

astronomers about that period. Nobody knows exactly when the first stars formed, or how they organised themselves into galaxies or even whether stars were the first luminous objects. They may have been preceded by quasars, which are mysterious, bright spots found at the centres of some galaxies. Now, two independent groups of astronomers, one led by Robert Becker of the University of California, and the other by George Djorgovski of Caltech, claim to have peered far enough into space with their telescopes (and therefore backwards enough in time) to observe the closing days of the Dark Age.

The main problem that plagued previous efforts to study the Dark Age was not the lack of suitable telescopes, but rather the lack of suitable things at which to point them. Because these events took place over 13 billion years ago, if astronomers are to have any hope of unravelling them they must study objects that are at least 13 billion light years away. The best prospects are quasars, because they are so bright and compact that they can be seen across vast stretches of space. The energy source that powers a quasar is unknown, although it is suspected to be the intense gravity of a giant black hole. However, at the distances required for the study of Dark Age, even quasars are extremely rare and faint.

Recently some members of Dr Becker's team announced their discovery of the four most distant quasars known. All the new quasars are terribly faint, a challenge that both teams overcame by peering at them through one of twin telescopes in Hawaii. These are the world's largest, and can therefore collect the most light. The new work by Dr Becker's team analysed the light from all four quasars. Three of them appeared to be similar to ordinary, less distant quasars. However, the fourth and most distant, unlike any other quasar ever seen, showed unmistakable signs of being shrouded in a fog of hydrogen gas. This gas is leftover material from the Big Bang that did not condense into stars or quasars. It acts like fog because new-born stars and quasars emit mainly ultraviolet light, and hydrogen gas is opaque to ultraviolet. Seeing this fog had been the goal of would-be Dark Age astronomers since 1965, when James Gunn and Bruce Peterson spelled out the technique for causing quasars as backlighting beacons to observe the fog's ultraviolet shadow.

The fog prolonged the period of darkness until the heat from the first stars and quasars had the chance to ionise the hydrogen (breaking it into its constituent parts, protons and electrons). Ionised hydrogen is transparent to ultraviolet radiation, so at that moment the fog lifted and the universe became the well-lit place it is today. For this reason, the end of the Dark Age is called the "Epoch of Re-ionisation", because the ultraviolet shadow is visible only in the most distant of the four quasars. Dr Becker's team concluded that the fog had dissipated completely by the time the universe was about 900 million years old, and one-seventh of its current size.

66. In the passage, the Dark Age refers to:

- (a) the period when the universe became cold after the Big Bang.
- (b) a period about which astronomers know very little
- (c) the medieval period when cultural activity seemed to have come to an end.
- (d) the time that the universe took to heat up after the Big-Bang.

67. Astronomers find it difficult to study the Dark Age because:

- (a) suitable telescopes are few.
- (b) the associated events took place aeons ago.
- (c) the energy source that powers a quasar is unknown.
- (d) their best chance is to study quasars, which are faint objects to begin with.

68. The four most distant quasars discovered recently:

- (a) could only be seen with quasars discovered recently.
- (b) appear to be similar to other ordinary, quasars.
- (c) appears to be shrouded in a fog of hydrogen gas.
- (d) have been sought to be discovered by Dark Age astronomers since 1965.

69. The fog of hydrogen gas seen through the telescopes:

- (a) is transparent to hydrogen radiation from stars and quasars in all states.
- (b) was lifted after heat from stars and quasars ionised it.
- (c) is material which eventually became stars and quasars.
- (d) is broken into constituent elements when stars and quasars are formed.

PASSAGE—V

Studies of factors governing reading development in young children have achieved a remarkable degree of consensus over the past two decades. This consensus concerns the causal role of phonological skills in young children's reading progress. Children who have good phonological skills, or good "phonological awareness", become good readers and good spellers. Children with poor phonological skills progress more poorly. In particular, those who have a specific phonological deficit are likely to be classified as dyslexic by the time that they are 9 or 10 years old.

Phonological skills in young children can be measured at a number of different levels. The term phonological awareness is a global one, and refers to a deficit in recognising smaller units of sound within spoken words. Development work has shown that this deficit can be at the level of syllables. Of onsets and rimes, or of phonemes. For example, a 4-year old child might have difficulty in recognising that a word like valentine has three syllables, suggesting a lack of syllabic awareness. A 5-year-old might have difficulty in recognising that the odd word out in the set of words fan, cat, hat, mat is fan. This task requires an awareness of the sub-syllable units of the onset and the rime. The onset corresponds to any initial consonants in a syllable, and the rime corresponds to the vowel and to any following consonants. Rimes correspond single-syllable words, and so the rime in fan differs from the rime in cat, hat, and mat. In longer words, rime and rhyme may differ. The onsets in valentine are /v/and/t/, and the rimes correspond to the spelling patterns 'al', 'en', and 'ine'.

A 6-year-old might have difficulty in recognising that plea and may begin with the same initial sound. This is a phonemic judgement. Although the initial phoneme/p/is shared between the two words, in plea it is part of the onset 'pr'. Until children can segment the onset (or the rime), such phonemic judgements are difficult for them to make. In fact, a recent survey of different developmental studies has shown that the different level of phonological awareness appears to emerge sequentially. The awareness of syllables, onsets, and rimes appears to emerge at around the ages of 3 and 4, long before most children go to school. The awareness of phonemes, on the other hand, usually emerges at around the age of 5 or 6, when children have been taught to read for about a year. An awareness of onsets and rimes thus appears to be a precursor of reading, whereas an awareness of phonemes at every serial position in a word only appears to develop as reading is taught. The onset-rime and phonemic levels of phonological structure, however, are not distinct. Many onsets in English are single phonemes, and so are some rimes (e.g., sea, go, zoo).

The early availability of onsets and rimes is supported by studies that have compared the development of phonological awareness of onsets, rimes, and phonemes in the same subjects using the same phonological awareness tasks. For example, a study by Treiman and Zudowski used a same/different judgement task based on the beginning or the end sounds of words. In the beginning sound task, the words either began with the same onset, as in plea and plank, or shared only the initial phoneme, as in plea and pray. In the end-sound task, the words either shared the entire rime, as in spit and wit, or shared only the final phoneme, as in rat and wit. Treiman and Zudowski showed that 4 and 5 year old children found the onset-rime version of the same/different task significantly easier than the version based on phonemes. Only the 6-year-olds, who had been learning to read for about a year, were able to perform both versions of the tasks with an equal level of success.

