

**RRB Junior Engineer - 1st Stage Grand Test – RRB-JE-T1 – 190311**

**HINTS & SOLUTIONS**

**ANSWER KEY**

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

**HINTS & SOLUTIONS**

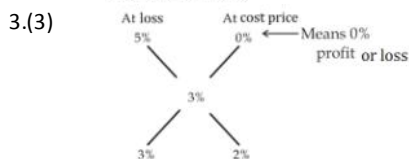
1.(4) Let, side of cube = 'a' unit  
Side of square = 'b' unit

Atq,  
 $12a = 4b$   
 $\Rightarrow b = 3a$

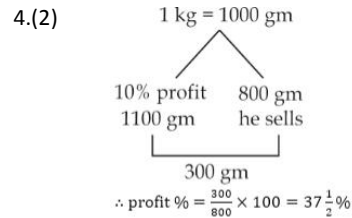
Again,  
Volume of cube = area of square  
 $a^3 = b^2$

$\left(\frac{b}{3}\right)^3 = b^2$   
 $\Rightarrow \frac{b^3}{27} = b^2$   
 $\Rightarrow b = 27$  units

2.(4)  $-70 + 28 \div (7 - 3)$   
 $= -70 + 28 \div 4$   
 $= -70 + 7 = -63$



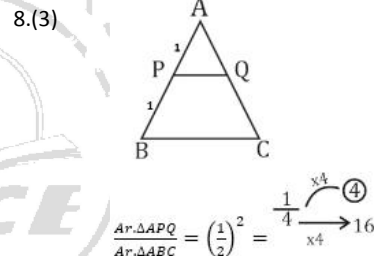
Ratio of quantity of tea sold at loss and cost price = 3 : 2  
 $\therefore$  Quantity of salt sold at cost price =  $\frac{2}{5} \times 40 = 16$  kg



5.(4)  $A = 3000 \left(1 + \frac{20}{200}\right)^3$   
 $= 3000 \left(\frac{11}{10}\right)^3$   
 $= 3000 \times \frac{1331}{1000} = Rs\ 3993$

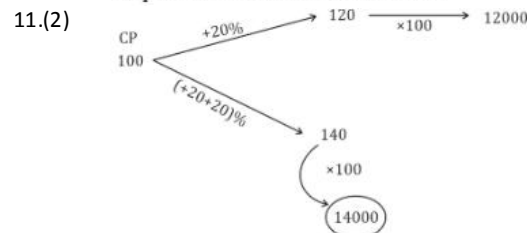
6.(3) Dipa : Neha  
 $6000 \times 7 : 7000 \times 6$   
 $42000 : 42000$

7.(3)  $X = \frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + \dots \dots \dots + \frac{1}{9} - \frac{1}{10}$   
 $X = \frac{1}{1} - \frac{1}{10}$



9.(2)  $\frac{160+120}{S_1+S_2} = \frac{7}{60 \times 60}$   
 $S_1 + S_2 = 40 \times 60 \times 60$   
 $= 144000$  cm/hr  
 $= 144$  km/hr

10.(1) Sum of first 100 numbers =  $\frac{100 \times 1001}{2} = 5050$   
Sum of first 50 numbers =  $\frac{50 \times 51}{2} = 1275$   
Now,  
Required sum =  $5050 - 1275 = 3775$



12.(2)  $[(0.83)^2 + (0.17)^2 + (0.83 \times 0.34)]^{2017}$   
 $\downarrow \quad \downarrow \quad \downarrow$   
 $a^2 \quad b^2 \quad 2ab$

Where  $a = 0.83, b = 0.17$   
 $= [(a + b)^2]^{2017} = [(1)^2]^{2017} = 1$

13.(4) The difference (298 – 18) will be completely divisible by a  
 $\therefore$  280 will be divisible  
By option (d) biggest value 70 divides 280

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14. (2)  $572 = 2 \times 2 \times 11 \times 13 \times 1$   
Possible ways are – 1 laptop to each, 2 laptop to each, 11 Laptop to each, 13, 4, 22, 26, 44, 52, 572, 143, 286.  
Total 12 ways possible.

