \frac{13}{22} \right)$ of $\frac{3}{5}$ equals
 (a) 1 (b) $\frac{1}{2}$ (c) $\frac{5}{12}$ (d) $\frac{7}{9}$
10. If Rs. 370 are divided among 10 men, 12 women and 20 boys such that each man gets an amount equal to that received by one woman and one boy together and that each woman gets twice the amount received by a boy, then the amount received by 10 men would be
 (a) Rs. 100 (b) Rs. 150
 (c) Rs. 120 (d) Rs. 130

11. A car starting from station A at 8 AM reaches station B at 12 noon. If another car starting from station B at 9 AM reaches station A at 11 : 30 AM, then the two cars will meet each other at

(a) 10 : 30 AM (b) 11 : 00 AM

(c) $10 : 9\frac{3}{13}$ AM (d) 10 : 23 AM

12. If m persons working m hours a day for each of the m days produce m units of work, then the units of work produced by n persons working n hours a day for each of the n days is

(a) $\frac{n^3}{m^2}$ (b) $\frac{n^2}{m^3}$ (c) $\frac{m^2}{n^3}$ (d) $\frac{m^3}{n^2}$

13. The salary received by an officer A is 5% more than that received by the officer B, but $12\frac{1}{2}\%$ less than that received by the officer C. If the officer C received $x\%$ more than what is received by the officer B, then the value of x will be

(a) 10% (b) 15% (c) 20% (d) 30%

14. A person incurs a loss of 6% by selling a watch at Rs. 423. In order to get a profit of 6%, the person should sell the watch at

(a) Rs. 486 (b) Rs. 477

(c) Rs. 586 (d) Rs. 577

15. Consider the following statements :
For any positive integer n , the number $10^n - 1$ is divisible by

1. 9 for $n =$ odd only.

2. 9 for $n =$ even only.

3. 11 for $n =$ odd only.

4. 11 for $n =$ even only.

5. 9 for $n =$ odd or even.

Which of the above statements are correct ?

(a) 1 and 3 (b) 2 and 3

(c) 1 and 4 (d) 4 and 5

16. A prime number N , in the range 10 to 50, remains unchanged when its digits are reversed. The square of such a number is

(a) 1936 (b) 1089

(c) 484 (d) 121

17. In a six-digit number, the sum of the digits in the even places is 9 and the sum of the digits in the odd places is 20. All such numbers are divisible by

(a) 7 (b) 9 (c) 6 (d) 11

18. Which one of the following numbers is divisible by 15 ?

(a) 30560 (b) 29515

(c) 23755 (d) 17325

19. If m and n are positive integers, then the digit in the unit's place of $5^n + 6^m$ is always

(a) 1 (b) 5 (c) 6 (d) $n + m$

20. If two numbers are in the ratio of 2 : 3 and the product of their HCF and LCM is 33750, then the sum of the numbers is

(a) 250 (b) 425 (c) 325 (d) 375

21. If A , B and C are three numbers, such that, the LCM of A and B is B and the LCM of B and C is C , then the LCM of A , B and C is

(a) A (b) B (c) C (d) $\frac{A + B + C}{3}$

22. If $\log_{10}20 = 1.3010$ and $\log_{10}30 = 1.4771$, then $\log_{10}(60000)$ is equal to

(a) 0.7781 (b) 1.7781

(c) 2.7781 (d) 4.7781

23. If $\log_{10}x + \log_{10}y = 3$ and $\log_{10}x - \log_{10}y = 1$, then x and y are respectively

(a) 100 and 10 (b) 10 and 100

(c) 1000 and 100 (d) 100 and 1000

24. $\frac{(\log_a x)}{(\log_{ab} x)}$ equals

(a) $\log_a b$ (b) $1 + \log_a b$

(c) $\log_b a$ (d) $1 + \log_b a$

25. If $\log 2 = 0.3010$, then the number of digits in 2^{64} is
 (a) 20 (b) 32 (c) 128 (d) 301

26. If $2\frac{1}{2}$ minutes is represented by 30 units, then the unit of time is
 (a) 5 sec (b) 6 sec
 (c) 7 sec (d) 8 sec

27. The expression
 $f(x) = a_0x^n + a_1x^{n-1} + a_2x^{n-2} + \dots$
 $\dots + a_{n-1}x + a_n$

is a polynomial of degree n
 (a) Only when n is a positive integer
 (b) If n is a negative integer and $a_n \neq 0$
 (c) If n is a positive integer and $a_0 \neq 0$
 (d) If n is any integer

28. $9x^2 - (x^2 - 4)^2$ can be factorised as
 (a) $(x - 1)(x + 4)(x - 4)(x + 1)$
 (b) $-(x - 1)(x - 4)(x + 1)(x + 4)$
 (c) $(x + 1)(x^2 - 4)$
 (d) $(3x - 1)(3x - 2)(x^2 + 4)$

29. $xy(z^2 + 1) + z(x^2 + y^2)$ can be factorised as
 (a) $(xy + z)(yz + x)$
 (b) $(zx + y)(xy + z)$
 (c) $(yz + x)(zx + y)$
 (d) $(x^2 + y^2)(z + x)$