70. The single-syllable words Rhyme and Rime are constituted by

the exact same set of:

- A. Rime(s) B. Onset(s)
 C. Rhyme(s) D. Phonemes(s)
 (a) A, B (b) A, C
 (c) A, B, C (d) B, C, D

71. The Treiman and Zudowski experiment found evidence to support the following:

- (a) at age 6, reading instruction helps children perform, both, the same-different judgement task.
 (b) the development of onset-rime awareness precedes the development of an awareness of phonemes.
 (c) at age 4-5 children find the onset-rime version of the same/different task significantly easier.
 (d) the development of onset-rime awareness is a necessary and sufficient condition for the development of an awareness of phonemes.

72. A phonological deficit in which of the following is likely to be classified as dyslexia?

- (a) Phonemic judgement.
 (b) Onset judgement.
 (c) Rime judgement.
 (d) Any one or more of the above.

73. From the following statements, pick out the true statement according to the passage.

- (a) A mono-syllabic word can have only one onset.
 (b) A mono-syllabic word can have only one rhyme but more than one rime.
 (c) A mono-syllabic word can have only one phoneme.
 (d) All of the above.

74. Which one of the following is likely to emerge last in the cognitive development of a child?

- (a) Rhyme (b) Rime
 (c) Onset (d) Phoneme

PASSAGE—VI

Democracy rests on a tension between two different principles. There is, on the one hand, the principle of equality before the law, or, more generally, of equality, and, on the other, what may be described as the leadership principle. The first gives priority to rules and the second to persons. No matter how skilfully we contrive our schemes, there is a point beyond which the one principle cannot be promoted without some sacrifice of the other.

Alexis de Tocqueville, the great nineteenth century writer on democracy, maintained that the age of democracy, whose birth he was witnessing, would also be the age of mediocrity; in saying this he was thinking primarily of a regime of equality governed by impersonal rules. Despite his strong attachment to democracy, he took great pains to point out what he believed to be its negative side: a dead level plane of achievement in practically every sphere of life. The age of democracy would, in his view, be an unheroic age; there would not be room in it for either heroes of hero-worshippers.

But modern democracies have not been able to do without heroes: this too was foreseen, with much misgiving, by Tocqueville. Tocqueville viewed this with misgiving because he believed, rightly or wrongly, that unlike in aristocratic societies there was no proper place in a democracy for heroes and, hence, when they arose they would sooner or later turn into despots. Whether they require heroes or not, democracies certainly require leaders, and, in the contemporary age, bred them in great profusion; the problem is to know what to do with them.

In a world preoccupied with scientific rationality the advantages of a system based on an impersonal rule of law should be a recommendation with everybody. There is something orderly and predictable about such a system. When life is lived mainly in small, self-contained communities, men are able to take finer personal distinctions into account in dealing with their

fellow men. They are unable to do this in a large and amorphous society, and organised living would be impossible without a system of impersonal rules. Above all, such a system guarantees a kind of equality to the extent that everybody, no matter in what station of life, is bound by the same explicit, often written, rules, and nobody is above them.

But a system governed solely by impersonal rules can at best ensure order and stability; it cannot create any shining vision of a future in which mere formal equality will be replaced by real equality and fellowship. A world governed by impersonal rules cannot easily change itself, or when it does, the change is so gradual as to make the basic and fundamental feature of society appear unchanged. For any kind of basic or fundamental change, a push is needed from within, a kind of individual initiative which will create new rules, new terms and conditions of life.

The issue of leadership thus acquires crucial significance in the context of change. If the modern age is preoccupied with scientific rationality, it is no less preoccupied with change. To accept what exists on its own terms is traditional, not modern, and it may be all very well to appreciate tradition in music, dance and drama, but for society as a whole the choice has already been made in favour of modernisation and development. Moreover, in some countries the gap between ideal and reality has become so great that the argument for development and change is now irresistible.

In these countries no argument for development has greater appeal or urgency than the one which shows development to be the condition for the mitigation, if not the elimination, of inequality. There is something contradictory about the very present of large inequalities in a society which professes to be democratic. It does not take people too long to realise that democracy by itself can guarantee only formal equality; beyond this, it can only whet people's appetite for real or substantive equality. From this arises their continued preoccupation with plans and schemes that will help to bridge the gap between the ideal of equality and the reality which is so contrary to it. When pre-existing rules give no clear directions of change, leadership comes into its own. Every democracy invests its leadership with a measure of charisma, and expects from it a corresponding measure of energy and vitality. Now, the greater the urge for change in a society the stronger the appeal of a dynamic leadership in it. A dynamic leadership seeks to free itself from the constraints of existing rules; in a sense that is the test of its dynamism. In this process it may take a turn at which it ceases to regard itself as being bound by these rules, placing itself above them. There is always a tension between 'charisma' and 'discipline' in the case of a democratic leadership, and when this leadership puts forward revolutionary claims, the tension tends to be resolved at the expense of discipline. Characteristically, the legitimacy of such a leadership rests on its claim to be able to abolish or at least substantially reduce the existing inequalities in society. From the argument that formal equality or equality before the law is but a limited good, it is often one short step to the argument that it is a hindrance or an obstacle to the establishment of real or substantive equality. The conflict between a 'progressive' executive and a 'conservative' judiciary is but one aspect of this larger problem. This conflict naturally acquires added piquancy when the executive is elected and the judiciary appointed.

75. Which of the following four statements can be inferred from the above passage?

- A. There is conflict between the pursuit of equality and individuality.
 B. The disadvantages of impersonal rules can be overcome in small communities.
 C. Despite limitations, impersonal rules are essential in large systems.
 D. Inspired leadership, rather than plans and schemes, is more effective in bridging inequality.
 (a) B, D but not A, C (b) A, B but not C, D

- (c) A, D but not B, C (d) A, C but not B, D
76. What possible factor would a dynamic leader consider a 'hindrance' in achieving the development goals of a nation?
- (a) Principle of equality before the law.
 (b) Judicial activism.
 (c) A conservative judiciary.
 (d) Need for discipline.
77. Which of the following four statements can be inferred from the above passage?
- A. Scientific rationality is an essential feature of modernity.
 B. Scientific rationality results in the development of impersonal rules.
 C. Modernisation and development have been chosen over traditional music, dance and drama.
 D. Democracies aspire to achieve substantive equality.
- (a) A, B, D but not C (b) A, B but not C, D
 (c) A, D but not B, C (d) A, B, C but not D
78. A key argument the author is making is that:
- (a) in the context of extreme inequality, the issue of leadership has limited significance.
 (b) democracy is incapable of eradicating inequality.
 (c) formal equality facilitates development and change.
 (d) impersonal rules are good for avoiding instability but fall short of achieving real equality.
79. Tocqueville believed that the age of democracy would be an un-heroic age because:
- (a) democratic principles do not encourage heroes.
 (b) there is no urgency for development in democratic countries.
 (c) heroes that emerged in democracies would become despots.
 (d) aristocratic society had a greater ability to produce heroes.
80. Dynamic leaders are needed in democracies because:
- (a) they have adopted the principles of 'formal' equality rather than 'substantive' equality.
 (b) 'formal' equality whets people's appetite for 'substantive' equality.
 (c) systems that rely on the impersonal rules of 'formal' equality lose their ability to make large changes.
 (d) of the conflict between a 'progressive' executive and a 'conservative' judiciary.

