INSTITUTE OF BANKING PERSONNEL SELECTION
BANK PO-2016 PRELIMS PAPER
Based on Memory

PRELIMINARY EXAMINATION (OBJECTIVE)*

Sr. No	Name of Tests	No. of Questions	Maximum Marks	Time allotted for each test (Separately timed)
1.	Reasoning Ability	35	35	20 minutes
2.	English Language	30	30	20 minutes
3.	Quantitative Aptitude	35	35	20 minutes
	Total	**100**	**100**	**60** minutes

Candidates have to qualify in each of the three tests by securing cut-off marks to be decided by IBPS. Adequate number of candidates in each category as decided by IBPS depending upon requirements will be shortlisted for Online Main examination.

INSTRUCTIONS

(i) All the sections are available in English only, and the time suggested above for each test is not for guidance, you have to follow the above mentioned time.

(ii) Do not use calculators, or any electronic medium for calculations. You may take a clean sheet of paper for rough work and all calculations must be performed manually by the candidate.

(iii) There will be penalty for wrong answer marked by you in the objective tests. There are five alternatives in every question of a test.

(iv) For each question for which a wrong answer has been given by you, 1/4 or 0.25 of the marks assigned to that question will be deducted as penalty. If a question is left blank, i.e. no answer is given by you, there will be no penalty for that question.

(v) There will be a cut off for each section and an overall cut off as well. Hence, your aim should be to answer maximum number of attempts in all three sections.

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REASONING ABILITY

Directions (Qs.1-5): In these questions, relationship between different elements is shown in the statements. The statements are followed by conclusions. Study the conclusions based on the given statements and select the appropriate answer.

1. **Statements:** $S \leq L \leq I = P \geq E > R; L > Q$
   Conclusions: I. $P \geq S$ II. $I > R$
   (1) **Only** conclusion **II** is true
   (2) **Only** conclusion **I** is true
   (3) **Both** conclusions **I** and **II** are true
   (4) **Either** conclusion **I** or **II** is true
   (5) **Neither** conclusion **I** nor **II** is true

2. **Statements:** $G > R \leq E = A \leq T \leq S; D \leq A \leq J$
   Conclusions: I. $T \geq D$ II. $R > S$
   (1) **Only** conclusion **II** is true
   (2) **Only** conclusion **I** is true
   (3) **Both** conclusions **I** and **II** are true
   (4) **Either** conclusion **I** or **II** is true
   (5) **Neither** conclusion **I** nor **II** is true

3. **Statement:** $A \geq B > C \leq D \leq E < F$
   Conclusions: I. $A \geq E$ II. $C < F$
   (1) **Only** conclusion **II** is true
   (2) **Only** conclusion **I** is true
   (3) **Both** conclusions **I** and **II** are true
   (4) **Either** conclusion **I** or **II** is true
   (5) **Neither** conclusion **I** nor **II** is true

4. **Statements:** $G > R \geq E = A \leq T \leq S; D \leq A \leq J$
   Conclusions: I. $J > G$ II. $J = G$
   (1) **Only** conclusion **II** is true
   (2) **Only** conclusion **I** is true
   (3) **Both** conclusions **I** and **II** are true
   (4) **Either** conclusion **I** or **II** is true
   (5) **Neither** conclusion **I** nor **II** is true

5. **Statements:** $S \leq L \leq I = P \geq E > R; L > Q$
   Conclusions: I. $L < R$ II. $E \geq Q$
   (1) **Only** conclusion **II** is true
   (2) **Only** conclusion **I** is true
   (3) **Both** conclusions **I** and **II** are true
   (4) **Either** conclusion **I** or **II** is true
   (5) **Neither** conclusion **I** nor **II** is true

Directions (Qs.6-10): Study the following information carefully and answer the questions given below:

Eight persons H, I, J, K, L, M, N and O — are standing in a straight line at equidistant. Some of them are facing north while others are facing south. M is standing third to the right to H. M is standing at one of the extreme ends. L is standing third to the left of H. The immediate neighbours of J face north. N is not an immediate neighbour of H. The persons standing at the extreme ends face the same direction (both are facing either north or south). The immediate neighbours of H face, just opposite direction as that of M. The immediate neighbours of O face opposite direction with respect to each other. K is one of the immediate neighbours of L and is facing north. I is standing between J and M. Not more than four persons are facing north. L is immediate right of K.

6. Who among the following is third to the left of N?
(1) K   (2) J   (3) H   (4) I   (5) O

7. The immediate neighbours of L are :
(1) M and N   (2) N and O   (3) K and N   (4) N and H   (5) J and H

8. How many persons are standing exactly between I and O?
(1) Three   (2) Four   (3) One   (4) Two   (5) None

9. Four of the following five are alike in a certain way based on the above arrangement and hence form a group. Which of the following does not belong to that group?
(1) N   (2) L   (3) O   (4) J   (5) K

10. Who among the following is exactly between L and J?
(1) N   (2) O   (3) H   (4) I   (5) None

Directions (Qs.11-15): In each question below are given two/three statements followed by two conclusions numbered I and II. You have to take the given statements to be true even if they seem to be at variance with commonly known facts. Read all the conclusions and then decide which of the given conclusions logically follows from the given statements, disregarding commonly known facts.

11. Statements: All circles are triangle
    Some triangles are rectangles
    All rectangles are squares

Conclusions: I. All rectangles being triangles is a possibility
               II. All circles being squares is a possibility

(1) Only conclusion I follows
(2) Only conclusion II follows
(3) Either conclusion I or II follows
(4) Neither conclusion I nor II follows
(5) Both conclusions I and II follow

12. Statements: Some chairs are tables
    Some beds are tables
    No furniture is bed

Conclusions: I. All chairs being furniture is a possibility
               II. Some tables are not bed is a possibility

(1) Only conclusion I follows
(2) Only conclusion II follows
(3) Either conclusion I or II follows
(4) Neither conclusion I nor II follows
(5) Both conclusions I and II follow

13. Statements: All circles are triangle
Some triangles are rectangles
All rectangles are squares

Conclusions: I. Some triangles are not rectangles
II. No square is a circle

(1) Only conclusion I follows
(2) Only conclusion II follows
(3) Either conclusion I or II follows
(4) Neither conclusion I nor II follows
(5) Both conclusions I and II follow

14. Statements: All arts are theatres
Some arts are dramas

Conclusions: I. All dramas being theatre is a possibility
II. Some dramas are theatre

(1) Only conclusion I follows
(2) Only conclusion II follows
(3) Either conclusion I or II follows
(4) Neither conclusion I nor II follows
(5) Both conclusions I and II follow

15. Statements: Some chairs are tables
Some beds are tables
No furniture is bed

Conclusions: I. Some tables are not furniture
II. All tables being furniture is a possibility

(1) Only conclusion I follows
(2) Only conclusion II follows
(3) Either conclusion I or II follows
(4) Neither conclusion I nor II follows
(5) Both conclusions I and II follow

Directions (Qs.16-18): Read the given information carefully and answer the given questions.