15. (4)  $50.39 - 26.84 = 3 \times ?$   
 $? = 23.55/3 = 7.85$

16. (2)  $a^x = b^y = c^z = k \Rightarrow a = K^{\frac{1}{x}}$

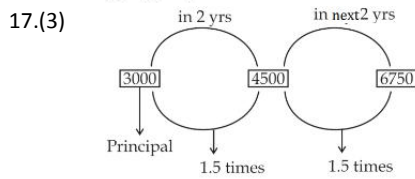
Similarly

$$b = K^{\frac{1}{y}}$$

$$c = K^{\frac{1}{z}}$$

$$K^{\frac{1}{x} + \frac{1}{y} + \frac{1}{z}} = k^0$$

$$\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0$$



18. (1)

$$\frac{8\sin\theta + 5\cos\theta}{\sin^2\theta + 2\cos^2\theta + 3\cos\theta} = \frac{8\tan\theta + 5}{\tan\theta \sin^2\theta + 2\cos^2\theta + 3}$$

$$= \frac{8\tan\theta + 5}{8\tan\theta + 5}$$

$$= \frac{2(\sin^2\theta + \cos^2\theta) + 3}{8\tan\theta + 5}$$

$$= \frac{2 \times 1 + 3}{8 \times 2 + 5} = \frac{5}{21}$$

19. (4) We know  $x + y + z = 0$ , then  $x^3 + y^3 + z^3 = 3xyz$

So,

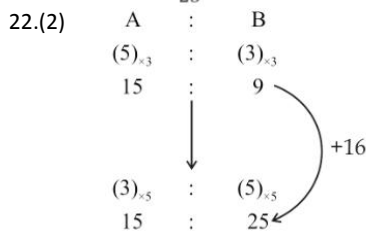
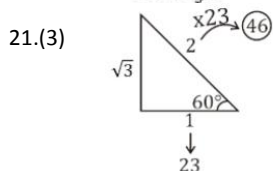
$$\frac{(a-b)^3 + (b-c)^3 + (c-a)^3}{3(a-b)(b-c)(c-a)} = 1$$

20. (3)

$$\frac{1}{\text{Time taken by Rohit}} = \frac{1}{10} - \frac{1}{15}$$

$$= \frac{6-4}{60} = \frac{2}{60} = \frac{1}{30}$$

= 30 days

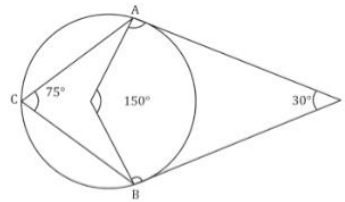


∴ 16 unit → 16 litre  
1 unit → 1 litre  
Quantity in the vessel = 15 + 25 = 40 litre

23. (2) Let speed of the motorboat in still water  $x$  km/h  
The speed of the motorboat along the stream =  $(x + 5)$  km/h  
Speed of the motorboat against the stream =  $(x - 5)$  km/h  
 $\therefore \frac{10}{x+5} + \frac{10}{x-5} = \frac{50}{60}$  hrs  
 $x = 25$  km/h

24. (1) 77% of overall product = 1331  
23% of overall product =  $\frac{1331}{77} \times 23 = \frac{121}{7} \times 23$   
Seven times =  $\frac{121}{7} \times 23 \times 7 = 121 \times 23$   
= 2783

25. (3)



Angle made by chord AB on the center is  $150^\circ$   
so angle made by same chord on circumference is half of that angle that means  $\angle ACB = 75^\circ$

26. (2)

Profit percent of company Y in 1997 = 35  
Let the income of company Y in 1997 be Rs  $x$  cr  
Then,  
 $35 = \frac{x-220}{220} \times 100 \Rightarrow x = 297$

27. (4)

Let the incomes of each of the two companies X and Y in 1999 be Rs  $x$   
And let the expenditure of companies X and Y in 1999 be  $E_1$  and  $E_2$  respectively.