Directions for questions 81 to 85: *The sentence given in each question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a letter. Choose the most logical order of sentences from among the given choices to construct a coherent paragraph.*

81. A. Passivity is not, of course, universal.
 B. In areas where there are no lords or laws, or in frontier zones where all men go armed, the attitude of the peasantry may well be different.
 C. So indeed it may be on the fringe of the unsubmitive.
 D. However, for most of the soil-bound peasants the problem is not whether to be normally passive or active, but when to pass from one state to another.
- (a) BDAC (b) CDAB
 (c) DBAC (d) ABCD

82. A. But in the industrial era destroying the enemy's productive capacity means bombing the factories which are located in the cities.
 B. So in the agrarian era, if you need to destroy the enemy's

productive capacity, what you want to do is burn his fields, or if you're really vicious, salt them.

- C. Now in the information era, destroying the enemy's productive capacity means destroying the information infrastructure.
 D. How do you do battle with your enemy?
 E. The idea is to destroy the enemy's productive capacity, and depending upon the economic foundation, that productive capacity is different in each case.
 F. With regard to defence, the purpose of the military is to defend the nation and be prepared to do battle with its enemy.
- (a) FDEBAC (b) FCABED
 (c) DEBACF (d) DFEBAC
83. A. Michael Hofman, a poet and translator, accepts this sorry fact without approval or complaint.
 B. But thanklessness and impossibility do not daunt him.
 C. He acknowledges too—in fact he returns to the point often—that best translators of poetry always fail at some level.
 D. Hofman feels passionately about his work, and this is clear from his writings.
 E. In terms of the gap between worth and reward, translators come somewhere near nurses and street-cleaners.
- (a) EACDB (b) ADEBC
 (c) EACBD (d) DCEAB

84. A. Although there are large regional variations, it is not infrequent to find a large number of people sitting here together and doing nothing.
 B. Once in office, they receive friends and relatives who feel free to call any time without prior appointment.
 C. While working, one is struck by the slow and clumsy actions and reactions, indifferent attitudes. Procedure rather than outcome orientation, and the lack of consideration for others.
 D. Even those who are employed often come late to the office and leave early unless they are forced to be punctual.
 E. Work is not intrinsically valued in India.
 F. Quite often people visit ailing friends and relatives or go out of their way to help them in their personal matters even during office hours.
- (a) ECADBF (b) EADCFB (c) EADBFC (d) ABFCBE

85. A. The situations in which violence occurs and the nature of that violence tends to be clearly defined at least in theory, as in the proverbial Irishman's question: 'Is this a private fight or can anyone join in?'
 B. So the actual risk to outsiders, though no doubt higher than our societies, is calculable.
 C. Probably the only uncontrolled applications of force are those of social superiors to social inferiors and even here there are probably some rules.
 D. However, binding the obligation to kill, members or feuding families engaged in mutual massacre will be genuinely appalled if by some mischance a bystander or outsider is killed.
- (a) DABC (b) ACDB (c) CBAD (d) DBAC

Directions for questions 86 to 90: *Each of the words below, a contextual usage is provided. Pick the word from the alternatives given that is most inappropriate in the given context.*

86. Disuse: Some words fall into disuse as technology makes objects obsolete.
 (a) Unused (b) Outdated
 (c) Misuse (d) Obsolescence
87. Facetious: When I suggested that war is a method of controlling population, my father remarked that I was being facetious.

- (a) Jovian (b) Jovial
(c) Jocular (d) Joking

88. Specious: A specious argument is not simply a false one but one that has the ring of truth.

- (a) Deceitful (b) Fallacious
(c) Credible (d) Deceptive

89. Parsimonious: The evidence was constructed from very parsimonious scraps of information.

- (a) Frugal (b) Penurious
(c) Thrifty (d) Altruistic

90. Obviate: The new mass transit system may obviate the need for the use of personal cars:

- (a) Prevent (b) Forestall
(c) Preclude (d) Bolster

Directions for questions 91 to 95: For the word given at the top, match the dictionary definitions (A, B, C, D) with their corresponding usage given (E, F, G, H). Out of the four possibilities given below select the one that has all the definitions and their usages correctly matched.

91. Exceed

Dictionary Definition

- A. To extend outside of or enlarge beyond used chiefly in strictly physical relations
B. To be greater than or superior to
C. Be beyond the comprehension of
D. To go beyond a limit set by (as an authority or privilege)

Usage

- E. The mercy of god exceeds our finite minds
F. Their accomplishments exceeded our expectation
G. He exceed his authority when he paid his brother's gambling debts with money from the trust
H. In this rain keeps up, the river will exceed its banks by morning
(a) A—H B—F C—E D—G
(b) A—H B—E C—F D—G
(c) A—G B—F C—E D—H
(d) A—F B—G C—H D—E

92. Infer

Dictionary Definition

- A. To derive by reasoning or implication
B. To surmise
C. To point out
D. To hint

Usage

- E. We see smoke and infer fire
F. Given some utterance, a listener may infer from it things which the utterer never implied
G. I waited all day to meet him, from this you can infer my zeal to see him
H. She did not take part in the debate except to ask a question inferring that she was not interested in the debate
(a) A—G B—H C—E D—F
(b) A—F B—H C—E D—G
(c) A—H B—G C—F D—E
(d) A—E B—F C—G D—H

93. Mellow

Dictionary Definition

- A. Adequately and properly ages so as to be free of harshness
B. Freed from the rashness of youth
C. Of soft and loamy consistency
D. Rich and full but free from stridency

Usage

- E. He has mellowed with age
F. The tones of the old violin were mellow.

