

Solved Paper

09-12-2012

# Railway Combined Pre. Exam

## Non-Technical Stage I

1. Who was the founder-editor of the famous newspaper Kesari during the National struggle?
  - (a) Mahatma Gandhi
  - (b) Jawaharlal Nehru
  - (c) Lokmanya Tilak
  - (d) Mohammad Iqbal
2. The Ghadar Movement was founded by
  - (a) Ajit Singh
  - (b) Lala Hansraj
  - (c) Lala Hardayal
  - (d) None of these
3. The book 'Unto This Last' which influenced Gandhi was authored by
  - (a) Boris Yeltsin
  - (b) John Ruskin
  - (c) Pushkin
  - (d) Ruskin Bond
4. Which among the following is the sacred book of the Buddhists?
  - (a) Upanishad
  - (b) Vedas
  - (c) Tripitaka
  - (d) Aranyak
5. Budha means
  - (a) the enlightened one
  - (b) the religious preacher
  - (c) the genius
  - (d) the powerful
6. Bijapur is known for its
  - (a) Heavy rainfall
  - (b) Rock Temple
  - (c) Gol Gumbaj
  - (d) State of Gomateshwara
7. The famous Kohinoor diamond was produced from one of the mines in
  - (a) Odisha
  - (b) Chhotanagpur
  - (c) Bijapur
  - (d) Golconda
8. Geostationary orbit is at a height of
  - (a) 6 km
  - (b) 1000 km
  - (c) 3600 km
  - (d) 36000 km
9. Which scale is used to measure the intensity of earthquake?
  - (a) Richter
  - (b) Metric
  - (c) Centigrade
  - (d) Newton
10. The largest ocean is
  - (a) Atlantic ocean
  - (b) Indian ocean
  - (c) Arctic ocean
  - (d) Pacific ocean
11. Dead sea is situated in which one of the following
  - (a) A Rift valley
  - (b) An Intermontane Plateau
  - (c) Intermontane Plains
  - (d) Canyons
12. The oldest type of energy known to man is
  - (a) wind power
  - (b) solar power
  - (c) tidal power
  - (d) geothermal energy
13. The 'Dark continent' is
  - (a) Africa
  - (b) South America
  - (c) Australia
  - (d) Asia
14. The largest producer of gold in the world is
  - (a) Australia
  - (b) Canada
  - (c) Russia
  - (d) South Africa
15. Which of the following is not correctly matched?
  - (a) Indonesia/Jakarta
  - (b) Maldives/Male
  - (c) North Korea/ Seoul
  - (d) Zimbabwe/Harare
16. Which of the following states is a member of the 'Seven sisters'?
  - (a) Paschim Banga
  - (b) Tripura
  - (c) Odisha
  - (d) Bihar
17. The Finance Commission is constituted under Article ..... of the Constitution of India.
  - (a) 275
  - (b) 280
  - (c) 282
  - (d) None of the above
18. The article of Indian Constitution related to abolition of untouchability is
  - (a) Article 15
  - (b) Article 16
  - (c) Article 17
  - (d) Article 18
19. The item 'Education' belongs to the
  - (a) Union List
  - (b) State List
  - (c) Concurrent List
  - (d) Residuary Subjects
20. 'The Federal System with Strong Centre' has been borrowed by the Indian Constitution from
  - (a) USA
  - (b) Canada
  - (c) UK
  - (d) France
21. The Constitution of India was adopted on
  - (a) 26th January, 1950
  - (b) 26th January, 1949
  - (c) 26th November, 1949
  - (d) 15th August, 1947
22. Diarchy was first introduced under
  - (a) Morley-Minto Reforms
  - (b) Montford Reforms
  - (c) Simon Commission Plan
  - (d) Government of India Act, 1935
23. Which Amendment of the Indian Constitution inserted the two words 'Socialist' and 'Secular' in the preamble?
  - (a) 28th
  - (b) 40th
  - (c) 42nd
  - (d) 52nd
24. Who had estimated National Income in India first?
  - (a) Dadabhai Naoroji
  - (b) RC Dutt
  - (c) VKRV Rao
  - (d) DR Gadgil