Then, for company X we have  
 $50 = \frac{x-E_1}{E_1} \times 100 \Rightarrow x = \frac{150}{100} E_1$  ... (i)

Also for company Y we have  
 $60 = \frac{x-E_2}{E_2} \times 100 \Rightarrow x = \frac{160}{100} E_2$  ... (ii)

From (i) and (ii)

$$\frac{E_1}{E_2} = \frac{16}{15}$$

28. (1)

Let the income of company X in 1998 be Rs  $x$  crores

Then,  
 $55 = \frac{x-200}{200} \times 100 \Rightarrow x = 310$

∴ Expenditure of company  $x$  in 2001 = income of company X in 1998 = Rs 310 cr

Let the income of company X in 2001 be Rs  $z$  crore

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

∴ Income of company X in 2001 = Rs 465 cr

29. (3)

$$16 \times 21 \frac{6}{7} = \frac{16 \times 153}{7} = \frac{2448}{7} = 349 \frac{5}{7} \text{ m}$$

30. (4)

SP at 15% loss, =  $1200 \times \frac{85}{100}$   
= Rs 1020

Now,

SP after 5% reduction =  $\frac{1020 \times 95}{100}$   
= Rs 969

R : P = [2 : 1] × 3 = 6 : 3

R : K = [3 : 1] × 2 = 6 : 2

R : P : K = 6 : 3 : 2

P = 24 yrs

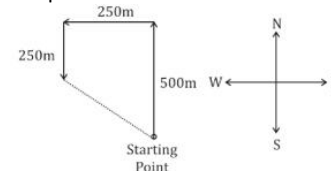
Kumar =  $\frac{24}{3} \times 2 = 16$  yrs

After 3 yrs = 19 yrs

32. (4)

The shaded region is in anti-clockwise direction of the given arrow. Therefore, position of shaded region should be upward.

33. (4)



She is in North-west from her starting point.

34. (4)

Sankranti is a festival celebrated in Andhra Pradesh. In same way, Onam is celebrated in Kerala.

35. (3)

As 'mat is cow'.

36. (4)

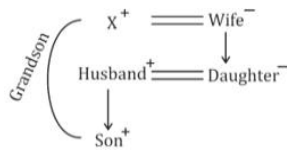
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37. (1)

38. (4)

Neither assumption I nor II is implicit.

39.(1)



40.(1)

41.(1)

42.(2)

P I P E  
16 9 16 5

Similarly,

S W A N  
19 23 1 14

'4' is the last digit of SWAN.

43.(2)

No of families owning a car =  $\frac{60 \times 30}{100} = 18$   
 Remaining =  $60 - 18 = 42$   
 50% of remaining families own motorcycle = 21  
 Remaining families that own bicycle =  $42 - 21 = 21$

44.(1)

Hammer is related to carpenter

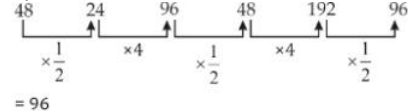
Similarly,

Wrench is related to plumber

45.(4)

Option (4) is different from other.

46.(3)

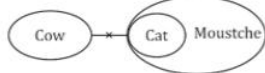


= 96

47.(3)

$3 \times 3 + 1 = 10$   
 $10 \times 10 + 1 = 101$   
 $101 \times 101 + 1 = 10202$

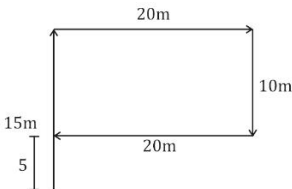
48.(4)



I. x  
 II. x

49.(3)

50.(1)



51.(4)

Correct order will be

Paleocene → Oligocene →

Pliocene → Pleistocene →

Holocene

Holocene being the current epoch

52.(4)

None of the statements is implicit.

53.(2)

$3^3 \rightarrow 27$   
 $4^3 + 1 \rightarrow 65$   
 Similarly,  $4^3 \rightarrow 64$   
 $5^3 + 1 \rightarrow 126$

54.(2)

Fish live in water but mountain means water, hence mountain is the correct answer.

55.(1)

$19 + 2 - 35 + 10 \times 6$   
 $= 19 + 2 + 35 + 10 - 6$   
 $= 19 + 2 \times \frac{35}{10} - 6$   
 $= 19 + 7 - 6 = 20$

56.(4)

Charter act of 1813 ended the monopoly of the East India Company in India, however the company's monopoly in trade with china and trade in tea with India was kept intact.