B is 25 m south of A. C is 10 m east of B. D is 30 m north of C. E is 7 m east of D. X is 18 m south of E. M is 12 m south of X. C is 7 m west of M

16. B is in which direction from Point D?
(1) South   (2) South-West (3) North-East (4) South-East (5) North

17. If Point W is 3 m to the north of A, then what is the distance between B and W?
(1) 28 m   (2) 15 m   (3) 21 m   (4) 24 m   (5) 17 m

18. What is the distance between B and M?
(1) 17 m   (2) 15 m   (3) 21 m   (4) 19 m   (5) 13 m

Directions (Qs.19-23): Study the following information to answer the given questions.

S, T, U, V, W, X, Y and Z are sitting in a straight line equidistant from each other (but not necessarily in the same order). Some of them are facing south while some are facing north.

(**Note:** Facing the same direction means, if one is facing north then the other also faces north and vice versa. Facing the opposite directions means, if one is facing north then the other faces south and vice versa).

S faces north. Only two people sit to the right of S. T sits third to the left of S. Only one person sits between T and X. X sits to the immediate right of W. Only one person sits between W and Z. Both the immediate neighbours of T face the same direction. U sits third to the left of X. T faces the opposite direction as S. Y does not sit at any of the extreme ends of the line. V faces the same direction as W. Both Y and U face the opposite direction of Z.

19. How many persons in the given arrangement are facing North?
(1) Two   (2) Four   (3) One
(4) Three   (5) More than four

20. Four of the following five are alike in a certain way, and so form a group. Which of the following does not belong to the group?
(1) W, X   (2) Z, Y   (3) T, S   (4) T, Y   (5) V, U

21. What is the position of X with respect to Z?
(1) Second to the left   (2) Third to the right   (3) Third to the left
(4) Fifth to the right   (5) Second to the right

22. Who amongst the following sits exactly between Z and W?
(1) T   (2) Y   (3) X   (4) W   (5) U

23. Who is sitting second to the right of T?
(1) Z   (2) V   (3) X   (4) W   (5) None of these

Directions (Qs.24-26): Study the following information and answer the given questions.

D is daughter of N. E is wife of N. G is sister of D. C is married to G. N has no son. K is mother of E.
Q is only daughter of C.

24. How Q is related to D?
(1) Daughter   (2) Cousin   (3) Niece   (4) Sister-in-law (5) Can't Say

25. How N is related to K?
(1) Father   (2) Cousin   (3) Son-in-law (4) Sister   (5) Brother

26. How many daughters does N have?
(1) One   (2) Three   (3) Two   (4) Can't Say   (5) None of these

Directions (Qs.27-29): Study the following information and answer the given questions.

There are six wires in a cable A, B, C, D, E and F. They have different length but not necessarily in the same order. E is greater than C but less than D and B. A is greater than D and B. A is not the longest wire. F is 13 cm long and E is 4 cm long.

27. If D is 5 cm less than F. What would be the length of D?
   (1) 7   (2) 8   (3) 9   (4) Can't Say   (5) None of these

28. Which wire has least length?
   (1) B   (2) A   (3) C   (4) E   (5) None of these

29. If A carries 10 cm length and B carries 5 cm length then what would be the length of C?
   (1) 6   (2) 2   (3) 7   (4) 9   (5) None of these

Directions (Qs.30-35): Study the given information carefully to answer the given questions.

M, N, O, P, Q R and S are seven people live on seven different floors of a building but not necessarily in the same order. The lower most floor of the building is numbered 1, the one above that is numbered 2 and so on till the topmost floor is numbered 7. Each one of them have different income i.e., 3500, 15000, 7500, 9000, 11000, 13500, and 5000. (But not necessarily in the same order.) M lives on an odd numbered floor but not on the floor numbered 3. The one who has income of 11000 lives immediately above M. Only two people live between M and the one who has income of 7500. The one who has income of 15000 lives on one of the odd numbered floors above P. Only three people live between O and the one who has income of 15000. The one who has income of 7500 lives immediately above O. R earns 4000 more than Q. The one who has income of 3500 lives immediately above the one who has income of 5000. S lives on an odd numbered floor. Only one person lives between N and Q. N lives on one of the floors above Q. Neither O nor M has income of 9000. Q does not have income of 5000.

30. How much income M has?
   (1) 13500   (2) 5000   (3) 7500   (4) 15000   (5) 3500

31. Which of the following combinations is true with respect to the given arrangement?
   (1) 13500–O (2) 15000–R   (3) 5000–S   (4) 11000–P   (5) 9000-N

32. If all the people are made to live in alphabetical order from top to bottom, the positions of how many people will remain unchanged?
   (1) Four   (2) None   (3) Two   (4) One   (5) Three

33. Which of the following statements is true with respect to the given arrangement?
   (1) The one who has income of 5000 lives immediately below M
   (2) R has income of 15000
   (3) None of the given options is true
   (4) Only four people live between P and S
   (5) S lives immediately below Q

34. Who amongst the following lives on the floor numbered 2?
   (1) N   (2) M   (3) P   (4) O   (5) R

35. How much income R has?
   (1) 13500   (2) 5000   (3) 7500   (4) 15000   (5) 3500

ENGLISH LANGUAGE

Directions (Qs.36-42): Read the passage carefully and answer the questions given below it.

Governments looking for easy popularity have frequently been tempted into announcing giveaways of all sorts; free electricity, virtually free water, subsidized food, cloth at half price, and so on. The subsidy culture has gone to extremes. The richest farmers in the country get subsidized fertilizers. University education, typically accessed by the wealthier sections, is charged at a fraction of cost. Postal services are subsidized, and so are railway services. Bus fares cannot be raised to economical levels because there will be violent protest, so bus travel is subsidized too. In the past, price control on a variety of items, from steel to cement, meant that industrial consumer of these items got them at less than actual cost, while the losses of the public sector companies that produced them were borne by the taxpayer. A study done a few years ago came to the conclusion that subsidies in the Indian economy total as much as 14.5 per cent of gross domestic product. At today's level, that would work out to about 1,50,000 crore. And who pay the bill? The theory and the Political fiction on the basis of which it is sold to unsuspecting voters is that subsidies go the poor, and are paid for by the rich. The fact is that most subsidies go the 'rich' (defined in the Indian context as those who are above the poverty line), and much of the tab goes indirectly to the poor. Because the hefty subsidy bill results in fiscal deficits, which in turn push up rates of inflation which, as everyone knows, hits the poor the hardest of all. That is why taxmen call inflation the most regressive form of taxation. The entire subsidy system is built on the thesis is that people cannot help themselves, therefore governments must do so. That people cannot afford to pay for variety of goods and services, and therefore the government must step in. This thesis has been applied not just in the poor countries but in the rich ones as well; hence the birth of the welfare state in the west, and an almost Utopian social security system; free medical care, food aid, old age security, etc. But with the passage of time, most of the wealthy nations have discovered that their economies cannot sustain this social safety net, which in fact reduces the desire among people to pay their own way, and takes away some of the incentives to work, in short, the bill was unaffordable, and their societies were simply not willing to pay. To the regret of many, but because of the laws of economies are harsh, most Western societies have been busy pruning the welfare bill.