G. Some wines are mellow

H. Mellow soil is found in the Gangetic plains

- (a) A—E B—G C—F D—H
(b) A—E B—F C—G D—H
(c) A—G B—E C—H D—F
(d) A—H B—G C—F D—E

94. Relief

Dictionary Definition

- A. Removal or lightening of something distressing
B. Aid in the form of necessities for the indigent
C. Diversion
D. Release from the performance of duty

Usage

- E. A ceremony follows the relief of a sentry after the morning shift
F. It was a relief to take off the tight shoes
G. The only relief I get is by playing cards
H. Disaster relief was offered to the victims
(a) A—F B—H C—E D—G
(b) A—F B—H C—G D—E
(c) A—H B—F C—G D—E
(d) A—G B—E C—H D—F

95. Purge

Dictionary Definition

- A. Remove a stigma from the name of
B. Make clean by removing whatever is superfluous, foreign
C. Get rid of
D. To cause evacuation of

Usage

- E. The opposition was purged after the coup
F. The committee heard his attempt to purge himself of a charge of heresy.
G. Drugs that purge the bowels are often bad for the brain
H. It is recommended to purge water by distillation
(a) A—E B—G C—F D—H
(b) A—F B—E C—H D—G
(c) A—H B—F C—G D—E
(d) A—F B—H C—E D—G

Directions for questions 96 to 100: In each of the following sentences, parts of the sentence are left blank. Beneath each sentence, four different ways of completing the sentence are indicated. Choose the best alternative from among the four.

96. But _____ are now regularly written to describe well-established practices, organisations and institutions, not all of which seem to be _____ away.

- (a) reports, withering (b) stories, trading
(c) books, dying (d) obituaries, fading

97. The Darwin who _____ is most remarkable for the way in which he _____ the attributes of the world class thinker and head of the household.

- (a) comes, figures (b) arises, adds
(c) emerges, combines (d) appeared, combines

98. Since her face was free of _____ there was no way to _____ if she appreciated what had happened.

- (a) make-up, realise (b) expression, ascertain
(c) emotion, diagnose (d) scars, understand

99. In this context, the _____ of the British labour movement is particularly _____.

- (a) affair, weird (b) activity, moving
(c) experience, significant (d) atmosphere, gloomy

100. Indian intellectuals may boast, if they are so inclined, of being _____ to the most elitist among the intellectual _____ of the world.

- (a) subordinate, traditions (b) heirs, cliques
(c) ancestors, societies (d) heir, traditions

SECTION—3

No. of Questions 50

Directions for questions 101 to 107: Answer each of the questions independent of each other.

101. Four friends Ashok, Bashir, Chirag and Deepak are out shopping. Ashok has less money than three times the amount that Bashir has. Chirag has more money than Bashir. Deepak has an amount equal to the difference of amounts with Bashir and Chirag. Ashok has three times the money with Deepak. They each have to buy at least one shirt, or one shawl, or one sweater, or one jacket, that are priced Rs 200, Rs 400, Rs 600 and Rs 1000 apiece, respectively. Chirag borrows Rs 300 from Ashok and buys a jacket. Bashir buys a sweater after borrowing Rs 100 from Ashok and is left with no money. Ashok buys three shirts. What is the costliest item that Deepak could buy with his own money?

- (a) A shirt (b) A shawl
(c) A sweater (d) A jacket

102. In a family gathering there are two males who are grandfathers and four males who are fathers. In the same gathering there are two females who are grandmothers and four females who are mothers. There is at least one grandson or a grand-daughter present in this gathering. There are two husband-wife pairs in this group. These can either be a grandfather and a grandmother, or a father and a mother. The single grandfather (whose wife is not present) has two grandsons and a son present. The single grandmother (whose husband is not present) has two grand-daughters and a daughter present. A grandfather or a grandmother present with their spouses does not have any grandson or grand-daughter present. What is the minimum number of people present in this gathering?

- (a) 10 (b) 12
(c) 14 (d) 16

103. Eight people carrying food baskets are going for a picnic on motorcycles. Their names are A, B, C, D, E, F, G and H. They have four motorcycles M1, M2, M3 and M4 among them. They also have four food baskets O, P, Q and R of different size and shapes and which can be carried only on motorcycles M1, M2, M3 or M4 respectively. No more than two persons can travel on a motorcycle and no more than one basket can be carried on a motorcycle. There are two husband-wife pairs in this group of eight people and each pair will ride on a motorcycle together. C cannot travel with A or B. E cannot travel with B or F. G cannot travel with F, or H, or D. The husband-wife pairs must carry baskets O and P. Q is with A and P is with D. F travels on M1 and E travels on M2 motorcycles. G is with Q, and B cannot go with R. Who is travelling with H?

- (a) A (b) B
(c) C (d) D

104. I have a total of Rs 1000. Item A costs Rs 110, item B costs Rs 90, item C costs Rs 70, item D costs Rs 40 and item E costs Rs 45. For every item D that I purchase, I must also buy two of item B. For every item A, I must buy one of item C. For every item E, I must also buy two of item D and one of item B. For every time purchased I earn 1000 points and for every rupee not spent I earn a penalty of 150 points. My objective is to maximise the points I earn. What is the number of items that I must purchase to maximise my points?

- (a) 13 (b) 14
(c) 15 (d) 16

105. On her walk through the park, Hamsa collected 50 coloured leaves, all either maple or oak. She sorted them by category when she got home, and found the following:

- The number of red oak leaves with spots is even and positive.
- The number of red oak leaves without any spot equals the number of red maple leaves without spots. All non-red oak leaves have spots, and there are five times as many of them as there are red spotted oak leaves.
- There are no spotted maple leaves that are not red.
- There are exactly 6 red spotted maple leaves.

■ There are exactly 22 maple leaves that are neither spotted nor red. How many oak leaves did she collect?

- (a) 22 (b) 17
(c) 25 (d) 18

106. A King has unflinching loyalty from eight of his ministers M1 to M8, but he has to select only four to make a cabinet committee. He decides to choose these four such that each selected person shares a liking with at least one of the other three selected. The selected persons must also hate atleast one of the liking of any of the other three persons selected.

- M1 likes fishing and smoking, but hates gambling.
M2 likes smoking and drinking, but hates fishing.
M3 likes gambling, but hates smoking.
M4 likes mountaineering, but hates drinking.
M5 likes drinking, but hates smoking and mountaineering.
M6 likes fishing, but hates smoking and mountaineering.
M7 likes gambling and mountaineering, but hates fishing, and
M8 likes smoking and gambling, but hates mountaineering.
Who are the four people selected by the king?

- (a) M1, M2, M5, M6
(b) M3, M4, M5, M6
(c) M4, M5, M6, M8
(d) M1, M2, M4, M7

107. In a "keep-fit" gymnasium class there are fifteen females enrolled in a weight-loss program. They all have been grouped in any one of the five weight-groups W1, W2, W3, W4, or W5. One instructor is assigned to one weight-group only. Sonali, Shalini, Shubhra, and Shahira belong to the same weight-group. Sonali and Rupa are in one weight-group, Rupali and Renuka are also in one weight-group. Rupa, Radha, Renuka, Ruchika, and Ritu belong to different weight-groups. Somya cannot be with Ritu, and Tara cannot be with Radha. Komal cannot be with Radha, Somya, or Ritu. Shahira is in W1 and Somya is in W4 with Ruchika. Sweta and Jyotika cannot be with Rupali, but are in a weight-group with total membership of four. No weight-group can have more than five or less than one member. Amita, Babita, Chandrika, Deepika, and Elina are instructors of weight-groups with membership sizes 5, 4, 3, 2 and 1, respectively. Who is the instructor of Radha?