57.(1)

The Luni is a river of western Rajasthan state, India. It originates in the Pushkar valley of the Aravalli Range, near Ajmer and ends in the marshy lands of Rann of Kutch in Gujarat, after travelling a distance of 495 km. It is important river of Indian desert.

58.(4)

The ranks of coal quality are as follows anthracite, bituminous, lignite and peat. Anthracite is a hard, black, shiny form of coal that contains virtually no moisture and very low volatile content. Because of this, it burns with little or no smoke and is sold as a "smokeless fuel".

59.(1)

The first Chairman of Disinvestment Commission was GV Ramkrishna

60.(4)

The Indian Railways has named the indigenously manufactured Train 18 as Vande Bharat Express. The train is set to run between Delhi and Varanasi at a maximum speed of 160kmph.

61.(3)

The Alai Darwaza that translates to 'Alai Gate' was named after the first Khalji Sultan named Ala-ud-din Khalji (Khalji) of the Khalji dynasty in 1311 AD. It lies towards the southern end of the ancient Quwwat-UL-Islam Masjid within the Qutb Complex in South Delhi.

62.(3)

The brackish water lagoon or Chilika Lake of Odisha is largest coastal lagoon in India which is home to a number of threatened species of plants and animals. Chilika Lake is the second largest lagoon in the world and largest wintering ground for migratory birds, it also supports a unique life of marine, brackish and freshwater species.

63.(4)

Hutti Gold Mines also spelled as Hatti is a town in Raichur district in the Indian state of Karnataka.

64.(4)

The Lok Sabha (House of the People) is the Lower house of India's bicameral Parliament, with the Upper house being the Rajya Sabha. The maximum strength of the House of the people is 552 by the constitution. The maximum strength of the Upper house is 250 by the constitution.

65.(4)

Money in India consist of paper currency, current deposits, Metallic coins.

66.(2)

India is one of the richest countries in the world in terms of biodiversity. This natural variation in life is also reflected in the demography of the land. Aravali hills is not the biodiversity hot spot.

67.(3)

The Panchatantra is an ancient Indian collection of interrelated animal fables in Sanskrit verse and prose, arranged within a frame story. The surviving work is dated to about 300 BCE, it is written by Vishnu Sharma.

68.(3)

Dyarchy was first introduced in India under Montagu-Chelmsford reforms also known as Mont-Ford Reforms in 1919.

69.(3)

Under Article 324 of the Constitution of India, the Election Commission of India, interalia, is vested with the power of superintendence, direction and control of conducting the elections.

70.(3)

INS Trikand, a front-line warship of the Indian Navy, participated in a multinational training exercise 'Cutlass Express- 19', which was held from January 27 to February 6, 2019.

71.(1)

The Chemical formula of Cadmium Nitrate is  $Cd(NO_3)_2$ .

72.(1)

Crook Glass is a type of glass that contains cerium and other rare earths and has a high absorption of ultraviolet radiation; used in sunglasses.