## Railway Combined Pre. Exam Non-Technical Stage I 19

25. The planning commission of India is  
 (a) a constitutional body  
 (b) a statutory body  
 (c) a non-statutory body  
 (d) an independent and autonomous body
26. The 2011 census could be the  
 (a) 13th census (b) 14th census  
 (c) 15th census (d) 16th census
27. 'Higher than Hopes' is a biography of  
 (a) Mother Teresa  
 (b) Nelson Mandela  
 (c) Bishop Tutu  
 (d) None of the above
28. Who coined the term 'Hindu rate of growth' for Indian Economy?  
 (a) AK Sen  
 (b) Kirit S Parikh  
 (c) Raj Krishna  
 (d) Motek Singh Ahluwalia
29. Net National Product (NNP) of a country is  
 (a) GDP minus depreciation allowances  
 (b) GDP plus net income from abroad  
 (c) GNP minus net income from abroad  
 (d) GNP minus depreciation allowances
30. In which one of year 'Rolling Plan' was in operation in India?  
 (a) 1968-69 (b) 1978-79  
 (c) 1988-89 (d) 1990-91
31. The headquarter of UNHCR is located at  
 (a) New York (b) Rome  
 (c) London (d) Geneva
32. S I unit of surface tension is  
 (a)  $\frac{N}{m^2}$  (b)  $\frac{N}{m}$   
 (c)  $\frac{Ns}{m}$  (d)  $\frac{J}{S}$
33. Which of the following is most elastic  
 (a) rubber (b) wet clay  
 (c) steel  
 (d) plastic
34. The speed of light with the rise in the temperature of the medium  
 (a) increases  
 (b) decreases  
 (c) remains unaltered  
 (d) drops suddenly
35. The best conductor of heat among the following is  
 (a) alcohol (b) mercury  
 (c) ether (d) water
36. X-rays were discovered by  
 (a) Roentgen (b) Becquere  
 (c) Curie (d) Van lane
37. Which one of the following is not electromagnetic in nature?  
 (a) Cathode rays (b) X-rays  
 (c) Gamma-rays (d) Infrared rays
38. C, BASIC, COBOL and Java are examples of language  
 (a) low-level  
 (b) computer  
 (c) system programming  
 (d) high level
39. Where is the headquarter of ONGC?  
 (a) Mumbai (b) Dehradun  
 (c) Vadodra (d) Digboi
40. Which is used in storage batteries?  
 (a) Copper (b) Lead  
 (c) Tin (d) Zinc
41. The First field Marshal of India was  
 (a) A Vaidya  
 (b) K.M Cariappa  
 (c) Vikram Singh  
 (d) SHFJ Manekshave
42. Higher concentration of nitrogen dioxide in atmosphere air causes  
 (a) cancer (b) bronchitis  
 (c) asphyxiation (d) corrosion
43. Which one of the following is used as an anti-freeze for the automobile engines?  
 (a) Propyl alcohol  
 (b) Ethanol  
 (c) Methanol  
 (d) Ethylene glycol
44. Enzymes are mainly  
 (a) carbohydrate (b) protein  
 (c) lipids (d) amino acid
45. Virus of bird flue is also known as  
 (a) NH 51 (b) NH 5  
 (c) N1H5 (d) N5H1
46. The weights of zinc, copper and aluminium in an alloy are in the ratio 2 : 3 : 7. In the alloy weighing 48 kg, the difference in weights of zinc and aluminium is  
 (a) 20 kg  
 (b) 4 kg  
 (c) 5 kg  
 (d) 16 kg
47. If a shopkeeper marks the price of goods 50% more than their cost price and allows a discount of 40%, what is his gain or loss per cent?  
 (a) 15% loss (b) 10% loss  
 (c) 10% gain (d) 15% gain
48. Two numbers are in the ratio 9 : 16. If each number is increased by 15, then the ratio becomes 2 : 3. The numbers are  
 (a) 36 and 48 (b) 27 and 48  
 (c) 18 and 32 (d) 24 and 36
49. Cyclist A started his journey on cycle at 7:30 am at a speed of 8 km/h. After 30 min, cyclist B started from the same place but with a speed of 10 km/h. At what time did B overtake A ?  
 (a) 9 am (b) 9:30 am  
 (c) 8 am (d) 10 am
50. If the simple interest on a certain sum of money for 3 yr is ₹ 225 and the compound interest on the same sum at the same rate for 2 yr is ₹ 153, then the principal invested (in ₹) is  
 (a) 3000 (b) 1875  
 (c) 1500 (d) 2250
51. The areas, of a square and a rectangle with equal perimeter are denoted by S and R, respectively. Which one of the following is correct?  
 (a)  $S < R$  (b)  $S = 2R$   
 (c)  $S = R$  (d)  $S > R$
52. A bought a computer system for ₹ 40000 and sold it to B at a loss of 4%. If B sold it to C for ₹ 40320, profit per cent for B is  
 (a) 3 (b) 6  
 (c) 4 (d) 5
53. The difference between the selling price of a shirt sold at profits 15% and 17% is ₹ 3. Then, the cost price of the shirt is  
 (a) ₹ 175 (b) ₹ 180  
 (c) ₹ 200 (d) ₹ 150
54. If  $x = \sqrt{\frac{\sqrt{5} + 1}{\sqrt{5} - 1}}$ , value of  $x^2 + x - 1$  is  
 (a)  $-\sqrt{5}$  (b) 0  
 (c)  $\sqrt{5}$  (d) 2
55. The value of k for which the system of equations  $x + 2y = 5, 3x + ky + 15 = 0$  has no solution, is  
 (a) 2 (b) -2  
 (c) 6 (d) -6
56. If the radius of a circle is increased by 10%, then percentage of increase of its area is  
 (a) 17 (b) 21  
 (c) 12 (d) 15