30. If the polynomial $x^{19} + x^{17} + x^{13} + x^{11} + x^7 + x^5 + x^3$ is divided by $(x^2 + 1)$, then the remainder is
 (a) 1 (b) $x^2 + 4$ (c) $-x$ (d) x

31. If the polynomial $2x^3 - 9x^2 + 15x + p$, when divided by $(x - 2)$, leaves $-b$ as remainder, then p is equal to
 (a) -16 (b) 15 (c) 20 (d) 10

32. If $(x + a)$ is the HCF of $x^2 + px + q$ and $x^2 + lx + m$, then the value of 'a' is given by

(a) $\frac{p-l}{q-m}$ (b) $\frac{q-m}{p-l}$

(c) $\frac{l+p}{q+m}$ (d) $\frac{p+m}{p+l}$

33. The HCF of $(x^4 - y^4)$ and $(x^6 - y^6)$ is

(a) $x^2 - y^2$ (b) $x^2 + y^2$
 (c) $x^3 + y^3$ (d) $x^3 - y^3$

34. If $x + y + z = 0$, then $x^2 + xy + y^2$ equals

(a) $y^2 + yz + z^2$ (b) $y^2 - yz + z^2$
 (c) $z^2 - zx + x^2$ (d) $z^2 + zx + x^2$

35. $\left(1 + \frac{1}{x+1}\right)\left(1 + \frac{1}{x+2}\right)$

$\left(1 + \frac{1}{x+3}\right)\left(1 + \frac{1}{x+4}\right)$

is equal to

(a) $1 + \frac{1}{x+5}$ (b) $\frac{1}{x+5}$

(c) $\frac{x+5}{x+1}$ (d) $\frac{x+1}{x+5}$

36. The area of the region bounded by $|x - 1| \leq 1$, $|y - 2| \leq 2$ and $2x + y = 4$ is

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

37. A lady has 25-paise coins and 50-paise coins. If in all, she has 80 coins totalling Rs. 21, then the difference between the number of 25-paise and 50-paise coins is

(a) 4 (b) 8 (c) 72 (d) 76

38. The cost price of a table and a chair together is Rs. 430. If the table costs 15% more than the chair, then the cost (in rupees) of the table and the chair are respectively

(a) 196 and 175
 (b) 230 and 200
 (c) 200 and 170
 (d) 240 and 190

39. The sum of the digits of a two-digit number is 9. If the number obtained by reversing the digits of the number exceeds the given number by 27, then the number is

- (a) 54 (b) 45 (c) 36 (d) 27

40. The set of linear inequations, $x + y < 0$, $x > 0$, $y > 0$ has

- (a) 3 solutions (b) 1 solution
(c) No solution
(d) An infinite number of solutions

41. The course of an enemy submarine as plotted on a set of rectangular axes is $2x + 3y = 5$. On the same axes, the course of the destroyer is indicated by $x - y = 10$. The point (x, y) at which the submarine can be destroyed is

- (a) $(-7, 3)$ (b) $(-3, 7)$
(c) $(3, -7)$ (d) $(7, -3)$

42. The set of values of k , for which $x^2 + 5kx + 16 = 0$ has no real root, is

- (a) $k \geq \frac{8}{5}$ (b) $k \leq \frac{8}{5}$
(c) $-\frac{8}{5} < k < \frac{8}{5}$ (d) $-8 < k < 8$

43. If $a > 0$, $b > 0$, $c > 0$ and $a \neq b \neq c$, then both the roots of the equation, $(x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0$, will always be

- (a) Distinct (b) Equal
(c) Negative (d) Not real

44. In a group of children, each child exchanges a gift with every other child. If the number of gifts is 132, then the number of children in the group is

- (a) 10 (b) 11 (c) 12 (d) 13

45. $\sqrt{2\sqrt{2\sqrt{2\sqrt{2\sqrt{2}}}}}$ is equal to

- (a) 0 (b) $\sqrt{2}$
(c) 2 (d) $\frac{31}{2^{32}}$

46. If $x = 3^{\frac{1}{3}} + 3^{-\frac{1}{3}}$, then $3x^3 - 10$ is

- (a) $-3x$ (b) $3x$ (c) $-9x$ (d) $9x$

47. If $2^{x-1} + 2^{x+1} = 320$, then the value of x is

- (a) 5 (b) 6 (c) 7 (d) 8

48. $(A \cap B)'$ is equal to

- (a) $A' \cap B'$ (b) $A' \cup B'$
(c) $A' \subset B'$ (d) $B' \subset A'$

49. For any three sets, A , B and C , $A \cap (B \cup C)$ is equal to

- (a) $(A \cup C) \cap (B \cup C)$
(b) $(A \cap B) \cup (A \cap C)$
(c) $(A \cup B) \cap C$ (d) $(A \cap B) \cup C$

50. Which one of the following is a null set?

- (a) $\{0\}$ (b) $\{x : x < 0 \text{ or } x > 0\}$
(c) $\{x : x^2 = 9 \text{ or } x = 4\}$
(d) $\{x : x \neq x\}$

51. If ABCD is a parallelogram with the diagonals intersecting at O, then the number of distinct pairs of congruent triangles formed is

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

52. The lines $ax + by + c = 0$, $bx + cy + a = 0$ and $cx + ay + b = 0$ are concurrent only when

- (a) $a + b + c = 0$
(b) $a^2 + b^2 + c^2 = 2abc$
(c) $a^3 + b^3 + c^3 = 3abc$
(d) $a + b + c = abc$