In India, the lessons of this experience over several decades, and in many Countries do not seem to have been learnt. Or they are simply ignored in the pursuit of immediate votes. People who are promised cheap food or clothing do not in most cases look beyond the gift horses to the question of who picks up the tab. The uproar over higher petrol, diesel and cooking gas prices ignored this basic question; if the user of cooking gas does not want to pay for its cost, who should pay? Diesel in the country is subsidised, and if the user of cooking gas does not want to pay for its full cost, who does he or she think should pay the balance of the cost? It is a simple question, nevertheless it remains unasked. The Deva Gowda government has shown some courage in biting the bullet when it comes to the price of petroleum products. But it has been bitten by much bigger subsidy bug. It wants to offer food at half its cost to everyone below the poverty line, supposedly estimated at some 380 million people. What will be the cost? And of course, who will pick up the tab? The Andhra Pradesh Government has been bankrupted by selling rice as Rs.2 per kg. Should the Central Government be bankrupted too, before facing up to the question of what is affordable and what is not? Already, India is perennially short of power because the subsidy on electricity has bankrupted most electricity boards, and made private investment wary unless it gets all manner of state guarantees. Delhi's subsidised bus fares have bankrupted the Delhi Transport Corporation, whose buses have slowly disappeared from the capital's streets. It is easy

to be soft and sentimental, by looking at programmes that will be popular. After all, who does not like a free lunch? But the evidence is surely mounting that the lunch isn't free at all. Somebody is paying the bill. And if you want to know who, take at the country's poor economic performance over the years.

36. Which of the following should not be subsidised over the years?
(1) University education
(2) Postal services
(3) Steel
(4) None of these
(5) All of the above options

37. The statement that 'subsidies are paid by the rich and go to the poor' is
(1) fiction
(2) fact
(3) fact, according to the author
(4) fiction, according to the author
(5) None of these

38. Why do you think that the author calls the Western social security system Utopian?
(1) The countries belief in the efficacy of the system was bound to turn out to be false
(2) The system followed by these countries is the best available in the present context
(3) Everything under this system was supposed to be free but people were charging money for them
(4) The theory of system followed by these countries was devised by Dr. Utopia
(5) All the options are responsible

39. It can be inferred from the passage that the author :
(1) believes that people can help themselves and do not need the government.
(2) believes that the theory of helping with subsidy is very destructive.
(3) believes in democracy and free speech.
(4) is not a successful politician.
(5) believes that subsidies are the best way to help poor.

40. Which of the following is not a victim of extreme subsidies?
(1) The poor
(2) The Delhi Transport Corporation
(3) The Andhra Pradesh Government
(4) Other than those given as options
(5) The rich

41. Which of the following is not true in the context of the passage?
(1) Where subsidies are concerned, the poor ultimately pay the tab
(2) Inflation is caused by too much subsidies
(3) Experts call subsidies the most regressive form of taxation
(4) Fiscal deficits are caused due to heavy subsidy bills
(5) None of the following is true in the context of the passage

42. A suitable title to the passage would be:
(1) There's no such thing as a free lunch
(2) The Economic Overview
(3) Deva Gowda's Government and its Follies
(4) It takes Two to Tango
(5) The Rich and The Poor: Extreme Partiality

Directions (Qs.43-47): Rearrange the following six sentences (A), (B), (C), (D), (E) and (F) in the proper sequence to form a meaningful paragraph and then answer the questions given below.

(A) It is the only country in the world that is carbon negative, which means it produces more oxygen than it consumes
(B) Bhutan, sandwiched between the two most populous nations on Earth, suffers for their sins.
(C) So far, so good. But then, two things happened
(D) Carbon sinks, 70% forest cover, powered almost entirely by mountain streams—Bhutan is a poster child for green living
(E) Glaciers are beginning to melt, flash floods and heavy rains—and even droughts—are common, and temperatures are climbing
(F) One, India and China got richer

43. Which of the following should be the **FIRST** sentence of the given paragraph?
(1) E   (2) D   (3) C   (4) B   (5) A

44. Which of the following should be the **THIRD** sentence of the given paragraph?
(1) A   (2) B   (3) C   (4) D   (5) E

45. Which of the following should be the **LAST** sentence of the given paragraph?
(1) A   (2) D   (3) C   (4) B   (5) E

46. Which of the following should be the **FOURTH** sentence of the given paragraph?
(1) F   (2) C   (3) B   (4) E   (5) D

47. Which of the following should be the **SECOND** sentence of the given paragraph?
(1) B   (2) D   (3) A   (4) C   (5) E

Directions (Qs.48-55): In the following questions, you have a brief passage. In the passage, some of the words have been left out. First read the passage over and try to understand what it is about. Then fill in the blanks with the help of the alternatives given.

Big ideas come from tackling **...(48)...** problems. When one is confronted with an overwhelming task, it's pieces. Business jargon is full of phrases about that, like "pilot projects" and "low hanging fruit." They have their place, but in the repertory of management **...(49)...** they should share their place with bold approaches to big challenges. Much of today's most valuable management knowledge came from wrestling with such issues. The most complicated workplace in the middle of the last century was the automobile assembly plant. Drawn to its complexity where Peter F. Drucker, W. Edwards Deming, and Taiichi Ohno, among others. The work they and their disciples did, applied in industry after industry, is the basis of the best that we know about operations, managing people, innovation, organizational design, and much more. The most complex workplaces are tertiary care hospitals. These vast **...(50)...** employ tens of thousands of people who, under one roof, do everything from neurosurgery to laundry. Each patient –

that is to say, each "job" — calls on a different set of people with a different constellation of **...(51)...** even when the two patients have the same diagnosis, success may be **...(52)...** differently. This is complexity of an order of magnitude greater than automobile assembly, and anyone who **...(53)...** hospitalized knows that management has thus far been unequal to the scope of task. The workers, managers, consultants, and scholars **...(54)...** crack this nut will reshape industries and institutions just as **...(55)...** as Drucker, Deming, and Ohno did.

48. (1) small   (2) big   (3) irrelevant   (4) buildings   (5) minor

49. (1) weakness   (2) strength   (3) power   (4) practice   (5) symptom

50. (1) houses   (2) institute   (3) demagogue   (4) forts   (5) enterprises

51. (1) barbarity   (2) talent   (3) skills   (4) unskilled   (5) barbaric

52. (1) managed   (2) officious   (3) delivered   (4) measured   (5) postponed

53. (1) are been   (2) have being   (3) have been   (4) has been   (5) is be

54. (1) who   (2) whom   (3) whose   (4) which   (5) whomsoever

55. (1) profoundly   (2) gradually   (3) superficially   (4) speciously   (5) earnest

Directions (Qs.56-65): Identify the error in the sentences given below, if there is no error, mark option (5).