## 20 Railway Combined Pre. Exam Non-Technical Stage I

57. If the height and radius of a hemisphere and a right circular cylinder are respectively equal, then ratio of the volume of the hemisphere and the cylinder is  
 (a) 1 : 2 (b) 1 : 1  
 (c) 2 : 3 (d) 3 : 2
58. The volume of a solid hemisphere is numerically equal to its total surface area. Its radius is  
 (a)  $4\frac{1}{2}$  units (b) 9 units  
 (c) 3 units (d)  $1\frac{1}{2}$  units
59. If  $x$  and  $y$  be two real numbers and  $x + y = 8$ , then the greatest value of  $xy$  is  
 (a) 16 (b) 18 (c) 12 (d) 15
60. In  $\Delta ABC$ ,  $\angle B = 90^\circ$ ,  $\angle C = 45^\circ$  and  $D$  is the mid-point of  $AC$ . If  $AC = 4\sqrt{2}$  units, then  $BD$  is equal to  
 (a)  $\frac{5}{2}$  units (b) 2 units  
 (c)  $2\sqrt{2}$  units (d)  $4\sqrt{2}$  units
61.  $\sin^2 21^\circ + \sin^2 69^\circ$  is equal to  
 (a)  $2 \sin^2 21^\circ$  (b)  $2 \sin^2 69^\circ$   
 (c) 1 (d) 0
62. In two types of stainless steel, the ratio of chromium and steel are 2 : 11 and 5 : 21, respectively. In what proportion should the two types be mixed, so that the ratio of chromium to steel in the mixed type become 7 : 32?  
 (a) 1 : 2 (b) 1 : 3  
 (c) 2 : 3 (d) 3 : 4
63. In the afternoon, a student read 100 pages at the rate of 60 pages/h. In the evening, when she was tired, she read 100 more pages at the rate of 40 pages/h. What was her average rate of reading, in pages per hour?  
 (a) 48 (b) 50  
 (c) 60 (d) 70
64. A cricketer has a mean score of 60 runs in 10 innings. Find out how many runs are to be scored in the eleventh innings to raise the mean score to 62?  
 (a) 80 (b) 81  
 (c) 83 (d) 82
65. A salesman expects a gain of 13% on his cost price. If in a month his sale was ₹ 791000. What was his profit?  
 (a) ₹ 91000 (b) ₹ 97786  
 (c) ₹ 85659 (d) ₹ 88300
66. From 2008 to 2009, the sales of a book decreased by 80%. If the sales in 2010 were the same as in 2008, by what per cent did it increase from 2009 to 2010?  
 (a) 80% (b) 100%  
 (c) 120% (d) 400%
67. The compound interest on ₹ 30000 at 7% per annum for a certain time is ₹ 4347. The time is  
 (a) 2 yr (b) 2.5 yr  
 (c) 3 yr (d) 4 yr
68. The base of a cone and a cylinder have the same radius 6 cm ; they have also the same height 8 cm. The ratio of the curved surfaces of the cylinder to that of the cone is  
 (a) 4 : 3 (b) 5 : 3  
 (c) 8 : 5 (d) 8 : 3
69. In a circle of radius 21 cm, an arc subtends an angle of  $72^\circ$  at the centre. The length of the arc is  
 (a) 13.2 cm (b) 19.8 cm  
 (c) 21.6 cm (d) 26.4 cm
70. If  $x = \sqrt{3} + \sqrt{2}$ , then the value of  $\left(x + \frac{1}{x}\right)$  is  
 (a) 2 (b) 3  
 (c)  $2\sqrt{2}$  (d)  $2\sqrt{3}$
71. An equilateral  $\Delta TQR$  is drawn inside a square  $PQRS$ . The value of the  $\angle PTS$  in degrees, is  
 (a)  $75^\circ$  (b)  $90^\circ$   
 (c)  $120^\circ$  (d)  $150^\circ$
- Directions (Q. Nos. 72-75)** The following pie chart shows the performance in an examination in a particular year for 360 students. Study the pie chart and answer the questions.
- A pie chart representing the performance of 360 students in an examination. The chart is divided into four segments: '2nd division' with a central angle of 162°, '1st division' with a central angle of 54°, '3rd division' with a central angle of 108°, and 'Failed' with a central angle of 36°.
72. The number of students who passed in first division is  
 (a) 45 (b) 54  
 (c) 64 (d) 74
73. The number of students who passed in second division is more than those in first division by  
 (a) 111 (b) 112 (c) 109 (d) 108
74. The ratio of successful students to the failed students is  
 (a) 9 : 1 (b) 5 : 1  
 (c) 1 : 9 (d) 2 : 7
75. The percentage of students who have failed in the examination is  
 (a) 20% (b) 36% (c) 10% (d) 30%
- Directions (Q.Nos. 76-78)** Select the related letter/world/number from the given alternative.
76. LOM : NMK :: PKI : ?  
 (a) RIH (b) SHG (c) RIG (d) RHG
77. 5 : 30 :: 8 : ?  
 (a) 14 (b) 50 (c) 69 (d) 80
78. Illiteracy : Education :: Drought : ?  
 (a) Well (b) Rain (c) Dam (d) River
- Directions (Q. Nos. 79-81)** In these questions, select the one which is different from the other three responses.
79. (a) Petrol - Car (b) Coal - Engine  
 (c) Smoke - Fire (d) Oil - Lamp
80. (a) 21-98 (b) 45-210  
 (c) 7-29 (d) 27-126
81. (a) BQCR (b) DSET  
 (c) FUGV (d) HWIY
- Directions (Q. No. 82)** In this this question, which one of the given responses would be a meaningful order of the following words in ascending order.
82. 1. Plastering 2. Painting  
 3. Foundation 4. Walls  
 5. Ceiling  
 (a) 1, 2, 3, 4, 5 (b) 3, 4, 1, 2, 5  
 (c) 3, 4, 5, 1, 2 (d) 5, 4, 3, 2, 1
83. If the following words are arranged according to English Dictionary, which word will be on third place?  
 (a) KNOW (b) KNACK  
 (c) KNIT (d) KNOB
84. Which one set of letters when sequentially placed at the gaps in the given letter series shall complete it?  
 \_ bc c \_ a abc \_ ba ab \_  
 (a) acbc (b) abac  
 (c) abcc (d) acac

## Railway Combined Pre. Exam Non-Technical Stage I 21

**Directions** (Q.No. 85) *In this question a series is given with the term missing. Chose the correct alternative to complete the series.*