53. If the slope of one of the lines $x^2 - 4xy + y^2 = 0$ is k times the slope of the other, then the value of k is equal to

- (a) $3 \pm \sqrt{7}$ (b) $7 \pm 2\sqrt{3}$
(c) $7 \pm 4\sqrt{3}$ (d) $3 \pm 2\sqrt{7}$

54. If the exterior angle of a regular polygon is equal to the acute angle of a right-angled isosceles triangle, then the polygon is a regular

- (a) Pentagon (b) Hexagon
(c) Octagon (d) Heptagon

55. AB is a straight line and O is a point lying on AB. A line OC is drawn from O such that $\angle COA = 36^\circ$. OD is a line within the $\angle COA$ such that $\angle DOA = \left(\frac{1}{3}\right) \angle COA$. If OE is a line within the $\angle BOC$ such that $\angle EOC = \frac{1}{4} \angle BOC$, then the $\angle DOE$ must be

- (a) 60° (b) 45° (c) 36° (d) 30°

56. The transversal EG intersects the parallel lines AB and CD at F and G respectively. If $\angle AFE = 60^\circ$ and HI bisects the $\angle EGD$, then $\angle DGI$ is equal to

- (a) 95° (b) 100° (c) 120° (d) 140°

57. In an equilateral triangle ABC, if the side BC is trisected at D, then $9AD^2$ will be equal to

- (a) $5 AB^2$ (b) $6 AB^2$
(c) $7 AB^2$ (d) $8 AB^2$

58. ABC is a triangle. D and E are two points on AB and AC such that $\frac{AD}{AB} = \frac{AE}{AC} = 2m$ for $0 < m < 1$. From D and E, lines are drawn parallel to AC and AB to meet at a point O. This point O will lie on the line BC if the value of m is

- (a) 1 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{1}{4}$

59. The incentre of a triangle is the point of intersection of its

- (a) Medians
(b) Perpendicular bisectors of the sides
(c) Altitudes
(d) Angular bisectors

60. If PQRS is a square and M is the midpoint of \overline{PQ} , then

- (a) $SM = RM$
(b) $SM = MP + PS$
(c) $SM = MQ + MR$
(d) $SM \neq MR$

61. ABCD is a rectangle. The quadrilateral PQRS formed by the bisectors of the angles of ABCD will be a

- (a) Rectangle (b) Square
(c) Trapezium
(d) Cyclic quadrilateral

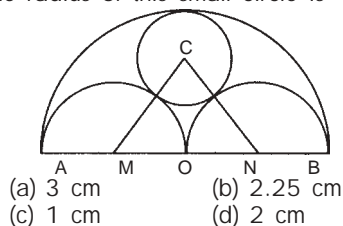
62. Five passengers start from the same point in five directions covering the same distance in a given time. If this situation is to be seen in the light of a four-sided closed figure with one of the diagonals representing the fifth distance, then the resulting figure is

- (a) A parallelogram with equal sides and one angle as 45°
(b) A quadrilateral with one angle as 60°
(c) A rhombus with one angle as 60°
(d) A rhombus with one angle as 30°

63. If a circle touches the side BC of a $\triangle ABC$ at P and also sides AB and AC produced at Q and R respectively, then AQ is equal to

- (a) $\frac{1}{2}$ (Perimeter of $\triangle ABC$)
(b) $\frac{1}{4}$ (Perimeter of $\triangle ABC$)
(c) $\frac{1}{6}$ (Perimeter of $\triangle ABC$)
(d) None of the above

64. In the given figure, AB = 6 cm and O is the middle point of AB. Semi-circles are drawn on AB, AO and OB. If C is the centre of the small circle which touches all the semi-circles, then the radius of this small circle is



65. If A and B are two fixed points and P is a point moving in such a way that $PA + PB = \text{constant}$, then the locus of P is a/an

- (a) Circle (b) Ellipse
(c) Straight line (d) Parabola

66. If three sides of a triangle are 6 cm, 8 cm, and 10 cm, then the altitude of the triangle, using the largest side as its base, will be

- (a) 8 cm (b) 6 cm
(c) 4.8 cm (d) 4.4 cm

67. A rectangle and a parallelogram are drawn between the same parallel lines on a common base of 10 cm. If the perimeter of the rectangle is 36 cm, then the area of the parallelogram is

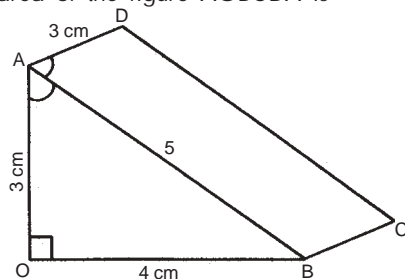
- (a) 100 cm^2 (b) 80 cm^2
(c) 81 cm^2 (d) 60 cm^2

68. If a wheel covers a distance of 440 m in 20 rotations, then the diameter

of the wheel is $\left(\pi = \frac{22}{7}\right)$

- (a) 3.5 m (b) 7 m
(c) 14 m (d) 21 m

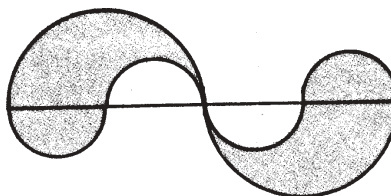
69. In the given figure, OAB is a triangle and ABCD is a parallelogram. If $OA = AD = 3 \text{ cm}$, $OB = 4 \text{ cm}$, $\angle AOB = 90^\circ$ and $\angle OAB = \angle BAD$, then the area of the figure AOB CDA is