56. (1) The need to set up/ (2) a good library in the locality/(3) has been in the minds of people/(4) for some time now./ (5) No error

57. (1) Most people would have/ (2) attended the union meeting/ (3) if they had/ (4) had longer notice of it./ (5) No error

58. (1) He took to/ (2) reading Times/ (3) for better knowledge/ (4) of the facts./ (5) No error

59. (1) The RBI has proposed to introduce/(2) polymer notes after taking into considering/ (3) the cost and longevity/ (4) associated with their manufacturing./ (5) No error

60. (1) Studies show that the lives of millions of mothers/ (2) and their children could be saved if countries would/ (3) invest in programs that ensures a healthy pregnancy,/ (4) and safe childbirth./ (5) No error

61. (1) Film viewers claim that/ (2) the number of scenes depicting alcohol consumption/ (3) have increased dramatically over/ (4) the last decade./ (5) No error

62. (1) Forty percent of the people alive today have/ (2) never made a phone call, but/ (3) thirty percent still have no electricity connections/ (4) to their homes./ (5) No error

63. (1) Workers with less/ (2) personal problems are/ (3) likely to be/ (4) more productive in their work./ (5) No error

64. (1) Everyone who visits Singapore/ (2) is impressed by its cleanliness,/ (3) which is mainly a result of rigorous implementation./ (4) of their strict laws./ (5) No error

65. (1) The bridal dress was/ (2) most unique: the prince / (3) designed it and his/ (4) mother provided the lace fabric./ (5) No error

QUANTITATIVE APTITUDE

Directions (Qs.66-69): Study the table carefully and answer the given questions.

STATE	Percentage of population below the poverty line	Proportion of Males and Females	
		Below poverty line	**Above poverty line**
		M : F	**M : F**
P	35	5 : 6	6 : 7
Q	25	3 : 5	4 : 5
R	24	1 : 2	2 : 3
S	29	3 : 2	4 : 3
T	15	5 : 3	3 : 2

66. If the male population above poverty line for State R is 1.9 million then what is the total population of state R?
(1) 4.5 million (2) 4.85 million (3) 5.33 million (4) 6.25 million (5) 6 million

67. What will be the number of females above poverty line in the State S if it is known that the population of State S is 7 million?
(1) 3 million (2) 2.13 million (3) 1.33 million (4) 5.7 million (5) 4 million

68. What is the male population above poverty line for State P if the female population below poverty line for State P is 2.1 million?
(1) 2.1 million (2) 2.7 million (3) 3.3 million (4) 2.3 million (5) 3 million

69. If the population of males below poverty line for State Q is 2.4 million and that for State T is 6 million, then what is the respective ratio of the total population of states Q and T?
(1) 1 : 3 (2) 2 : 5 (3) 3 : 7 (4) 4 : 9 (5) 3 : 9

70. Find the probability that a number from 1 to 300 is divisible by 3 or 7?
(1) $\frac{37}{75}$ (2) $\frac{32}{75}$ (3) $\frac{36}{75}$ (4) $\frac{28}{75}$ (5) $\frac{26}{75}$

71. 14 men can do a work in 18 days, 15 women can do a work in 24 days. If 14 men work for first three days and 10 women work after that for three days, find the part of work left after that?
(1) $\frac{3}{4}$ (2) $\frac{1}{4}$ (3) $\frac{1}{2}$ (4) $\frac{1}{6}$ (5) $\frac{1}{5}$

72. Perimeter of a rectangle is x and circumference of a circle is 8 more than the perimeter of the rectangle. Ratio of radius of circle and length of the rectangle is 1 : 2 and ratio of length and breadth of rectangle is 7 : 3. Find the length of the rectangle?
(1) 14　　　(2) 21　　　(3) 28　　　(4) 35　　　(5) 7

73. A invests on some scheme at the rate of 5% and B at 3% for two years. If the total sum invested by A and B is Rs.4000 and the simple interest received by both is same then find the amount invested by A.
(1) Rs.1300　(2) Rs.1500　(3) Rs.2500　(4) Rs.2700　(5) Rs.2100

74. Two trains cross each other in 14 sec when they are moving in opposite direction, and when they are moving in same direction they cross each other in 3 min 2 sec. Find the speed of the faster train by what percent more than the speed of the slower train?
(1) 16.67%　(2) 17.33%　(3) 16.33%　(4) 17.67%　(5) 18.33%

Directions (Qs.75-79): What will come in place of the question mark (?) in the following number series?

75. 11   20   38   74   ?
(1) 146　　(2) 154　　(3) 128　　(4) 132　　(5) 136

76. 15   21   38   65   101   ?
(1) 124　　(2) 145　　(3) 136　　(4) 158　　(5) 162

77. 24   28   19   35   10   ?
(1) 26　　(2) 36　　(3) 16　　(4) 46　　(5) 15

78. 7   16   45   184   915   ?
(1) 2092　　(2) 5496　　(3) 1048　　(4) 4038　　(5) 3268

79. 12   19   35   59   90   ?
(1) 134　　(2) 127　　(3) 132　　(4) 98　　(5) 114

Directions (Qs.80-84): Study the following table and answer the questions that follow.

	2006	2007	2008	2009	2010	2011
■ Company X	40	45	55	50	65	50
● Company Y	45	35	50	60	50	55
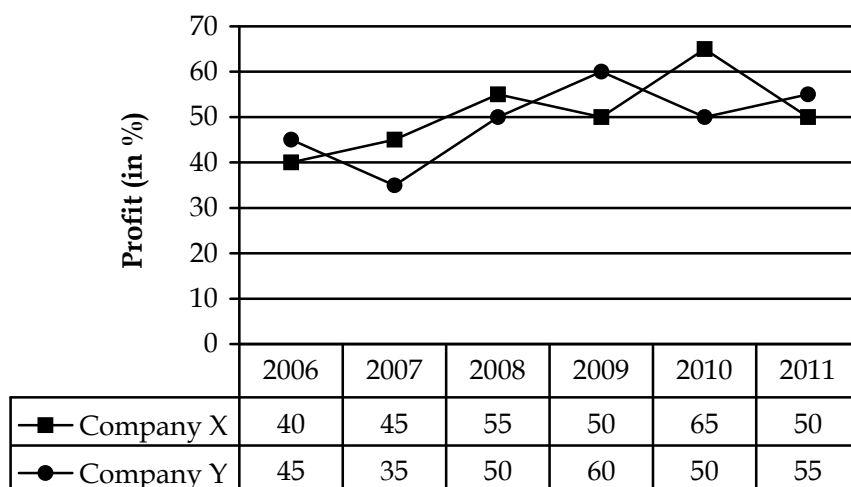
80. The incomes of companies X and Y in 2010 were in the ratio of 3 : 4 respectively. What was the respective ratio of their expenditures in 2010?
(1) 7 : 22   (2) 14 : 19   (3) 15 : 22   (4) 27 : 35   (5) 35 : 49