- (a) Babita (b) Elina
(c) Chandrika (d) Deepika

Directions for questions 108-110: Answer the following questions based on the passage below:

A group of three or four has to be selected from seven persons. Among the seven are two women, Fiza and Kavita, and five men: Ram, Shyam, David, Peter and Rahim. Ram would not like to be in the group if Shyam is also selected. Shyam and Rahim want to be selected together in the group. Kavita would like to be in the group only if David is also there. David, if selected, would not like Peter in the group. Ram would like to be in the group only if Peter is also there. David insists that Fiza be selected in case he is there in the group.

108. Which of the following statements is true?

- (a) Kavita and Ram can be part of a group of four.
(b) A group of four can have two women.
(c) A group of four can have all four men.
(d) None of the above.

109. Which of the following is a feasible group of four?

- (a) Ram, Peter, Fiza, Rahim
(b) Shyam, Rahim, Kavita, David
(c) Shyam, Rahim, Fiza, David
(d) Fiza, David, Ram, Peter

110. Which of the following is a feasible group of three?

- (a) David, Ram, Rahim
(b) Peter, Shyam, Rahim
(c) Kavita, David, Shyam

(d) Fiza, David, Ram

Directions for questions 111-112: Answer the following questions based on the information given below:

Elle is three times older than Yogesh, Zaheer is half the age of Wahida. Yogesh is older than Zaheer.

111. Which of the following information will be sufficient to estimate Elle's age?

- (a) Zaheer is 10 years old.
- (b) Both Yogesh and Wahida are older than Zaheer by the same number of years.
- (c) Both (a) and (b) above.
- (d) None of the above.

112. Which of the following can be inferred?

- (a) Yogesh is older than Wahida.
- (b) Elle is older than Wahida.
- (c) Elle may be younger than Wahida.
- (d) None of the above.

Directions for questions 113 to 116: A and B are two sets (e.g. A = mothers, B = women). The elements that could belong to both the sets (e.g. women who are mothers) is given by the set $C = A \cap B$. The elements which could belong to either A or B, or both, is indicated by the set $D = A \cup B$. A set that does not contain any elements is known as a null set, represented by @ (for example, if none of the women in the set B is a mother, then $C = A \cap B$ is a null set, or $C = @$). Let 'V' signify the set of all vertebrates; 'M' the set of all mammals; 'D' dogs; 'F' fish; 'A' Alsatian and 'P' a dog named Pluto.

113. If $P \cap A = @$ and $P \cup A = D$, then which of the following is true?

- (a) Pluto and Alsatian are dogs
- (b) Pluto is an Alsatian
- (c) Pluto is not an Alsatian
- (d) D is a null set.

114. If $y = FO$ (D.V.) is not a null set, it implies that:

- (a) All fish are vertebrates.
- (b) All dogs are vertebrates.
- (c) Some fish are dogs.
- (d) None of the above.

115. If $Z = (P \cap D) \cup OM$, then

- (a) The elements of Z consist of Pluto the dog or any other mammal.
- (b) Z implies any dog or mammal.
- (c) Z implies Pluto or any dog that is a mammal.
- (d) Z is a null set.

116. Given that $X = M \cap D$ is such that $X = D$, which of the following is true?

- (a) All dogs are mammals.
- (b) Some dogs are mammals.
- (c) $X = @$
- (d) All mammals are dogs.

Directions for question 117 to 120: Answer the questions independent of each other.

117. At a village mela, the following six nautankis (plays) are schedule as shown in the table below:

Nautanki	Duration	Show times
1. Sati Savitri	1 hour	9.00 am and 2.00 pm
2. Joru ka Gulam	1 hour	10.30 am and 11.30 am
3. Sunder Kand	30 minutes	10.00 am and 11.00 am
4. Veer Abhimanyu	1 hour	10.00 am and 11.00 am
5. Reshma aur Shera	1 hour	9.30 am, 12.00 noon and 2.00 pm
6. Jhansi ki Rani	30 minutes	11.00 am and 1.30 pm

You wish to see all the six nautankis. Further you wish to ensure that you get a lunch break from 12.30 p.m. to 1.30 p.m.

Which of the following ways can you do this?

- (a) Sati-Savitri is viewed first; Sunder Kand is viewed third and Jhansi ki Rani is viewed last.
- (b) Sati-Savitri is viewed last; Sunder Kand is viewed third and Jhansi ki Rani is viewed last.
- (c) Sati-Savitri is viewed first; Sunder Kand is viewed third and Joru ka Gulam is viewed fourth.
- (d) Veer Abhimanyu is viewed third; Reshma aur Shera is viewed fourth and Jhansi ki Rani is viewed fifth.

118. While Balbir had his back turned, a dog ran into his butcher shop, snatched a piece of meat off the counter and ran off. Balbir was mad when he realised what had happened. He asked three other shopkeepers, who had seen the dog, to describe it. The shopkeepers really didn't want to help Balbir. So each of them made a statement which contained one truth and one lie.

■ Shopkeeper Number 1 said : "The dog had black hair and a long tail."

■ Shopkeeper Number 2 said : "The dog had a short tail and wore a collar."

■ Shopkeeper Number 3 said : "The dog had white hair and no collar."

Based on the above statements, which of the following could be a correct description?

- (a) The dog had white hair, short tail and no collar.
- (b) The dog had white hair, long tail and a collar.
- (c) The dog had black hair, long tail and a collar.
- (d) The dog had black hair, long tail and no collar.

119. The Bannerjees, the Sharmas and the Pattabhiramans each have a tradition of eating Sunday lunch as a family. Each family serves a special meal at a certain time of day. Each family has a particular set of chinaware used only for this meal. Use the clues below to answer the following question.

■ The Sharma family eats at noon.

■ The family that serves fried brinjal uses blue chinaware.

■ The Bannerjee family eats at 2 o'clock.

■ The family that serves sambar does not use red chinaware.

■ The family that eats at 1 o'clock serves fried brinjal.

■ The Pattabhiraman family does not use white chinaware.

■ The family that eats last likes *makki-ki-roti*.

Which one of the following statements is true?