85. ACE, BDF, CEG, ?  
 (a) CED (b) DFH  
 (c) DEM (d) HED
86. Find the wrong number in the given number series  
 2, 10, 30, 68, 120, 222  
 (a) 68 (b) 120  
 (c) 30 (d) 222
87. Savitha introduced a boy as the son of the only daughter of the father of her maternal uncle. How is boy related to Savitha?  
 (a) Brother (b) Son  
 (c) Nephew (d) Son-in-law
88. From the following alternatives select the word which can be formed using the letters of the given word  
 EXPERIENCE  
 (a) EXPIRE  
 (b) PERCIEVE  
 (c) EMPIRE  
 (d) EXPENSE
89. Which interchange of signs will make the following equation correct?  
 $(16 - 4) \times 6 \div 2 + 8 = 30$   
 (a) + and - (b) 4 and 2  
 (c) - and + (d) 16 and 6
90. If GRINDER is coded as 7654326, how is RENDER coded in that code?  
 (a) 642356 (b) 624536  
 (c) 624326 (d) 623426
91. A group of alphabets are given with each being assigned a number. These have to be unscrambled into a meaningful word and correct order of letters may be indicated from the given responses.  
 R T E F A  
 1 2 3 4 5  
 (a) 2, 5, 1, 3, 4  
 (b) 4, 3, 5, 1, 2  
 (c) 5, 4, 1, 3, 2  
 (d) 5, 4, 2, 3, 1
92. If TALENT is written as LATENT, how EXOTIC can be written in that code?  
 (a) OXOTIC  
 (b) TEXTIC  
 (c) OXETIC  
 (d) EXOTIC

**Directions** (Q. No. 93) *Select the missing number from the given responses.*

93.

4	10	6
12	96	48
16	152	?

- (a) 110 (b) 104 (c) 112 (d) 124
94. Anita drives from point A towards North and travels 30 km. She then turns to her right and travels 4 km, and then again turns to the right and drives straight for 30 km. How much distance she has to cover to go straight to the starting point?  
 (a) 26 km (b) 8 km  
 (c) 22 km (d) 4 km
95. Six friends A, B, C, D, E and F are sitting in a row facing East. 'C' is between 'A' and 'E'. 'B' is just to the right of 'E' but left of 'D'. 'F' is not at the right end. How many persons are to the right of 'E'?  
 (a) 1 (b) 2 (c) 3 (d) 4
96. Two statements are given followed by two conclusions I and II. You have to consider the statements to be true even, if they seem to be at variance from commonly known facts. You are to decide which of the given conclusions, if any, follow from the given statements. Indicate your answer.  
**Statements** All fruits are sweet.  
 All sweet things are not good for health.

**Conclusions**

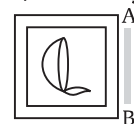
- I. All fruits are not good for health.  
 II. Some fruits are not good for health.

- (a) Only I follows  
 (b) Only II follows  
 (c) Neither I nor II follows  
 (d) Both I and II follow

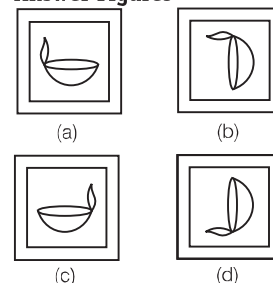
97. A solid cube of 4 inches has been painted red, green and black on pair of opposite faces. It has been cut into one inch cubes. How many cubes have only one face painted?  
 (a) 4 (b) 8  
 (c) 16 (d) 24

98. Which of the answer figure is exactly the mirror image of the given figure, when the mirror is held on the line AB?

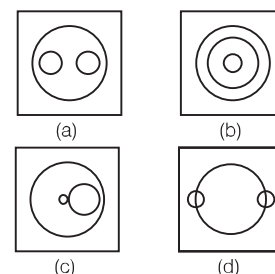
**Question Figure**



**Answer Figures**

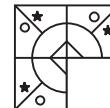


99. Which one of the following diagrams best depicts the relationship among Nation, States and Districts? Nation, States, Districts

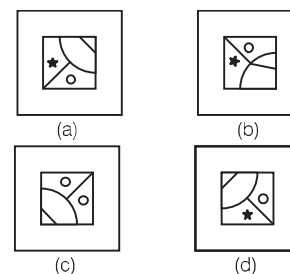


100. Which answer figure will complete the pattern in the question figure?

**Question Figure**



**Answer Figures**



## Answers

- |         |         |         |         |         |         |         |         |         |          |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| 1. (c)  | 2. (c)  | 3. (b)  | 4. (c)  | 5. (a)  | 6. (c)  | 7. (d)  | 8. (d)  | 9. (a)  | 10. (d)  |
| 11. (a) | 12. (d) | 13. (a) | 14. (a) | 15. (c) | 16. (b) | 17. (b) | 18. (c) | 19. (c) | 20. (b)  |
| 21. (c) | 22. (b) | 23. (c) | 24. (a) | 25. (c) | 26. (c) | 27. (b) | 28. (c) | 29. (d) | 30. (b)  |
| 31. (d) | 32. (b) | 33. (c) | 34. (c) | 35. (b) | 36. (a) | 37. (a) | 38. (d) | 39. (b) | 40. (b)  |
| 41. (d) | 42. (b) | 43. (d) | 44. (b) | 45. (d) | 46. (a) | 47. (b) | 48. (b) | 49. (d) | 50. (b)  |
| 51. (d) | 52. (d) | 53. (d) | 54. (*) | 55. (c) | 56. (b) | 57. (c) | 58. (a) | 59. (a) | 60. (c)  |
| 61. (c) | 62. (a) | 63. (a) | 64. (d) | 65. (a) | 66. (d) | 67. (a) | 68. (c) | 69. (d) | 70. (d)  |
| 71. (d) | 72. (b) | 73. (d) | 74. (a) | 75. (c) | 76. (c) | 77. (c) | 78. (b) | 79. (c) | 80. (c)  |
| 81. (d) | 82. (c) | 83. (d) | 84. (c) | 85. (b) | 86. (b) | 87. (b) | 88. (a) | 89. (a) | 90. (c)  |
| 91. (d) | 92. (c) | 93. (b) | 94. (d) | 95. (b) | 96. (d) | 97. (d) | 98. (d) | 99. (b) | 100. (d) |