- (a) 18 cm^2 (b) 21 cm^2
(c) 24 cm^2 (d) 27 cm^2

70. If r and R are the respective radii of the smaller and the bigger semi-

circles, then the area of the shaded portion in the given figure is

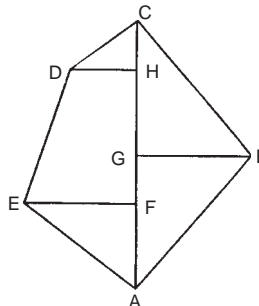


- (a) $\pi R^2 - \pi r^2$ (b) πR^2
(c) πr^2 (d) $\pi R^2 + \pi r^2$

71. The cross-section of a canal is in the shape of a trapezium. The canal is 15 m wide at the top and 9 m wide at the bottom. If the area of the cross-section is 720 m^2 , then the depth of the canal is

- (a) 58.4 m (b) 58.6 m
(c) 58.8 m (d) 60 m

72. The dimensions of the field shown in the given figure are : $AC = 150 \text{ m}$, $AH = 120 \text{ m}$, $AG = 80 \text{ m}$, $AF = 50 \text{ m}$, $EF = 30 \text{ m}$, $GB = 50 \text{ m}$, $HD = 20 \text{ m}$.



The area of this field is

- (a) 6500 m^2 (b) 6550 m^2
(c) 6600 m^2 (d) 6650 m^2

73. If three cubes of copper, each with an edge of 6 cm, 8 cm and 10 cm respectively, are melted to form a single cube, then the diagonal of the new cube will be

- (a) 18 cm (b) 19 cm
(c) 19.5 cm (d) 20.8 cm

74. The volume of a rectangular solid is 210 cm^3 and the surface area is 214 cm^2 . If the area of the base is 42 cm^2 , then the edges of the rectangular solid are

- (a) 3, 4 and 5 cm
- (b) 4, 5 and 6 cm
- (c) 5, 6 and 7 cm
- (d) 6, 7 and 8 cm

75. If the area of the curved surface of a right-circular cone of diameter 14 cm is 550 cm^2 , then the volume of the cone is

- (a) 1230 cm^3 (b) 1231 cm^3
- (c) 1232 cm^3 (d) 1233 cm^3

76. A right-pyramid is on a regular hexagonal base. Each side of the base is 10 m and the height is 60 m. The volume of the pyramid is

- (a) 5000 m^3 (b) 5100 m^3
- (c) 5195 m^3 (d) 5196 m^3

77. The diameter of the base of a right-circular cylinder is 42 cm. If the area of the curved surface is 1320 cm^2 , then the height of the cylinder is

- (a) 8 cm (b) 9 cm
- (c) 10 cm (d) 12 cm

78. A solid cylinder of base radius 7 cm and height 24 cm is surmounted by a cone of the same base radius and same vertical height. A hemisphere surmounts the cylinder at the other end. Surface area of the solid will be

- (a) $527 \pi \text{ cm}^2$ (b) $609 \pi \text{ cm}^2$
- (c) $707 \pi \text{ cm}^2$ (d) $805 \pi \text{ cm}^2$

79. If a spherical ball of radius r is melted and recast into 3 smaller spheres of equal size, then the radius of each of the smaller spheres will be

- (a) $\frac{r}{3}$ (b) $\frac{r}{\sqrt{3}}$ (c) $\frac{r}{\sqrt[3]{3}}$ (d) $\sqrt[3]{\frac{r}{3}}$

80. Solid spherical balls each of diameter 1.4 cm are dropped into a cylindrical beaker containing water upto

a height of 28 cm and are fully submerged. The diameter of the beaker is 5.6 cm. If the water in the beaker rises by 17.5 cm, then the number of balls dropped in it will be

- (a) 63 (b) 100
- (c) 300 (d) 780

81. Consider the following statements :

1. $\sin \theta$ is an increasing function of θ in the first quadrant.
2. $\cos \theta$ is a decreasing function of θ in the first and second quadrants.
3. $0 < \sin \theta < \cos \theta$ for $0 < \theta < \frac{\pi}{4}$
4. $\sin \theta < \cos \theta < 0$ for $\frac{\pi}{4} < \theta < \frac{\pi}{2}$

Which of the above statements are correct ?