81. If the expenditures of companies X and Y in 2006 were equal and the total income of two companies in 2006 was Rs.342 crore, what was the total profit of two companies together in 2006? (Profit = Income-Expenditure)
(1) Rs.240 crore   (2) Rs.171 crore   (3) Rs.120 crore
(4) Rs.102 crore   (5) Rs.150 crore

82. If the expenditure of company Y in 2007 was Rs.220 crore, what was its income in 2007?
(1) Rs.312 crore   (2) Rs.297 crore   (3) Rs.283 crore
(4) Rs.275 crore   (5) Rs.250 crore

83. The expenditure of company X in the year 2008 was Rs.200 crore and the income of company X in 2008 was the same as its expenditure in 2011?
What is the income of Company X in 2011?
(1) Rs.385 crore   (2) Rs.465 crore   (3) Rs.335 crore
(4) Rs.295 crore   (5) Rs.250 crore

84. If the incomes of two companies were equal in 2009, then what was the ratio of expenditure of Company X to that of Company Y in 2009?
(1) 6 : 5   (2) 5 : 6   (3) 11 : 6   (4) 16 : 15   (5) 20 : 11

Directions (Qs.85-89): In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and select your answer.

85. I. $3x^2 - 22x + 7 = 0$

II. $y^2 - 15y + 56 = 0$

(1) $x > y$
(2) $x \geq y$
(3) $x < y$
(4) $x \leq y$
(5) $x = y$ or relationship between x and y cannot be established

86. I. $2x^2 - 17x + 36 = 0$

II. $2y^2 - 19y + 44 = 0$

(1) $x > y$
(2) $x \geq y$
(3) $x < y$
(4) $x \leq y$
(5) $x = y$ or relationship between x and y cannot be established

87. I. $x - \sqrt{169} = 0$

II. $y - \sqrt{169} = 0$

(1) $x > y$
(2) $x \geq y$
(3) $x < y$
(4) $x \leq y$
(5) $x = y$ or relationship between x and y cannot be established

88. I. $3x^2 + 20x + 25 = 0$

II. $3y^2 + 14y + 8 = 0$

(1) $x > y$

(2) $x \geq y$

(3) $x < y$

(4) $x \leq y$

(5) $x = y$ or relationship between x and y cannot be established

89. I. $3x^2 + 5x + 2 = 0$

II. $3y^2 + 18y + 24 = 0$

(1) $x > y$

(2) $x \geq y$

(3) $x < y$

(4) $x \leq y$

(5) $x = y$ or relationship between x and y cannot be established

90. A seller marks the price 50% above the cost price and gives 10% discount on an item. While selling, he cheats a customer by giving 20% less in weight. Find his overall profit percent (approximate)?

(1) 26%   (2) 65%   (3) 68%

(4) 72%   (5) 76%

91. There are 81 litre pure milk in a container. One-third of milk is replaced by water in the container. Again one-third of mixture is extracted and equal amount of water is added. What is the ratio of milk to water in the new mixture?

(1) 1 : 2   (2) 1 : 1   (3) 2 : 1

(4) 4 : 5   (5) None of these

92. A, B and C started a business with their investments in the ratio 1 : 2 : 4. After 6 months, A invested the half amount more as before and B invested same the amount as before while C withdrew $\frac{1}{4}$th of his investment. Find the ratio of their profits at the end of the year.

(1) 5 : 12 : 13   (2) 5 : 11 : 14   (3) 5 : 12 : 14

(4) 5 : 12 : 10   (5) None of these

93. A is 2 years older than B while B is 3 years younger than C. The ratio of age of A, 6 years hence and B, 2 years ago is 5 : 3. What was age of C, 6 years ago?

(1) 12 years   (2) 19 years   (3) 15 years

(4) 14 years   (5) 21 years

94. The average marks in Science subject of a class of 20 students is 68. If the marks of two students were misread as 48 and 65 of the actual marks 72 and 61 respectively, then what would be the correct average?

(1) 68.5   (2) 69   (3) 69.5

(4) 70   (5) 66

Directions (Qs.95-99): What should come in the place of question mark (?) in the given questions?

95. 40% of 265 + 35% of 180 = 50% of ? + ?% of 80

(1) 80   (2) 95.5   (3) 130   (4) 125.5   (5) 115

96. $\sqrt{0.25}$ of 0.16 of $157 = ?$

(1) 0.43   (2) 12.56   (3) 0.91   (4) 17.25   (5) 9.50

97. $\sqrt{?} + 416 = (60\%$ of $920) - 110$

(1) 576   (2) 676   (3) 784   (4) 1024   (5) 1156

98. (682% of 782) ÷ 856 = ?

(1) 4.50   (2) 10.65   (3) 2.55   (4) 8.75   (5) 6.25

99. 15.5% of 850 + 24.8% of 650 = ?

(1) 295   (2) 330   (3) 270   (4) 375   (5) 220

100. The time taken by a boat to travel; 'x' km upstream is twice the time taken by the same boat to travel 'x' km downstream. If speed of the boat in still water is 12 km/hr. What is the speed of current? (in km/hr)

(1) 3   (2) 4   (3) 3.5   (4) 4.5   (5) None of these

ANSWER WITH EXPLANATION:

1. **Ans (3): Both conclusions I and II are true**
   Statements: S ≤ L ≤ I = P ≥ E > R; L > Q
   Conclusions: I. P ≥ S (✓)   II. I > R (✓)

2. **Ans (2): Only conclusion I is true**
   Statements: G > R ≤ E = A ≤ T ≤ S; D ≤ A ≤ J
   Conclusions: I. T ≥ D (✓)   II. R > S (✗)

3. **Ans (1): Only conclusion II is true**
   Statement: A ≥ B > C ≤ D ≤ E < F
   Conclusions: I. A ≥ E (✗)   II. C < F (✓)

4. **Ans (5): Neither conclusion I nor II is true**
   Statements: G > R ≥ E = A ≤ T ≤ S; D ≤ A ≤ J
   Conclusions: I. J > G (✗)   II. J = G (✗)

5. **Ans (5): Neither conclusion I nor II is true**
   Statements: S ≤ L ≤ I = P ≥ E > R; L > Q
   Conclusions: I. L < R (✗)   II. E ≥ Q (✗)

For (Qs.6-10):
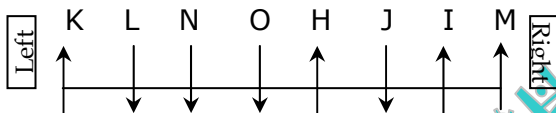
6. **Ans (2): J**
   J is third to the left of N.

7. **Ans (3): K and N**
   K and N are immediate neighbours of L.

8. **Ans (4): Two**
   H and J are in between I and O.