## Hints and Solutions

- 46.** Let the common ratio =  $x$   
Then, weight of zinc, copper and aluminium =  $2x, 3x$  and  $7x$ , respectively.

$$\begin{aligned} \text{Now, weight of zinc} &= \frac{2x}{12x} \times 48 \\ &= 8 \text{ kg} \\ \text{weight of aluminium} &= \frac{7x}{12x} \times 48 \\ &= 28 \text{ kg} \end{aligned}$$

$$\therefore \text{Difference} = (28 - 8) \text{ kg} = 20 \text{ kg}$$

- 47.** Let the cost price = ₹ 100  
Then, marked price is 50% above CP  
 $\therefore$  Marked price =  $\frac{(100 + 50\%) \times 100}{100}$

$$\begin{aligned} &= \frac{150 \times 100}{100} \\ &= ₹ 150 \end{aligned}$$

Now, shop allowed 40% discount  
 $\therefore$  Selling price =  $\frac{(100 - \text{Discount}\%) \times \text{Marked price}}{100}$

$$\begin{aligned} &= \frac{(100 - 40) \times 150}{100} \\ &= \frac{60 \times 150}{100} \end{aligned}$$

$$= ₹ 90$$

Clearly, shopkeeper had a loss as CP > SP

$$\begin{aligned} \therefore \text{Loss per cent} &= \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100 \\ &= \frac{100 - 90}{100} \times 100 \\ &= 10\% \text{ loss} \end{aligned}$$

- 48.** Let the common ratio be  $x$ .  
 $\therefore$  Numbers are  $9x$  and  $16x$ .  
Now, by given condition

$$\begin{aligned} \frac{9x + 15}{16x + 15} &= \frac{2}{3} \\ \Rightarrow (9x + 15) \cdot 3 &= 2(16x + 15) \\ \Rightarrow 27x + 45 &= 32x + 30 \\ \Rightarrow 45 - 30 &= 32x - 27x \\ \Rightarrow 15 &= 5x \\ \Rightarrow x &= \frac{15}{5} = 3 \end{aligned}$$

$\therefore$  Numbers are  $(9x = 9 \times 3) = 27$  and  $(16x = 16 \times 3) = 48$

- 49.** Distance covered by cyclist A in 30 min at speed of 8 km/h started at 7:30 am.

$$\begin{aligned} \text{Distance} &= \text{Speed} \times \text{Time} \\ &= 8 \times \frac{1}{2} = 4 \text{ km} \end{aligned}$$

Now, cyclist B starts at 8 am with speed of 10 km/h.

$\therefore$  Relative speed between two cyclists

$$= (10 - 8) = 2 \text{ km/h}$$

So, cyclist B have to cover 4 km at relative speed of 2 km/h.

$$\begin{aligned} \text{Now, time taken to cover 4 km} &= \frac{\text{Distance}}{\text{Relative Speed}} = \frac{4}{2} = 2 \text{ h} \end{aligned}$$

Now, cyclist B will cross cyclist A after 2 h

i.e., 8 am + 2 h = 10 am

- 50.** Let the principle be ₹  $P$

Rate of interest =  $R\%$

Using formula of simple interest

$$\begin{aligned} \text{SI} &= \frac{P \times R \times T}{100} \\ 225 &= \frac{P \times R \times 3}{100}; \frac{225 \times 100}{3} = P \times R \end{aligned}$$

$$P \times 7500 \Rightarrow R = \frac{7500}{P}$$

Now, using formula of Amount for Compound interest

$$\text{CI} = P \left[ \left( 1 + \frac{R}{100} \right)^2 - 1 \right]$$

Putting value of CI and  $R$  calculated above

$$153 = P \left[ \left( 1 + \frac{7500}{P \times 100} \right)^2 - 1 \right]$$

$$\frac{153}{P} + 1 = \left( \frac{P + 75}{P} \right)^2$$

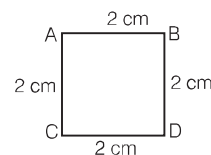
$$\frac{153 + P}{P} = \frac{(P + 75)^2}{P^2} \cdot P$$

$$\begin{aligned} (153 + P) &= P^2 + 150P + 5625 \\ 153P + P^2 &= P^2 + 150P + 5625 \\ 153P - 150P &= 5625 \end{aligned}$$

$$3P = 5625$$

$$P = \frac{5625}{3} = ₹ 1875$$

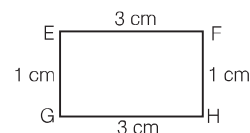
- 51.** Let side of square be = 2 cm



$\therefore$  Perimeter of square =  $4 \times 2 = 8$  cm

$\therefore$  Area of square,  $(S) = 2^2 = 4$  cm

Let length of a rectangle be 3 cm and breadth of rectangle be 1 cm.