- (a) 1 and 3 (b) 2 and 4
- (c) 1, 2 and 4 (d) 1, 3 and 4

82. Graphs of $y = \sin x$ and $y =$

$\cos x$, where $0 \leq x \leq \frac{\pi}{2}$, intersect at the point whose abscissa is

- (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) 0

83. If $A = 2B = 3C = 90^\circ$, then

$$\cos^2 A - \cot^2 B + \operatorname{cosec}^2 C \text{ is}$$

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

84. Which one of the following statements is correct ?

- (a) $\tan 1^\circ = \tan 2^\circ$ (b) $\tan 1^\circ < \tan 2^\circ$
- (c) $\tan 1^\circ > \tan 2^\circ$ (d) $\tan 1^\circ = 1$

85. If $\alpha = 45^\circ$, then the value of

$$2 \sin(\alpha - 45^\circ) + \sin(\alpha + 45^\circ) + 5 \cos 2\alpha \cdot \cos(135^\circ - \alpha) \text{ is}$$

- (a) 0 (b) 1 (c) $\frac{1}{2}$ (d) $\frac{1}{\sqrt{2}}$

86. If θ is an interior angle of a regular polygon of n sides such that $\tan \theta = \sqrt{3}$, then n is equal to

- (a) 3 (b) 4 (c) 5 (d) 6

87. The value of the product $\cot 1^\circ \cdot \cot 2^\circ \cdot \cot 3^\circ \dots \cot 89^\circ$ is

- (a) 0 (b) $\frac{1}{2}$ (c) 1 (d) ∞

88. If $A = \sin^4\theta + \cos^4\theta$, then

- (a) $0 < A < \frac{1}{2}$ (b) $\frac{1}{2} \leq A \leq 1$

- (c) $1 < A \leq \frac{3}{2}$ (d) $\frac{3}{2} \leq A \leq 2$

89. If $x = r \cos \theta \cos \phi$, $y = r \cos \theta \sin \phi$ and $z = r \sin \theta$, then $x^2 + y^2 + z^2$ is equal to

- (a) 1 (b) r (c) r^2 (d) $\frac{1}{r^2}$

90. If $\sec \theta + \tan \theta = p$, then $\cos \theta$ is

- (a) $\frac{p^2 + 1}{p^2 - 1}$ (b) $\frac{p^2 - 1}{(p^2 + 1)^2}$

- (c) $\frac{2p}{p^2 + 1}$ (d) $\frac{4p^2}{(p^2 + 1)^2}$

91. In any ΔABC , if a, b and c are the sides opposite to the angles A, B and C respectively, then $\frac{\sin(A - B)}{\sin(A + B)}$ is equal to

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

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

92. If the angle of elevation of the sun is 60° , then the length of the shadow of a vertical pillar of height h will be

- (a) $\frac{h}{\sqrt{3}}$ (b) $h\sqrt{3}$

- (c) $h\sqrt{2}$ (d) $\frac{h}{\sqrt{2}}$

93. The angle of depression from the top of a light-house of two boats are 45° and 30° towards the east. If the

two boats are 60 m apart, then the height of the light-house is

- (a) $60\sqrt{3}$ (b) $30(\sqrt{3} + 1)$

- (c) $30(\sqrt{3} - 1)$ (d) $60(\sqrt{3} - 1)$

94. A flag-staff is fixed at the top of a tower. The angles of elevation of the top and the bottom of this flag-staff at a point distant 'a' metres from the foot of the tower are α and β respectively. The height of the flag-staff (in metres) is

- (a) $a(\sin \alpha - \sin \beta)$

- (b) $a(\cos \beta - \cos \alpha)$

- (c) $a(\tan \alpha - \tan \beta)$

- (d) $a \tan(\alpha - \beta)$

95. The angle of elevation of the top of an incomplete tower at a point 40 m from its base is 45° . If the elevation of the completed tower at the same point is 60° , then the height through which the tower has been raised is

- (a) $40\sqrt{3}$ m

- (b) $40(\sqrt{3} + 1)$ m

- (c) $40\left(1 - \frac{1}{\sqrt{3}}\right)$ m

- (d) $40(\sqrt{3} - 1)$ m

96. The cumulative frequency distribution is represented by

- (a) Ogive (b) Bar diagram

- (c) Logistic curve (d) Histogram

97. A student represents his scores in Mathematics, Statistics and Economics in a pie-chart. The central angle for Mathematics is 120° . He scored 96 in Statistics and 84 in Economics. The central angle for Statistics is

- (a) 116° (b) 128°

- (c) 192° (d) 212°

98. For obtaining the secondary data, one may rely on

- (a) Direct personal interview
- (b) Indirect personal interview through a team of investigators appointed for the purpose
- (c) Personal scrutiny of periodicals
- (d) Questionnaires filled by a group of enumerators appointed for the purpose

99. Monthly salary distribution of 25 employees of a financial company is given below :

Salary range (In Rs.)	Number of Employees
3000—4000	3
4000—5000	7
5000—6000	10
6000—7000	5

It was decided by the management of the company to give bonus equal to 20 percent of the lower limit of the class to which the employees belonged. The total amount of the bonus paid to all the employees is

- (a) Rs. 24,200 (b) Rs. 23,800
- (c) Rs. 23,400 (d) Rs. 23,000

100. Consider the data given in the following table :

Variable x	Frequency y
10	3
15	10
20	f
25	7
35	5

If the mean of the given data is 20.6, then the missing frequency f is

- (a) 21 (b) 25
- (c) 26 (d) 27

ANSWERS

1. (c) : $x \propto y \Rightarrow x = ky$
 $x = 4, y = 12$
 $\Rightarrow 4 = 12k \Rightarrow k = 1/3$
 $\therefore x = \frac{1}{3}y$ or $y = 3x$

2. (d) : Pattern is
 $5 + 8 = 13$ & $13 - 4 = 9$
 $9 + 8 = 17$ & $17 - 4 = 13$
 $13 + 8 = 21$ & $21 - 4 = 17$
 (missing number)

3. (a) : Simple interest on Rs. x for 2 years at the rate of 5% is $\frac{x}{10}$.