- (a) The Bannerjees eat *makki-ki-roti* at 2 o'clock, the Sharmas eat fried brinjal at 12 o'clock and the Pattabhiramans eat sambar from red chinaware.
- (b) The Sharmas eat sambar served in white chinaware, the Pattabhiramans eat fried brinjal at 1 o'clock and the Bannerjees eat *makki-ki-roti* in blue chinaware.
- (c) The Sharmas eat sambar at noon. The Pattabhiramans eat fried brinjal served in blue chinaware and the Bannerjees eat *makki-ki-roti* served in red chinaware.
- (d) The Bannerjees eat *makki-ki-roti* served in white chinaware, the Sharmas eat fried brinjal at 12 o'clock and the Pattabhiramans eat sambar from red chinaware.

120. Mrs Ranga has three children and has difficulty remembering their ages and the months of their birth. The clues below may help her remember.

- (a) The boy, who was born in June, is 7 years old.
- (b) One of the children is 4 years old, but is not Anshuman.
- (c) Vaibhav is older than Supriya.
- (d) One of the children was born in September but it was not Vaibhav.
- (e) Supriya's birthday is in April.
- (f) The youngest child is only 2 years old.

Based on the above clues, which one of the following statements is true?

- (a) Vaibhav is the oldest, followed by Anshuman who was born in September, and the youngest is Supriya who was born in April.
 (b) Anshuman is the oldest being born in June, followed by Supriya who is 4-year old, and the youngest is Vaibhav who is 2 years old.

- (c) Vaibhav is the oldest being 7 years old, followed by Supriya who was born in April, and the youngest is Anshuman who was born in September.
 (d) Supriya is the oldest, who was born in April, followed by Vaibhav who was born in June, and Anshuman who was born in September.

Directions for questions 121 to 124: Answer these questions based on the table given below concerning the busiest twenty international airports in the world.

No.	Name	International Airport type	Code	Location	Passengers
1.	Harstfield	A	ATL	Atlanta, Georgia, USA	77939536
2.	Chicago-O'Hare	A	ORD	Chicago, Illinois, USA	72568076
3.	Los Angeles	A	LAX	Los Angeles, California, USA	63876561
4.	Heathrow Airport	E	LHR	London, United Kingdom	62263710
5.	DFW	A	DFW	Dallas/ft. Worth, Texas, USA	60000125
6.	Hander Airport	F	HND	Tokyo, Japan	54338212
7.	Frankfurt Airport	E	FRA	Frankfurt, Germany	45858315
8.	Rouse-Charles de Gaulle	E	CDG	Paris, France	43596943
9.	San Francisco	A	SFO	San Francisco, California, USA	40387422
10.	Denver	A	DIA	Denver, Colorado, USA	38034231
11.	Amsterdam Schipol	E	AMS	Amsterdam, Netherlands	36781015
12.	Minneapolis-St. Paul	A	MSP	Minneapolis-St. Paul, USA	34216331
13.	Detroit Metropolitan	A	DTW	Detroit, Michigan, USA	34038381
14.	Miami	A	MIA	Miami, Florida, USA	33899246
15.	Newark	A	EWK	Newark, New Jersey, USA	33814000
16.	McCarran	A	LAS	Las Vegas, Nevada, USA	33669185
17.	Phoenix Sky harbor	A	PHX	Phoenix, Arizona, USA	33533353
18.	Kimpo	FE	SEL	Seoul, Korea	33371074
19.	George Bush	A	IAH	Houston, Texas, USA	33089333
20.	John F. Kennedy	A	JFK	New York, New York, USA	32003000

121. What percentage of top ten busiest airports is in the United States of America?

- (a) 60 (b) 80
 (c) 70 (d) 90

122. How many international airports of type 'A' account for more than 40 million passengers?

- (a) 4 (b) 5
 (c) 6 (d) 7

123. How many international airports of type 'A' account for more than 40 million passengers?

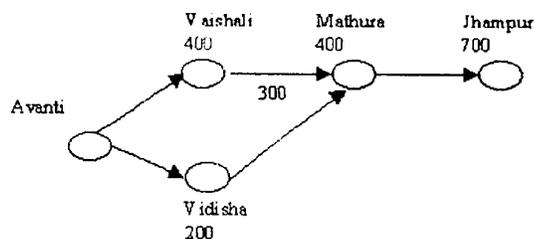
- (a) 5 (b) 6
 (c) 10 (d) 14

124. Of the five busiest airports, roughly what percentage of passengers is handled by Heathrow airport?

- (a) 30 (b) 40
 (c) 20 (d) 50

Directions for questions 125-127: Answer these questions based on the pipeline diagram below.

The following sketch shows the pipelines carrying material from one location to another. Each location has a demand for material. The demand at Vaishali is 400, at Mathura is 400, at Jhampur is 700 and at Vidisha is 200. Each arrow indicates the direction of material flow through the pipeline. The flow from Vaishali to Mathura is 300; the quantity of material flow is such that the demands at all these locations are exactly met. The capacity of each pipeline is 1000.



125. What is the free capacity available in the Avanti-Vidisha Pipeline?

- (a) 300 (b) 200
 (c) 100 (d) 0

126. What is the extra capacity available from Avanti to Vaishali?

- (a) 0 (b) 100
 (c) 200 (d) 300

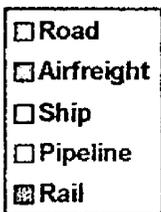
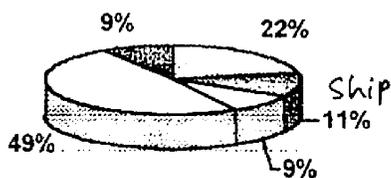
127. The quantity moved from Avanti to Vidisha is?

- (a) 200 (b) 800
 (c) 700 (d) 1000

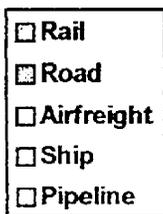
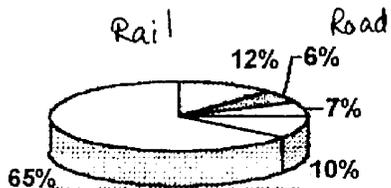
Directions for questions 128 to 130: The questions based on the pie charts given below:

Chart 1 shows the distribution of twelve million tonnes of crude oil transport through different modes over a specific period of time. Chart 2 shows the distribution of the cost of transporting this crude oil. The total cost was Rs 30 million.

Volume Transported



Cost of Transported



128. If the cost per tonne of transport by ship, air and road are represented by P, Q and R respectively, which of the following is true?

- (a) $R > Q > P$
- (b) $P > R > Q$
- (c) $P > Q > R$
- (d) $R > P > Q$

129. The cost in rupees per tonne of oil moved by rails and happens to be roughly:

- (a) 3
- (b) 1.5
- (c) 4.5
- (d) 8

130. From the charts given, it appears that the cheapest mode of transport is:

- (a) Road
- (b) Rail
- (c) Pipeline
- (d) Ship

Directions for questions 131 to 137: Each item is followed by two statements, A and B. Answer each question using the following instructions.