$\therefore$  Perimeter of rectangle

$$= 2(3 + 1) = 8 \text{ cm}$$

$\therefore$  Area of rectangle =  $3 \times 1$

$$= 3 \text{ cm S} > R$$

## Railway Combined Pre. Exam Non-Technical Stage I 23

**52.** Cost price of B  

$$= \frac{100 - \text{Loss} \times \text{CP of A}}{100}$$

$$= \frac{(100 - 4) \times 40000}{100} = ₹ 38400$$
 Now, CP of B = ₹ 38400  
 B sell the computer to C at ₹ 40320  
 $\therefore$  SP for B = 40320  
 Now, profit per cent =  $\frac{\text{SP} - \text{CP}}{\text{CP}} \times 100$   

$$= \frac{40320 - 38400}{38400} \times 100 = 5\%$$

**53.** Let the cost price of shirt = ₹ x  
 Then, selling price at profit of 15%  

$$= \frac{(100 + \text{Profit}) \times \text{CP}}{100}$$

$$= \frac{(100 + 15) \times x}{100} = \frac{115x}{100}$$
 Similarly, selling price at per cent of 17%  

$$= \frac{(100 + 17) \times \text{CP}}{100}$$

$$= \frac{117 \times x}{100} = \frac{117x}{100}$$

Now, by given condition  

$$\frac{117x}{100} - \frac{115x}{100} = 3$$

$$\frac{117x - 115x}{100} = 3$$

$$\Rightarrow x = \frac{100 \times 3}{2} = ₹ 150$$

**54.**  $x = \sqrt{\frac{\sqrt{5} + 1}{\sqrt{5} - 1}}$   
 Multiply numerator and denominator by  $\sqrt{5} + 1$ ,  

$$= \sqrt{\frac{\sqrt{5} + 1}{\sqrt{5} - 1} \times \frac{\sqrt{5} + 1}{\sqrt{5} + 1}}$$

$$x = \sqrt{\frac{(\sqrt{5} + 1)^2}{5 - 1}} \quad x = \frac{\sqrt{5} + 1}{2}$$

Now,  $x^2 + x - 1$   

$$= \left(\frac{\sqrt{5} + 1}{2}\right)^2 + \frac{\sqrt{5} + 1}{2} - 1$$

$$= \frac{5 + 1 + 2\sqrt{5}}{4} + \frac{\sqrt{5} + 1}{2} - 1$$

$$= \frac{6 + 2\sqrt{5} + 2\sqrt{5} + 2 - 4}{4}$$

$$= \frac{4 + 4\sqrt{5}}{4} = 1 + \sqrt{5}$$

None of the options is correct.

**55.**  $x + 2y = 5$   
 $\Rightarrow x + 2y - 5 = 0 \dots(i)$   
 $3x + ky + 15 = 0 \dots(ii)$

For no solution,  

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

$$\frac{1}{3} = \frac{2}{k} \neq \frac{-5}{15}$$

$\therefore k = 6$   
 For the value of  $k = 6$ , these lines have no solution.

**56.** Increase in radius = 10 %  
 $\therefore$  Increase in area =  $\left(2a + \frac{a^2}{100}\right)\%$   
 (Here,  $a$  = increase in radius)  

$$= \left(2 \times 10 + \frac{(10)^2}{100}\right)\%$$

$$= (20 + 1)\% = 21\%$$

**57.** Required ratio  

$$= \frac{\text{Volume of hemisphere}}{\text{Volume of cylinder}} = \frac{\frac{2}{3}\pi r^3}{\pi r^2 h} = \frac{2}{3}$$
 $\therefore$  Ratio = 2 : 3 ( $\because r = h$ )

**58.** Volume of hemisphere =  $\frac{2}{3}\pi r^3$   
 Total surface area of hemisphere  

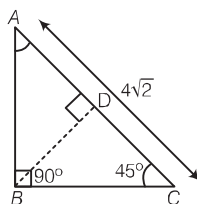
$$= 2\pi r^2 + \pi r^2 = 3\pi r^2$$
 Then, volume = total surface area  

$$\frac{2}{3}\pi r^3 = 3\pi r^2$$

$$r = \frac{9}{2} = 4\frac{1}{2} \text{ units}$$

**59.**  $x + y = 8$ ;  $xy = ?$   
 Greatest value of  $xy$  is when  $x = y$   
 Putting  $x = y$ ,  
 $x + y = 8$ ;  $y + y = 8$ ;  $2y = 8$ ;  $y = 4$   
 Also,  $x = 4$   
 $\therefore$  Greatest value of  $xy = 4 \times 4 = 16$

**60.**  $\angle A = 180^\circ - (\angle B + \angle C)$   
 (sum of angles of a triangle =  $180^\circ$ )



$$\angle A = 180^\circ - (90^\circ + 45^\circ)$$

$$= 180^\circ - 135^\circ = 45^\circ$$

Since,  $\angle A = 45^\circ$   
 $\therefore AB = BC$

(opposite sides are equal)  
 Now, using Pythagoras  
 $AB^2 + BC^2 = AC^2$   
 $AB^2 + AB^2 = (4\sqrt{2})^2$   
 $2(AB)^2 = 32$   
 $AB = \sqrt{16}$   
 $AB = 4 \text{ cm}$

Similarly, draw a perpendicular from B on line AC  
 Now,  $\angle ABD = 45^\circ$   
 $\therefore \angle ADB = 90^\circ$  and  $\angle A = 45^\circ$   
 $\therefore$  Again, using Pythagoras, also here

$$AD = BD$$

$$\Rightarrow AD^2 + BD^2 = (AB)^2$$

$$\Rightarrow BD^2 + BD^2 = (4)^2$$

$$\Rightarrow 2BD^2 = 16$$

$$\therefore BD = \sqrt{8} = 2\sqrt{2} \text{ units}$$

**61.**  $\sin^2 21^\circ + \sin^2 69^\circ$   

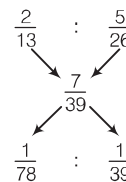
$$= \sin^2 21^\circ + [(\sin(90^\circ - 21^\circ))]^2$$

$$[\because \sin(90^\circ - \theta) = \cos \theta]$$

$$= \sin^2 21^\circ + \cos^2 21^\circ = 1$$

$$[\because \sin^2 \theta + \cos^2 \theta = 1]$$

**62.** Ratio of chromium in type 1 stainless steel =  $\frac{2}{13}$   
 Ratio of chromium in type 2 stainless steel =  $\frac{5}{26}$   
 Ratio of chromium in mixed type steel =  $\frac{7}{39}$