Also compound interest on capital x for 2 years at the

rate of 5% is $\frac{41}{400}x$

$\therefore \frac{41}{400}x - \frac{x}{10} = 2$
 $\Rightarrow x = 800.$

4. (b)

5. (c) : If the quantity of milk and water is $5x$ and $3x$, then $5x + 3x = 20$ or $x = 5/2$

\therefore Quantity of milk and water is $\frac{25}{2}$ and $\frac{15}{2}$ respectively.

Now in 4 litres of mixture taken out, there will be $\frac{5}{2}$ litres of

milk and $\frac{3}{2}$ litres of water.

\therefore After 4 litres of mixture is taken out, 16 litres of mixture is left and there will be

$\frac{25}{2} - \frac{5}{2} = 10$ litres of milk and

$\frac{15}{2} - \frac{3}{2} = 6$ litres of water.

∴ After 4 litres of milk is added, the 20 litres of mixture will have
 $10 + 4 = 14$ litres of milk
and $6 + 0 = 6$ litres of water.
Hence the required ratio
 $= 14 : 6$ or $7 : 3$

6. (d) : Let

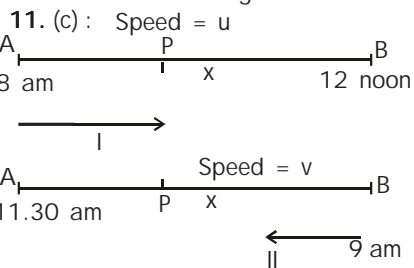
$$x = \sqrt{6 + \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}}$$
Then $x = \sqrt{6 + x}$
 $\Rightarrow x^2 - x - 6 = 0$
 $\Rightarrow (x - 3)(x + 2) = 0$
 $\Rightarrow x = 3$

7. (a)

8. (b) : Given $1^2 + 2^2 + 3^2 + \dots + 512^2 = m$
We have
 $2^2 + 4^2 + 6^2 + 1024^2$
 $= 2^2 [1^2 + 2^2 + 3^2 + \dots + 512^2]$
 $= 4m$

9. (c)

10. (b) : Note that if a boy gets Rs. x , then a woman gets Rs. $2x$ and a man gets Rs. $3x$.



Clearly, $u = \frac{x}{4}$ and $v = \frac{2x}{5}$.
Let the two cars meet after time t when car II starts from B. Then
For car II : $BP = \frac{2x}{5}t$
For car I : $BP = x - AP$
 $= x - \frac{x}{4}(1+t)$

Hence, $\frac{2xt}{5} = x - \frac{x}{4}(1+t)$
 $\Rightarrow t = \frac{15}{13} = 1\text{hour } 9\frac{3}{13}\text{ minutes.}$
Hence the two cars meet at
 $9 + \left(1\text{hour } 9\frac{3}{13}\text{ minutes}\right)$ or
at $\left(10\text{ hours } 9\frac{3}{13}\text{ minutes}\right)$ a.m.

12. (a)

13. (c) : Let the salary of B be Rs. y .
Then the salary of C will be
Rs. $\left(y + \frac{5y}{100}\right)$

Now Salary of A is

(i) 5% more than the salary
of B $= y + \frac{5y}{100}$... (1)

(ii) $12\frac{1}{2}\%$ less than the salary
of C $= y + \frac{xy}{100}$

$-\frac{25}{2 \times 100} \left(y + \frac{xy}{100}\right)$... (2)

From (1) and (2),

$y + \frac{5y}{100}$
 $= y + \frac{xy}{100} - \frac{25}{2 \times 100} \left(y + \frac{xy}{100}\right)$

On simplification, $x = 20$.

14. (b) : Cost price = Rs. $\frac{100 \times 423}{94}$
 $= \text{Rs. } 450$

To earn 6% profit, the S.P. should
be Rs. $\frac{106 \times 450}{100} = \text{Rs. } 477$

15. (d)

16. (d) : If the number is xy , then its reverse is yx . Since the number remains unchanged, therefore
 $10x + y = 10y + x$,

53. (c) : $x^2 - 4xy + y^2 = 0$

$$\Rightarrow \left(\frac{y}{x}\right)^2 - 4\frac{y}{x} + 1 = 0$$

$$\Rightarrow \frac{y}{x} = \frac{4 \pm \sqrt{16 - 4}}{2} = 2 \pm \sqrt{3}$$

\therefore The slopes of the two lines are $2 + \sqrt{3}$ and $2 - \sqrt{3}$.

$$\text{Now } 2 + \sqrt{3} = k(2 - \sqrt{3})$$

$$\Rightarrow k = 7 + 4\sqrt{3} \text{ and}$$

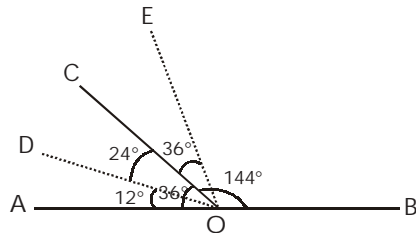
$$2 - \sqrt{3} = k(2 + \sqrt{3})$$

$$\Rightarrow k = 7 - 4\sqrt{3}$$

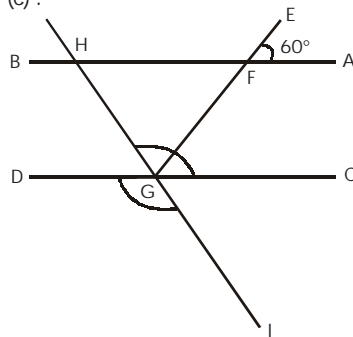
$$\therefore k = 7 \pm 4\sqrt{3}$$

54. (c)