9. **Ans (5): K**
   Except K, all others are facing south direction.
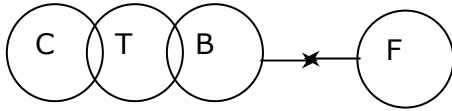
10. **Ans (2): O**
    O is exactly in the middle of I and J.

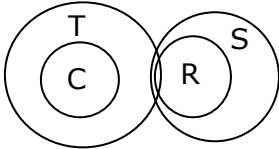11. **Ans (5): Both conclusions I and II follow**
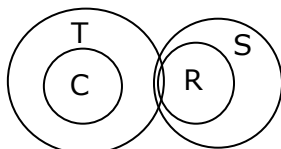
   Conclusions: I. All rectangles being triangles is a possibility (✓)
                    II. All circles being squares is a possibility (✓)
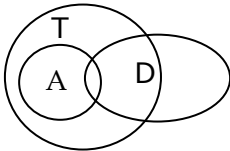
12. Ans (5): Both conclusions I and II follow

Conclusions: I. All chairs being furniture is a possibility (✓)
II. Some tables are not bed is a possibility (✓)
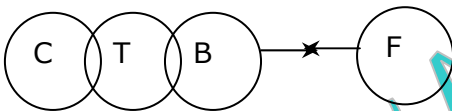
13. Ans (4): Neither Conclusion I nor II follows

Conclusions: I. Some triangles are not rectangles (✗)
II. No square is a circle (✗)

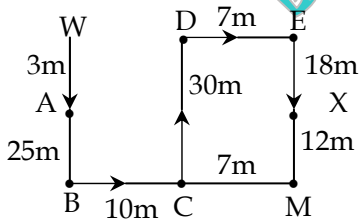## 14. Ans (5): Both conclusions I and II follow

Conclusions: I. All dramas being theatre is a possibility (✓)
II. Some dramas are theatre (✓)

15. Ans (1): Only conclusions I follows

Conclusions: I. Some tables are not furniture (✓)
II. All tables being furniture is a possibility (✗)

For (Qs.16-18):

16. Ans (2): South-West
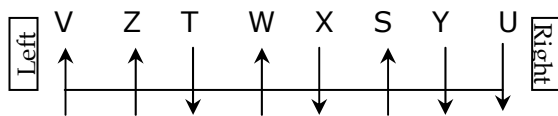Point B is in the South-West direction of point D.

17. Ans (1): 28 m
BW = 25 + 3 = 28 m

18. Ans (1): 17 m
BM = 10 + 7 = 17 m

For (Qs.19-23):

| | Left | V | Z | T | W | X | S | Y | U | Right |

19. **Ans (2): Four**
    There are four persons facing north.

20. **Ans (4): T, Y**
    Except TY, in all other pairs one person faces south and other person faces north.

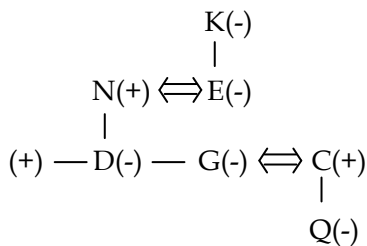21. **Ans (2): Third to the right**
    X is third to the right of Z.

22. **Ans (1): T**
    T sits between Z and W.

23. **Ans (2): V**
    V is sitting second to the right of T.

For (Qs.24-26):

```
                    K(-)
                     |
       N(+) ⟺ E(-)
         |
(+) — D(-) — G(-) ⟺ C(+)
                         |
                        Q(-)
```

24. **Ans (3): Niece**
    Q is the niece of D.

25. **Ans (3): Son-in-law**
    N is the son-in-law of K.

26. **Ans (3): Two**
    N has two daughters.

For (Qs.27-29): F(13) > A > D, B > E(4) > C

27. **Ans (2): 8**
    Length of D = 13 – 5 = 8cm

28. **Ans (3): C**
    C is the smallest wire

29. **Ans (2): 2**
    Length of C may be 2cm

For (Qs.30-35):

Floor	Person	Income	Alphabetical order of persons
7	S	9000	M
6	N	11000	N
5	M	15000	O
4	Q	3500	P
3	P	5000	Q
2	R	7500	R
1	O	13500	S

30. **Ans (4): 15000**
   M's income in Rs.15000.

31. **Ans (1): 13500 – O**
   Option (1) is correct combination.

32. **Ans (3): Two**
   M and R are remain unchanged.

33. **Ans (3):** None of the given options is true

34. **Ans (5): R**
   R lives on the floor number 2.

35. **Ans (3): 7500**
   R has the income of Rs.7500.

36. **Ans (5):** All of the above options

37. **Ans (4):** fiction, according to the author

38. **Ans (1):** The countries belief in the efficacy of the system was bound to turn out to be false

39. **Ans (2):** believes that the theory of helping with subsidy is very destructive

40. **Ans (4):** Other than those given as options

41. **Ans (3):** Experts call subsidies the most regressive form of taxation

42. **Ans (1):** There's no such thing as a free lunch

43. **Ans (2):** D

44. **Ans (3):** C

45. **Ans (5):** E

46. **Ans (1):** F

47. **Ans (3):** A

48. Ans (2): big

49. Ans (4): practice

50. Ans (5): enterprises

51. Ans (3): skills

52. Ans (4): measured

53. Ans (4): has been

54. Ans (1): who

55. Ans (1): profoundly

56. Ans (3): has been in the minds of people

57. Ans (4): had longer notice of it

58. Ans (2): reading Times

59. Ans (2): polymer notes after taking into considering

60. Ans (3): invest in programs that ensures a healthy pregnancy

61. Ans (3): have increased dramatically over

62. Ans (2): never made a phone call, but

63. Ans (1): Workers with less

64. Ans (4): of their strict laws

65. Ans (2): most unique: the prince

66. <u>Ans (4): 6.25 million</u>

Let x be total population of State R $= \dfrac{76}{100} \times \dfrac{2}{5} \times x = 1.9$

$\therefore x = \dfrac{1.9 \times 500}{76 \times 2} \Rightarrow x = 6.25$ million

67. <u>Ans (2): 2.13 million</u>

Total population above poverty line in the state $S = 7 \times \dfrac{71}{100} = 4.97$ million

$\therefore$ Number of females above poverty line in state $S = 4.97 \times \dfrac{3}{7} = 2.13$ million

68. **Ans (3): 3.3 million**

Let the population of state P be x million

Total population below poverty line for State P $\Rightarrow \dfrac{35}{100}x \times \dfrac{6}{11} = 2.1 \Rightarrow x = 11\,\text{million}$

Total population above poverty line for state P $= \dfrac{11 \times 65}{100} = 7.15\,\text{million}$

$\therefore$ Number of males above poverty line $= 7.15 \times \dfrac{6}{13} = 3.3\,\text{million}$

69. **Ans (2): 2 : 5**

Let the total population of state Q = A million

Total population below poverty line for State Q $= \dfrac{2.4}{3} \times 8 = 6.4\,\text{million}$