The required ratio  
 So, the required ratio =  $\frac{\frac{7}{39}}{\frac{1}{78}} = \frac{39}{1} = 39$

$\Rightarrow 1:2$

**63.** In afternoon 100 pages at 60 page/h  
 $\therefore$  Time taken to read 100 pages  

$$= \frac{100}{60} = 1.66 \text{ h}$$
 Similarly, in evening time taken  

$$= \frac{100}{40} = 2.5 \text{ h}$$

## 24 Railway Combined Pre. Exam Non-Technical Stage I

Now, average rate of reading  

$$= \frac{\text{Total Pages}}{\text{Total time taken}} = \frac{100 + 100}{1.66 + 2.5}$$

$$= \frac{200}{4.16} \approx 48 \text{ pages/h}$$

- 64.** Total runs scored in 10 innings =  $60 \times 10 = 600$

Let runs scored in 11th innings =  $x$   
 Now, total runs in 11 innings  

$$600 + x = 11 \times 62$$

$$\Rightarrow 600 + x = 682$$

$$\Rightarrow x = 682 - 600 = 82$$

- 65.** Gain = 13%; Total SP = 791000

Now CP =  $\frac{100 \times \text{SP}}{(100 + \text{Gain})}$   

$$= \frac{100 \times 791000}{(100 + 13)}$$

$$= \frac{79100000}{113} = ₹ 700000$$

Gain = SP - CP = 791000 - 700000 = ₹ 91000

- 66.** Decrease in sale = 80% from 2008 to 2009

Now, sales of 2010 are same as in 2008.

∴ Increase in sales =  $\left( \frac{100 \times a}{100 - a} \right) \%$

Here,  $a = 80\% = \left( \frac{100 \times 80}{100 - 80} \right)$   

$$= \frac{100 \times 80}{20} = 400\%$$

- 67.** P = 30000

$R = 7\%$   
 $CI = 4347$   
 $T = ?$

Using formula for compound interest

$$CI = P \left[ \left( 1 + \frac{R}{100} \right)^T - 1 \right]$$

$$\Rightarrow 4347 = 30000 \left[ \left( 1 + \frac{7}{100} \right)^T - 1 \right]$$

$$\Rightarrow \frac{4347}{30000} + 1 = \left( \frac{107}{100} \right)^T$$

$$\Rightarrow \frac{30000 + 4347}{30000} = \left( \frac{107}{100} \right)^T$$

$$\Rightarrow \frac{34347}{30000} = \left( \frac{107}{100} \right)^T$$

$$\Rightarrow \frac{11449}{10000} = \left( \frac{107}{100} \right)^T$$

$$\Rightarrow \frac{107 \times 107}{100 \times 100} = \left( \frac{107}{100} \right)^T$$

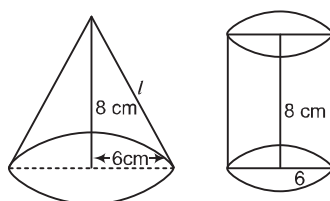
$$\Rightarrow \left( \frac{107}{100} \right)^2 = \left( \frac{107}{100} \right)^T$$

∴  $T = 2 \text{ yr}$

- 68.** Here, slant height,  $l = \sqrt{8^2 + 6^2}$   

$$= \sqrt{64 + 36}$$

$$= \sqrt{100} = 10$$



∴ Required ratio  

$$\frac{\text{Curved surface area of cylinder}}{\text{Curved surface area of cone}}$$

$$= \frac{2\pi rh}{\pi rl}$$

$$= \frac{2 \times \pi \times 6 \times 8}{\pi \times 6 \times 10} = \frac{8}{5} = 8:5$$

- 69.** Length of arc =  $\frac{\theta}{360^\circ} \times 2\pi r$   

$$= \frac{72^\circ}{360^\circ} \times 2 \times \frac{22}{7} \times 21$$

$$= \frac{1}{5} \times 2 \times 22 \times 3 = 26.4 \text{ cm}$$

- 70.**  $x = \sqrt{3} + \sqrt{2}$

$$\frac{1}{x} = \frac{1}{\sqrt{3} + \sqrt{2}} \text{ Rationalizing } \frac{1}{x}$$

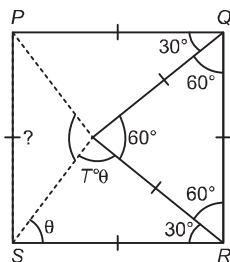
$$= \frac{1}{\sqrt{3} + \sqrt{2}} \times \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} - \sqrt{2}}$$

$$= \frac{\sqrt{3} - \sqrt{2}}{3 - 2} = \sqrt{3} - \sqrt{2}$$

∴  $x + \frac{1}{x} = \sqrt{3} + \sqrt{2} + \sqrt{3} - \sqrt{2}$   

$$= 2\sqrt{3}$$

- 71.**



In  $\Delta STR$ ,

Hence, it isosceles triangle

Then,  $\angle TSR = \angle RTS = \theta$

(∵ Angles opposite to equal sides of triangle)