Choose (a) if the question can be answered by one of the statements alone and not by the other.

Choose (b) if the question can be answered by using either statement alone.

Choose (c) if the question can be answered by using both the statements together, but cannot be answered by using either statement alone.

Choose (d) if the question cannot be answered even by using both statements together.

131. Two friends, Ram and Gopal, bought apples from a wholesale dealer. How many apples did they buy?

- A. Ram bought one-half the number of apples that Gopal bought.
- B. The wholesale dealer had a stock of 500 apples.

132. Is country X's GDP higher than country Y's GDP?

- A. GDPs of the countries X and Y have grown over the past five years at compounded annual rate of 5% and 6% respectively.
- B. Five years ago, GDP of country X was higher than that of country Y.

133. What is the value of X?

- A. X and Y are unequal even integers, less than 10, and $\frac{X}{Y}$ is an odd integer.

integer.

- B. X and Y are even integers, each less than 10, and product of X and Y is 12.

134. On a given day a boat ferried 1500 passengers across the river in twelve hours. How many round trips did it make?

- A. The boat can carry two hundred passengers at any time.
- B. It takes 40 minutes each way and 20 minutes of waiting time at each terminal.

135. What will be the time for downloading software?

- A. Transfer rate if 6 Kilobytes per second.
- B. The size of the software is 4.5 megabytes.

136. A square is inscribed in a circle. What is the difference between the area of the circle and that of the square?

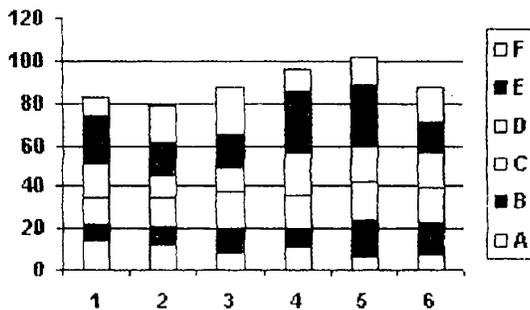
- A. The diameter of the circle is $\frac{25}{2}$ cm

- B. The side of the square is 25 cm.

137. What are the values of m and n?

- A. n is an even integer, m is an odd integer, and m is greater than n.
- B. Product of m and n is 30.

Directions for questions 138 to 140: Answer these questions based on the data given below:



There are six companies, 1 through 6. All of these companies use six operations, A through F. The following graph shows the distribution of efforts put in by each company in these six operations.

138. Suppose effort allocation is inter-changed between operations B and C, then C and D, and then D and E. If companies are then ranked in ascending order of effort, which company would be at third rank?

- (a) 2
- (b) 3
- (c) 4
- (d) 5

139. Suppose the companies find that they can remove operations B, C and D and re-distribute the effort released equally among the remaining operations. Then, which operation will show the maximum across all companies and all operations?

- (a) Operation E in company 1
- (b) Operation E in company 4
- (c) Operation F in company 5
- (d) Operation E in company 5

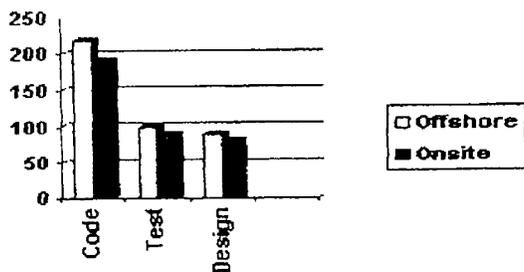
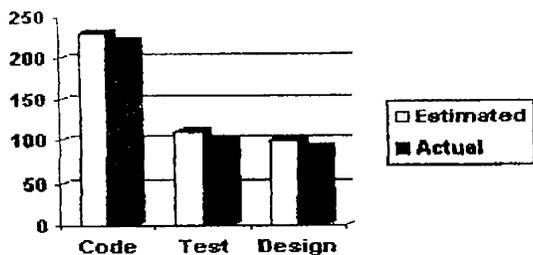
140. A new technology is introduced in company 4 such that the total effort for operations B through F get evenly distributed among these. What is the change in the percentage of effort in operation E?

- (a) Reduction of 12.3
- (b) Increase of 12.3
- (c) Reduction of 5.6
- (d) Increase of 5.6

Directions for questions 141 to 146: Answer these questions based on the two graphs shown below:

Figure 1 show the amount of work distribution, in man-hours for a software company between offshore and onsite activities. Figure 2 shows

the estimated and actual work effort involved in the different offshore activities in the same company during the same period. (Note: Onsite refers to work performed at the customer's premise and offshore refers to work performed at the developer's premise.)



141. If 50 per cent of the offshore work to be carried out onsite, with the distribution of effort between the tasks remaining the same, which of the following is true of all work carried out onsite?

- (a) The amount of coding done is greater than that of testing.
- (b) The amount of coding done onsite is less than that of design done onsite.
- (c) The amount of design carried out onsite is greater than that of testing.
- (d) The amount of testing carried out offshore is greater than that of total design.

142. Roughly what percentage of total work is carried on site?

- (a) 40
- (b) 20
- (c) 30
- (d) 50

143. The total effort in hours onsite is nearest to which of the following?

- (a) Sum of estimated and actual effort for offshore design.
- (b) The estimated man-hours of offshore coding.
- (c) The actual man-hours of offshore testing
- (d) Half the no. of estimated man-hours of offshore coding.

144. If the total working hours were 100 which of the following tasks will account for approx 50 hours:

- (a) coding
- (b) design
- (c) offshore testing
- (d) offshore design

145. If 50 per cent of the offshore work to be carried out onsite, with the distribution of effort between the tasks remaining the same, the percentage of testing carried out offshore would be:

- (a) 40%
- (b) 30%
- (c) 50%
- (d) 70%

146. Which of the work requires as many man hours as that spent in coding?

- (a) Offshore, design and coding
- (b) Offshore coding
- (c) Testing
- (d) Offshore testing and coding