55. (a) :



56. (c) :



$\therefore \angle AFE = 60^\circ \Rightarrow \angle FGC = 60^\circ$
 $\angle FGD = 180^\circ - \angle FGC = 120^\circ$
 Since HI is the bisector of $\angle FGD$, therefore $\angle FGH = 60^\circ$

Hence $\angle HGC$

$$= \angle FGH + \angle FGC = 120^\circ$$

$$\Rightarrow \angle DGI = 120^\circ.$$

57. (c) : If $AB = 3a$, then $BD = a$

$$\text{and } AD^2 = AB^2 + BD^2$$

$$= 2AB \cdot BD \cdot \cos 60^\circ.$$

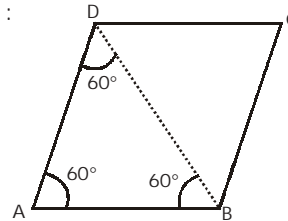
58. (a) : For $m = 1$, D becomes the mid-point of AB and E becomes the mid-point of AC. Obviously the parallels DO and EO will meet at O which will be the mid-point of BC.

59. (d)

60. (a)

61. (a)

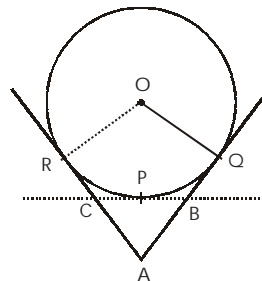
62. (a) :



Here

$$AB = BC = CD = DA = BD$$

63. (a) :



Here $AQ = AR$, $BQ = BP$

and $CP = CR$.

Now $AQ + AR$

$$= AB + BQ + AC + CR$$

$$\Rightarrow AQ + AQ$$

$$= AB + BP + AC + CP$$

$$\Rightarrow 2AQ = AB + AC + BC$$

$$\Rightarrow AQ = \frac{1}{2} (\text{Perimeter of } \triangle ABC)$$

64. (c) : Given AB = 6cm, AO = 3cm, OB = 3cm, MO = 1.5cm, ON = 1.5cm.

Let R be the radius of the circle whose centre is C. Then, in $\triangle CMO$,

$$\cos \alpha = \frac{MO}{CM} = \frac{1.5}{1.5 + R} \text{ and}$$

$$\sin \alpha = \frac{OC}{CM} = \frac{3 - R}{1.5 + R}$$

Now $\cos^2 \alpha + \sin^2 \alpha$

$$= \left(\frac{1.5}{1.5 + R} \right)^2 + \left(\frac{3 - R}{1.5 + R} \right)^2$$

$$\Rightarrow R = 1$$

65. (b)

66. (c)

67. (b) : Note that the rectangle and the parallelogram will have the same area. Moreover, if the perimeter of the rectangle is 36 and one side is 10, then the other side will be 8.

68. (b) : If r is the radius, then

$$2\pi r = \text{Circumference} = \frac{440}{20}$$

$$\Rightarrow \text{Diameter} = 2r = 7\text{m.}$$

69. (a) : From $\triangle OAB$, $\sin \alpha = 4/5$

$$\therefore \text{From } \triangle ADM, \sin \alpha = \frac{DM}{AB}$$

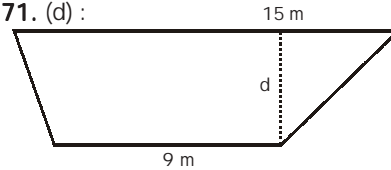
$$\Rightarrow DM = \sin \alpha \times 3 = \frac{12}{5}$$

Hence area of the figure AOB CDA = Area of $\triangle AOB$ + Area of parallelogram ABCD

$$= \frac{1}{2} \times 3 \times 4 + 5 \times \frac{12}{5} = 18 \text{ cm}^2$$

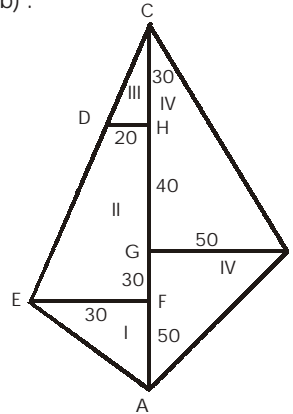
70. (b)

71. (d) :



$$\begin{aligned} 720 &= \text{Area of the cross-section} \\ &= \text{Area of the trapezium} \\ &= \frac{1}{2} d(9 + 15) = 12d \\ \Rightarrow d &= 60\text{m.} \end{aligned}$$

72. (b) :