Then,  $\theta + \theta + 30^\circ = 180$

$$2\theta = 180^\circ - 30^\circ$$

$$\theta = \frac{150^\circ}{2} = 75^\circ$$

Similarly, in  $\Delta PTQ$ ,  $\angle PTQ = 75^\circ$

Now,

$$\angle PTS + \angle STR + \angle PTQ + \angle QTS$$

$$= 360^\circ$$

$$\angle PTS = 360^\circ - 75^\circ - 75^\circ - 60^\circ$$

$$= 360^\circ - 210^\circ = 150^\circ$$

- 72.** Number of student who passed in first division

$$= \frac{54^\circ}{360^\circ} \times 360 = 54$$

- 73.** Number of student who passed in 2nd division

$$= \frac{162^\circ}{360^\circ} \times 360 = 162$$

Number of students who passed in 1st division = 54

∴ Difference = 162 - 54 = 108

- 74.** Total number of failed student

$$= \frac{36^\circ}{360^\circ} \times 360 = 36$$

∴ Total number of successful student = 360 - 36 = 324

∴ Required ratio = successful student : failed student

$$= 324 : 36 = 9 : 1$$

- 75.** Total number of failed student = 36  
 {calculated above}

∴ Percentage of failed student

$$= \left( \frac{\text{Total failed student}}{\text{Total student}} \times 100 \right) \%$$

$$= \left( \frac{36}{360} \times 100 \right) \% = 10\%$$

- 76.** As

$L \xrightarrow{+2} N$

$O \xrightarrow{-2} M$

$M \xrightarrow{-2} K$

Similarly,  $P \xrightarrow{+2} R$

$K \xrightarrow{-2} I$

$I \xrightarrow{-2} G$

- 77.** As, 5 and  $5^2 + 5 = 30$

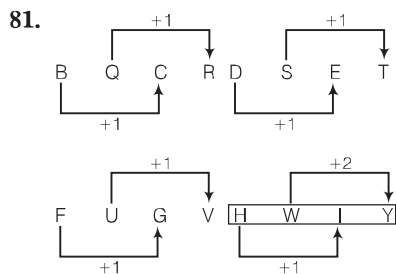
Similarly, 8 and  $8^2 + 8 = 69$

∴  $? = \boxed{69}$

- 78.** As, 'Illiteracy' is removed through 'Education'. Similarly, 'Drought' is removed from 'Rain'.

## Railway Combined Pre. Exam Non-Technical Stage I 25

79. Second thing is powered by first but in smoke-fire first is powered by second.
80. Except 7-29, in all others both numbers are divisible numbers while 7-29 both number are prime numbers.



∴ 'HWIY' is different from other three.

82. Meaningful order of the words are as follows  
 Foundation → Walls → Ceiling  
 (3) (4) (5)  
 → Plastering → Painting  
 (1) (2)

83. Dictionary order of the words are as follows

KNACK, KNIT, KNOB, KNOW  
 ∴ KNOB word will come in third place.

84.  $\underline{a} b c / \underline{c} \underline{b} a / \underline{a} b c / \underline{c} \underline{b} a / \underline{a} b c$   
 ⇒ a b c c

85. The pattern of series is
- 

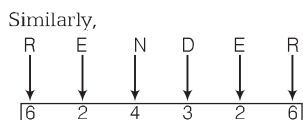
86. The pattern of series is
- 
- ∴ 130 will come in place of 120.

87. The only daughter of the father of her maternal uncle is Savitha's mother and Savitha's mother son is brother of Savitha.

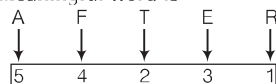
88. 'EXPIRE' word can be formed by using the given main word 'EXPERIENCE' because all letters are present in the main word.

89. Given equation,  $(16 - 4) \times 6 + 2 + 8 = 30$   
 From option (a), after interchanging signs  
 $(16 + 4) \times 6 - 2 + 8 = 30$   
 ⇒  $4 \times 6 - 2 + 8 = 30$   
 ⇒  $32 - 2 = 30$   
 ⇒  $30 = 30$

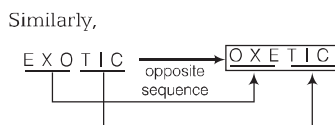
90. As,
- 



91. Meaningful word is



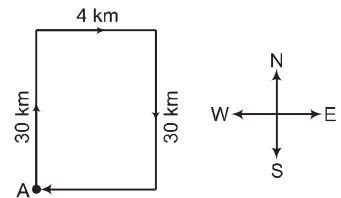
92. As,
- 



93. As,  $\sqrt{10 + 6} = \sqrt{16} = 4$  (first row)  
 and  $\sqrt{96 + 48} = \sqrt{144} = 12$   
 (second row)

Similarly,  
 $\sqrt{152 + 104} = \sqrt{256} = 16$  (third row)

94. Anita's walking directions are as follows

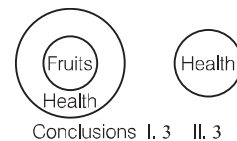


Hence, Anita is 4 km distance away from her starting point.

- 95.
- 

Hence, two persons (B and D) are to the right of E.

96. According to the statements,



Both follow.

97.  $n = \frac{4}{1} = 4$  inch

∴ Number of cubes have only one face painted  
 $= (n - 2)^2 \times 6 = (4 - 2)^2 \times 6 = 24$

98. Answer figure (d) will be the correct mirror image of the question figure.

- 99.
- 

100. Answer figure (d) will complete the question figure.

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