$A \times \dfrac{25}{100} = 6.4 \Rightarrow A = 25.6\,\text{million}$

Let total population of State T = B million

Total population below poverty line for State T $= \dfrac{6}{5} \times 8 = 9.6\,\text{million}$

$B \times \dfrac{15}{100} = 9.6 \Rightarrow B = 64\,\text{million}$

$\therefore$ Required ratio $\left(\dfrac{A}{B}\right) = \dfrac{25.6}{64} = 2 : 5$

70. **Ans (2): $\dfrac{32}{75}$**

Total number of integers = 300; Integers divisible by 3 = 100
Integers divisible by 7 = 42; Integers divisible by 21 = 14
Total numbers divisible by 3 or 7 = 100 + 42 − 14 = 128

Required probability $= \dfrac{128}{300} = \dfrac{32}{75}$

71. **Ans (1): $\dfrac{3}{4}$**

In 1 day 14 men will do $= \dfrac{1}{18}$; In 3 days 14 men will do $= \dfrac{3}{18} = \dfrac{1}{6}$

In 1 day 15 women will do $= \dfrac{1}{24}$; In 3 days 15 women will do $= \dfrac{3}{24} = \dfrac{1}{8}$

In 3 days 10 women will do $= \dfrac{1}{8} \times \dfrac{10}{15} = \dfrac{1}{12}$

$\therefore$ Remaining work $= 1 - \dfrac{1}{12} - \dfrac{1}{6} = \dfrac{12-1-2}{12} = \dfrac{9}{12} = \dfrac{3}{4}$

72. **Ans (3): 28**

Let the length and breadth of rectangle be 7a and 3a respectively.
Perimeter of rectangle = 2(7a + 3a) = 20a

$\dfrac{\text{Radius of Circle}}{\text{Length of Rectangle}} = \dfrac{1}{2} \Rightarrow \dfrac{r}{7a} = \dfrac{1}{2} \Rightarrow r = \dfrac{7a}{2}$

$\therefore 2\pi r - 20a = 8 \Rightarrow 2 \times \dfrac{22}{7} \times \dfrac{7a}{2} - 2a = 8 \Rightarrow 22a - 20a = 8 \Rightarrow 2a = 8 \Rightarrow a = 4$

Length of the rectangle = 7 × 4 = 28

73. **Ans (2): Rs.1,500**

Let the sum invested by A = Rs. x

And the sum invested by B = Rs. 4,000 – x

$$\frac{x \times 5 \times 2}{100} = \frac{(4000 - x) \times 3 \times 2}{100} \Rightarrow 5x = 12000 - 3x \Rightarrow 8x = 12000 \Rightarrow x = Rs.1500$$

∴Sum invested by A = Rs.1,500

74. **Ans (1): 16.67%**

Let the speed of slower train = $y_1 m/\sec$

And the speed of faster train = $y_2 m/\sec$

$$Time = \frac{Distance}{Speed} \Rightarrow 14 = \frac{1}{y_1 + y_2}...(i) \text{ and } 182 = \frac{1}{y_1 - y_2}...(ii)$$
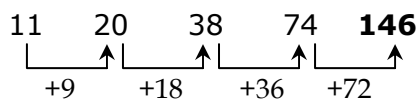
From equations (i) and (ii)

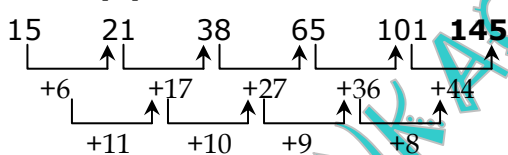$$14(y_1 + y_2) = 182(y_1 - y_2) \Rightarrow 14y_1 + 14y_2 = 182y_1 - 182y_2 \Rightarrow 168y_1 = 196y_2$$

$$\frac{y_1}{y_2} = \frac{196}{168} = \frac{7}{6}$$

$$\therefore Required\ Percentage = \frac{7-6}{6} \times 100 = \frac{50}{3} = 16.67\%$$

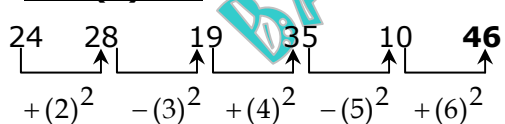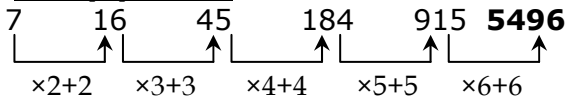**75.** **Ans (1): 146**

11   20   38   74   **146**

+9   +18   +36   +72

76. **Ans (2): 145**

15   21   38   65   101   **145**

+6   +17   +27   +36   +44

+11   +10   +9   +8

77. **Ans (4): 46**

24   28   19   35   10   **46**

$+(2)^2$ $-(3)^2$ $+(4)^2$ $-(5)^2$ $+(6)^2$

78. **Ans (2): 5496**

7   16   45   184   915   **5496**

×2+2   ×3+3   ×4+4   ×5+5   ×6+6

79. **Ans (2): 127**

12   19   35   59   90   **127**

+7   +16   +24   +31   +37

+9   +8   +7   +6
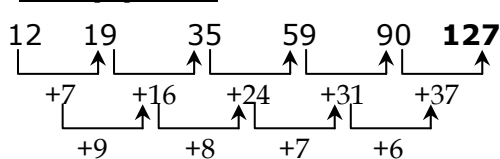
80. <u>**Ans (3): 15 : 22**</u>

$$\frac{x \times 165}{y \times 150} = \frac{3}{4} \Rightarrow \frac{x}{y} = \frac{3 \times 150}{4 \times 165} = \frac{15}{22}$$

81. <u>**Ans (4): Rs.102 crore**</u>

Let the expenditures of each of the companies X and Y in 2006 be Rs.x crore
And let the income of company X in 2006 be Rs.z crore
So that the income of company Y in 2006 = Rs.(342-z) crore
Then, for company X we have,

$$40 = \frac{z - x}{x} \times 100 \Rightarrow \frac{40}{100} = \frac{z}{x} - 1 \Rightarrow \frac{z}{x} = \frac{40}{100} + 1 \Rightarrow x = \frac{100z}{140}...(1)$$

Also, for company Y we have.

$$45 = \frac{342 - z - x}{x} \times 100 \Rightarrow 342 - z - x = \frac{45}{100}x \Rightarrow 342 - z = \frac{45x + 100x}{100} \Rightarrow x = \frac{(342 - z) \times 100}{145}$$

From equations (i) and (ii), we get $\Rightarrow \dfrac{100z}{140} = \dfrac{(342 - z) \times 100}{145} \Rightarrow \dfrac{5z}{7} = \dfrac{(342 - z) \times 20}{29}$

$29z = (342-z) \times 4 \times 7 \Rightarrow 29z = 342 \times 28 - 28z \Rightarrow 57z = 9576 \Rightarrow z = 168$
Putting the value of z in equation (i), we get

$$x = \frac{100 \times 168}{140} \Rightarrow x = 120$$

$\therefore$ Total expenditure of companies X and Y in 2006 = 2 × 120 = Rs.240 crore
$\therefore$ Total profit = 342 – 240 = Rs.102 crore