ANSWERS

- 61. (a) Inverted representations have often been employed as balm for the forsaken (directly stated).
- 62. (a) The reference is to make the social inequities well known (reverse globalisation).
- 63. (b) The argument is about whether caste is admissible into the agenda, hence (b). Also mentioned in the beginning of the second para.
- 64. (c) Second paragraph—"all subsequent distinctions are constructed ones".
- 65. (b) Racial and related discrimination—first line.
- 66. (b) The ignorance of astronomers....
- 67. (d) Mentioned in the third paragraph.
- 68. (a) Can best be done by eliminating choices b, c and d.
- 69. (c) Leftover material that did not condense into stars or quasars.
- 70. (d) The words have the same outset, rhyme and phoneme.
- 71. (c) Directly stated in the second last line.
- 72. (d) It is stated that any deficit could lead to dyslexia.
- 73. (c) Stated in the passage.
- 74. (d) Than the version based on phonemes (last paragraph).
- 75. (c) Statements A and B can be inferred from the first three paragraphs. But the author does not say about C or D.
- 76. (c) Second last line states this.
- 77. (c) A and D can be inferred (last paragraph).
- 78. (d) Directly stated "But a system...."
- 79. (a) Directly stated in the second paragraph.
- 80. (c) Directly stated in the last paragraph.
- 81. (a) Those the most logically related sentences.
- 82. (a) 83. (c) 84. (a) 85. (b)
- 86. (a) Some words stop being used
- 87. (d) Non serious
- 88. (d) False, but as a ring of truth: deceptive.
- 89. (a) Very little, frugal.
- 90. (a) 91. (b) 92. (d) 93. (c) 94. (b)
- 95. (d) 96. (a) 97. (c) 98. (b) 99. (c)
- 100. (d)

SECTION—3

- 101. (b) We know $A < 3B, C > B, D = C - B$ and $A = 3D$. B must have 500, since he has to borrow 100 from A. C must have at least 700, but this is not correct as this leaves D with 200 and A with 600. Since A lends 300 to C and 100 to B, A must have at least 1000 since $A = 3D$, we get $A = 1200, D = 400$, hence D can buy one shawl.
- 102. (b) There are 6 males and 6 females. Hence the minimum number of people present can be $6 + 6 = 12$.
- 103. (c) We get the following table which satisfies all the given conditions.

M1	M2	M3	M4
O	P	Q	R
FB	DE	AG	CH
- 104. (b) We must maximise the number of items and minimise the balance money. By hit and trial, we must buy $2(E + 2D + B)$ and $2(D + 2B) = 2 \times 215 + 2 \times 220 = 870$ which leaves 130, the minimum amount. Note that we must buy the cheapest combination, which is $E + 2D + B$, in order to maximise the number of items purchased.
- 105. (b) We have $22 + 6 = 28$ maple leaves. The red spotted oak leaves must be 2 and non-red spotted maple not red = 0, this means that red maple without spots must be 5, which is equal to the red oak leaves without spots. Total oak leaves = $10 + 2 + 7 = 17$.
- 106. (d) Likings: $M1 = F + S; M2 = S + D; M5 = D, M6 = F$. At least one liking is shared. Dislikes: $M1 = G, M2 = F, M5 = 5 + M, M6 = 5 + M$. Since G is not in the liking list, choice (a) is wrong. Continue checking. Only M1, M2, M4 and M7 (liking = $F + S + D + M +$

- G, dislike = G + F + D + F) meets all the requirements.
107. (b) Radha cannot be in W1 or with Tara or Komal. This leaves her to be in the group with membership 1, so Elina is her instructor.
108. (d) The group of 4 cannot be made with the conditions, except $S + R + F + D$.
109. (c) From the above.
110. (b) In all the other choices we have D, who insist that F be with him.
111. (c) We have $E = 3Y, Z = \frac{1}{2}W, Y > Z$. To find E, we must know Y, hence both statements are needed.
112. (b) Y could be 11, 12, ... hence the minimum age of E can be 33. Since $W = 20$, we can infer that $E > W$.
113. (a) $PA = @$ implies P into is not an Alsatian, but $POA = D$ implies both P and A are dogs.
114. (c) $Fish \cup (Dogs \cap Vertebrate) \neq @$ implies that some elements are common between Fish and Dogs.
115. (a) $Z = (Pluto \cap Dogs) \cup Mammals = Pluto \cup Mammals$.
116. (a) $X = Mammals \cap Dogs = Dogs$, hence dogs are mammals.
117. (c) 9-10: SS, 10-11: VA, 11-11.30: SK, 11.30-12.30 : JK; 12.30-1.30: Lunch; 1.30-2: JKG; 2-3: RS.
118. (b) Make truth tables as follows: Case I: The dog has black hair.
 a) Black hair—short tail
 b) Short tail—not wearing collar
 c) Black hair—not wearing collar
 Case II: The dog has white hair.
 a) White hair—long tail
 b) Long tail—wore a collar
 c) White hair—wore a collar
 Now check the choices. Only (b) is correct as per the above.
119. (c) We get the following table.
- | | | |
|--------|---------|----------|
| 12 | 1 | 2 |
| Sharma | Patti | Banerjee |
| Sambar | Brinjal | Makki |
| White | Blue | Red |
120. (c) Supriya—April—4; Vaibhav—June—7; Anshuman—September—2.
121. (c) There are 14 out of 20 busiest airports which are from USA = 70%.
122. (b) 1, 2, 3, 5, 9 = 5 airports.
123. (b) Count the A's in the top 10.
124. (c) $\frac{62}{336} = 20\%$ approx.
125. (d) Avanti-Vidisha carries 300 + 700 for Panchal, free capacity = 0
126. (d) Avanti-Vaishali carries 700; spare capacity = 300.
127. (d) Avanti-Vidisha: full capacity.
128. (c) Calculate the cost by ship, air and road.
- $$P = \frac{3}{1.08} = 2.77; Q = \frac{2.10}{1.32} = 1.58; R = \frac{1.80}{2.64} = 0.68$$
- Hence $P > Q > R$.
129. (a) $\frac{3.60}{1.08} = 3.33$.
130. (a) Road is the cheapest, from Q. 132.
131. (d) We cannot find out how many apples they bought, even from the two statements.
132. (d) We do not know the base figures, hence cannot come to a conclusion.
133. (b) We can get $X = 6$ from either statement.
134. (a) Only the second statement gives the time, hence total number of trips can be found out.
135. (c) We need both statements to find out the time required.
136. (b) The area of square and circle can be found out using either

- statement.
137. (c) We have three cases: 15, 2; 10, 3 and 6, 5. Using both statements, we zero in on the first one.
138. (b) Interchange the times between B and E. Then arrange in ascending order.
139. (d) In company 5, $\frac{(B+C+D)}{3} = \frac{36.8}{3} = 12.3$.
- Add to E = 28.6 + 12.3 = 40.9 which is the highest.
140. (a) Total reduction = $\frac{81.7}{5} = 16.3$
- Reduction = 28.6 – 16.3 = 12.3.
141. (a) Distribute 50% of the work and we find that coding > testing.
142. (c) $\frac{(80 + 100 + 150)}{(180 + 520 + 430)} = \frac{330}{1130} = 30\%$
143. (c) Total onsite hours: 440, which is equal to off-shore testing.
144. (b) $\frac{800}{2} = 400$ hours. Only coding comes equal to this figure.
145. (b) $\frac{140}{330} = 33\%$
146. (b) Visual question.

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