Required area

$$\begin{aligned} &= I + II + III + IV + V \\ &= \frac{1}{2} \times 30 \times 50 + \frac{1}{2} \times 70 \times (20 + 30) \\ &\quad + \frac{1}{2} \times 20 \times 30 + \frac{1}{2} \times 70 \times 50 \\ &\quad + \frac{1}{2} \times 50 \times 80 \\ &= \frac{1}{2} [1500 + 3500 + 600 \\ &\quad + 3500 + 4000] \\ &= \frac{1}{2} \times 13100 = 6550\text{m}^2 \end{aligned}$$

73. (d) : The volume of the new cube = $6^3 + 8^3 + 10^3 = 1728\text{cm}^3$
 \therefore The edge of the new cube

$$= \sqrt[3]{1728} \text{ cm} = 12 \text{ cm}$$

Hence the diagonal of the new cube

$$= \sqrt{12^2 + 12^2 + 12^2}$$

$$= 20.8 \text{ cm. approx.}$$

74. (c) : If the sides are a, b and c, then $abc = 210$, $2(ab + bc + ca) = 214$ and $ab = 42$

Solving we get, $a = 7$, $b = 6$ and $c = 5$.

75. (c) : If l is the slant height, then $\pi r l = 550 \Rightarrow l = 25$

$$\therefore \text{Height } h = \sqrt{l^2 - r^2}$$

$$= \sqrt{25^2 - 7^2} = 24$$

Hence the volume

$$= \frac{1}{3} \pi r^2 h = 1232 \text{ cm}^3$$

76. (d) : Volume of a pyramid

$$= \frac{1}{3} \times (\text{Area of the base}) \times \text{Height}$$

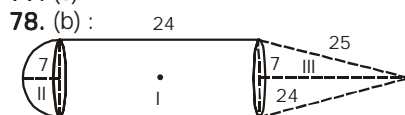
$$= \frac{1}{3} \times \frac{3\sqrt{3}}{2} \times (10)^2 \times 60$$

$$= 5196 \text{ m}^3.$$

[\therefore Area of the regular hexagon

$$\text{of side } a = \frac{3\sqrt{3}}{2} a^2 \text{ sq. units}]$$

77. (c)



Required surface area

= Surface Area of I

+ Surface Area of II

+ Surface Area of III

$$= (2\pi r h + 2\pi r^2 + \pi r l) \text{ cm}^2$$

$$= \pi (2 \times 7 \times 24 + 2 \times 7^2 + 7 \times 25)$$

$$= 609\pi \text{ cm}^2$$

79. (c)

80. (c) : If the number of balls = n, then

$$\frac{4}{3} \times \pi \times (.7)^3 \times n$$

$$= \pi \times (2.8)^2 \times 17.5$$

$$\Rightarrow n = 300$$

81. (None) : 1, 2 and 3 are correct.

82. (b) 83. (c) 84. (b) 85. (b)

86. (a) 87. (c)

88. (b) : $A = 1 - \frac{1}{2} \sin^2 2\theta$

$$\therefore 2(1 - A) = \sin^2 2\theta$$

$$\Rightarrow 0 < 2(1 - A) < 1$$

$$\Rightarrow \frac{1}{2} \leq A \leq 1$$

89. (c)

90. (c) : $p = \sec \theta + \tan \theta$

$$\Rightarrow p - \tan \theta = \sec \theta$$

$$\Rightarrow p^2 + \tan^2 \theta - 2p \tan \theta = \sec^2 \theta$$

$$\Rightarrow p^2 - 2p \tan \theta = 1$$

$$\Rightarrow \tan \theta = \frac{p^2 - 1}{2p}$$

$$\Rightarrow \cos \theta = \frac{2p}{p^2 + 1}$$

91. (a) : $\frac{\sin(A - B)}{\sin(A + B)}$

$$= \frac{\sin A \cos B - \cos A \sin B}{\sin A \cos B + \cos A \sin B}$$

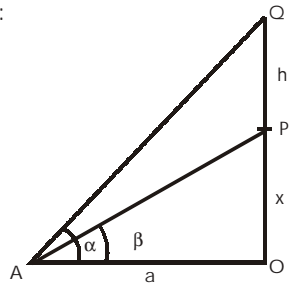
$$= \frac{a \left[\frac{a^2 + c^2 - b^2}{2ac} \right] - b \left[\frac{b^2 + c^2 - a^2}{2bc} \right]}{a \left[\frac{a^2 + c^2 - b^2}{2ac} \right] + b \left[\frac{b^2 + c^2 - a^2}{2bc} \right]}$$

$$= \frac{a^2 - b^2}{c^2}$$

92. (a)

93. (b)

94. (c) :



From $\triangle OPA$, $x = a \tan \beta$
 From $\triangle OQA$, $h + x = a \tan \alpha$
 $\therefore x = a \tan \beta = a \tan \alpha - h$
 $\Rightarrow h = a(\tan \alpha - \tan \beta)$

95. (d)

96. (a)

97. (b) : The central angle for Statistics and Economics = 240°

$\therefore 180 \text{ marks} = 240^\circ$

$$\Rightarrow 96 \text{ marks} = \frac{240 \times 96}{180}$$

= 128° = Central angle for Statistics.

98. (c)

99. (c)

100. (b) :
$$\frac{10 \times 3 + 15 \times 10 + 20 \times f + 25 \times 7 + 35 + 5}{3 + 10 + f + 7 + 5} = 20.6$$

$\Rightarrow f = 25.$