82. <u>**Ans (2): Rs.297 crore**</u>

Let the income of company Y in 2007 = x

$$\text{Profit percent} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \Rightarrow \frac{35}{100} = \frac{x - 220}{220} \Rightarrow 77 = x - 220 \Rightarrow x = \text{Rs.297}$$

83. <u>**Ans (2): Rs.465 crore**</u>

Let the income of company X in 2008 be x crore $= 55 = \dfrac{x - 200}{200} \times 100$

$\therefore$ Expenditure of company X in 2011 = Income of company X in 2008 = Rs.310 crore

$$50 = \frac{z - 310}{310} \times 100 \Rightarrow z = 465$$

$\therefore$ Income of company X in 2011 = 465 crore

84. <u>**Ans (4): 16 : 15**</u>

Let the income of each of the two companies X and Y in 2009 be Rs.x
And let the expenditures of companies X and Y in 2009 be E_1 and E_2 respectively.
Then for company x, we have

$$50 = \frac{x - E_1}{E_1} \times 100 \Rightarrow \frac{50}{100} = \frac{x}{E_1} - 1 \Rightarrow x = \frac{150}{100}E_1...(i)$$

Also for company Y we have,

$$60 = \frac{x - E_2}{E_2} \times 100 \Rightarrow \frac{60}{100} = \frac{x}{E_2} - 1 \Rightarrow x = \frac{160}{100}E_2...(ii)$$

From equations (i) and (ii) we get,

$$\frac{150}{100}E_1 = \frac{160}{100}E_2 \Rightarrow \frac{E_1}{E_2} = \frac{160}{100} \times \frac{100}{150} \Rightarrow \frac{16}{15} \Rightarrow E_1 : E_2 = 16 : 15$$

85. **Ans (4): $x \le y$**

   I. S.R = 22, P.R = 21 $\Rightarrow x = \dfrac{21}{3}, \dfrac{1}{3} = 7, 0.33$

   II. S.R = 15, P.R = 56 $\Rightarrow y = 8, 7$

86. **Ans (5): $x = y$ or Relationship between x and y cannot be established**

   I. S.R = 17, P.R = 72 $\Rightarrow x = \dfrac{9}{2}, \dfrac{8}{2} = 4.5, 4$

   II. S.R = 19, P.R = 88 $\Rightarrow y = \dfrac{11}{2}, \dfrac{8}{2} = 5.5, 4$

87. **Ans (5): relationship between x and y cannot be established**

   I. $x = 13, -13$

   II. $y = 13, -13$

88. **Ans (5): $x = y$ or relationship between x and y cannot be established**

   I. S.R = -20, P.R = 75 $\Rightarrow x = \dfrac{-15}{3}, \dfrac{-5}{3} = -5, -1.66$

   II. S.R = -18, P.R = 72 $\Rightarrow y = \dfrac{-12}{3}, \dfrac{-6}{3} = -4, -0.666$

89. **Ans (1): $x > y$**

   I. S.R = -5, P.R = 6 $\Rightarrow x = \dfrac{-3}{3}, \dfrac{-2}{3} = -1, -0.66$

   II. S.R = -18, P.R = 72 $\Rightarrow y = \dfrac{-12}{3}, \dfrac{-6}{3} = -4, -2$

90. **Ans (3): 68%**

   Let the cost price be Rs.100
   Then marked price will be Rs.150

   He gives 10% discount, so Selling price $= 150 \times \dfrac{90}{100} = Rs.135$

   As he cheats and gives 20% less in weight,

   Cost price becomes $= 100 \times \dfrac{80}{100} = Rs.80$

   Profit percentage $= \dfrac{135 - 80}{80} \times 100 \approx 68\%$

91. **Ans (4): 4 : 5**

   Amount of milk left after first withdrawal $= \dfrac{81}{3} = 54$ litre

   Amount of milk left after second withdrawal $= \dfrac{54}{3} = 36$ litre

   Amount of water left = 81 − 36 = 45
   Litre Ratio of milk to water in the new mixture = 36 : 45 = 4 : 5

92. **Ans (5): None of these**

   Let their initial investments be x, $2x$ and $4x$ respectively.
   $\therefore$ Required ratio =

   $[6 \times x + 6(x + \dfrac{x}{2})] : [2x \times 12] : [6 \times 4x + 6(4x - \dfrac{4x}{4})] = 15 : 2 \times 12 : 42 = 5 : 8 : 14$

93. Ans (4): 14 years

Let B's age = x years; A's age = $(x + 2)$ years; C's age = $(x + 3)$ years

$$\frac{x+2+6}{x-2} = \frac{5}{3} \Rightarrow 3x + 24 = 5x - 10 \Rightarrow 2x = 24 \Rightarrow x = 17 \text{ years}$$

C's age = 17 + 3 = 20 years

∴ C's age, 6 years ago = 20 – 6 = 14 years

94. Ans (2): 69

$$\text{Correct average marks} = \frac{20 \times 68 - 48 - 65 + 72 + 61}{20} = \frac{1360 + 20}{20} = 69$$

95. Ans (3): 130

$$\frac{40}{100} \times 265 + \frac{35}{100} \times 180 = \frac{50}{100} \times ? + \frac{?}{100} \times 80 \Rightarrow 106 + 63 = \frac{?}{2} + \frac{4 \times ?}{5}$$

$$169 = \frac{5 \times ? + 8 \times ?}{10} = 13 \times ? = 169 \times 10 \Rightarrow ? = 130$$

96. Ans (2): 12.56

$$\sqrt{0.25} \times 0.16 \times 157 = ? \Rightarrow 0.5 \times 25.12 = ? = 12.56$$

97. Ans (2): 676

$$\sqrt{?} + 416 = \frac{(60 \times 920)}{100} - 110 \Rightarrow \sqrt{?} + 416 = 552 - 110 \Rightarrow \sqrt{?} = 442 - 416 \Rightarrow \sqrt{?} = 26 \Rightarrow ? = 676$$

98. Ans (5): 6.25

$$\left(\frac{682}{100} \times 782\right) \div 856 = ? \Rightarrow 5333.24 \div 856 \Rightarrow ? = 6.23 \approx 6.25$$

99. Ans (1): 295

$$\frac{15.5}{100} \times 850 + \frac{24.8}{100} \times 650? \Rightarrow 131.75 + 161.2 = ? = 292.95 \approx 295$$

100. Ans (2): 4

Let the speed of current = y km/hr & Downstream speed of boat = $(12 + y)$ km/hr
Upstream speed of boat = $(12 – y)$ km/h

$$\frac{x}{12-y} = 2\left[\frac{x}{12+y}\right] \Rightarrow 12x + xy = 24x - 2xy$$

$$\Rightarrow 3xy - 12x = 0$$

$$\Rightarrow x(3y - 12) = 0 \Rightarrow y = \frac{12}{3} = 4$$

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