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- 73.(2) Beryllium has atomic number 4. Beryllium loses 2 electrons to achieve noble gas electron configuration.
- 74.(2) The most prominent roles of mitochondria are to produce the energy currency of the cell, ATP (i.e., phosphorylation of ADP), through respiration, and to regulate cellular metabolism. This process is known as cellular respiration. It is for this reason that mitochondria are often referred to as the powerhouses of the cell.
- 75.(2) Pneumatophores are spongy erect roots extending above the surface of the water that facilitate the exchange of oxygen and carbon dioxide for the roots. Produced by a plant growing in water, pneumatophores are specialized root structures (above-ground spongy outgrowths of roots) that grow out from the water surface where inadequate oxygen required for normal respiration of the roots is present.
- 76.(2) The blood groups O+ and O- are universal donors. The only difference is in the recipients to whom the blood is transfused; O+ can be transfused to any positive blood groups, whereas O- is transfused to both positive as well as negative blood groups.
- 77.(1) Solanum is a large and diverse genus of flowering plants, which include food crops of high economic importance, the potato, brinjal and the tomato.
- 78.(4) Typhoid is caused by Salmonella Typhi bacteria. Other three are viral diseases.
- 79.(3) Magnetic resonance imaging (MRI) is a test that uses to make pictures of organs and structures inside the body.
- 80.(2) Lexicography is related to a glossary of language design, compilation, the evaluation of general dictionaries.
- 81.(4) Law of Conservation of Energy means Energy can neither be created nor be destroyed, rather it can only be transformed from one form to another.
- 82.(4) Graphite is soft and slippery because there are only weak inter molecular forces between its layers. Graphite is a good conductor of heat and electricity.
- 83.(3) This is because of a phenomenon is known as winter stratification in water bodies. In the winter season, the water at the top layer of water bodies will be ice cold (0°C) and are gradually frozen. But still, the bottom layers will have liquid water and maintain a temperature (4°C) which supports the life there. Thus, fishes and other aquatic animals are saved from the frozen top layer of water.
- 84.(2) The color of light is determined by its wavelength. Different colors have different wavelengths. The wavelength of red colour is largest and violet colour has shortest wavelength.
- 85.(2) Many of the nuclear reactors use graphite as a moderator. Graphite is not as effective as heavy water, but it is cheaper and it also has a low degree of neutron capture like heavy water.
- 86.(1) Liver is the largest gland in human body. It is also the largest (internal) organ in our body and can weigh up to 1.5 kg for a human adult. That is, about 1/50th of the body weight is because of liver.
- 87.(1) Insulin is a hormone made by the pancreas that allows your body to use sugar (glucose) from carbohydrates in the food that you eat for energy or to store glucose for future use. Insulin helps keeps your blood sugar level from getting too high or too low.
- 88.(3) Adrenaline is a hormone secreted by adrenal medulla during stress. This is called as emergency hormone because it initiates quick reaction which makes the individual to think and respond quickly to the stress.
- 89.(2) Webbed neck is a characteristic of Turner's syndrome.
- 90.(4) Nitrogen fixation is the process by which atmospheric nitrogen is converted either by a natural or an industrial means to a form of nitrogen such as ammonia.
- 91.(1) C.F.L. is short for Compact Fluorescent Lamp. CFL uses significantly less energy than traditional light bulbs (75% less).
- 92.(2) Blue light which has the least wavelength of all the visible radiations is scattered most. The blue appearance of the sky is due to scattering of sunlight from the atmosphere. Light of shorter wavelength is scattered by air molecules which because of their smaller size follow Rayleigh's scattering. Blue light is strongly scattered by the air molecules and reach the observer. This explains the blue colour of the sky.
- 93.(1) As per the WHO the safe noise level for a city is 45 decibel (db).
- 94.(4) Infrared waves are used to transmit radio and TV signals but some of them are using radio waves. Infrared is an electromagnetic radiation.
- 95.(1) The working principle of a washing machine is based on centrifugation force. The term centrifugal force is used to refer to an inertial force or fictitious force, particular to a particle moving on a circular path that has the same magnitude and dimensions as the force that keeps the particle on its circular path but the point in the opposite direction.
- 96.(1) Electromagnetic waves are propagated by oscillating electric and magnetic fields oscillating at right angles to each other. They are not deflected by electric or magnetic field. They can show interference or diffraction, are transverse waves, may be polarized and need no medium of propagation.
- 97.(3) Zacharias Janssen was a Dutch spectacle-maker from Middelburg associated with the invention of the first Optical telescope. He is also credited for inventing the first truly compound microscope.
- 98.(2) Super cooling is the process of chilling a liquid below its freezing point, without it becoming solid.
- 99.(2) The sextant is an instrument used to measure angles. Mainly used at sea, the tool is so named because its arc is one sixth of a circle – 60 degrees.
- 100.(4) Since, the projectile is fired at an angle, its velocity can be split into two components - horizontal( $V_x$ ) and vertical( $V_y$ ).
- $$V_x = v \cos \phi$$
- $$V_y = v \sin \phi$$
- Gravity is the only force acting on it. And it is acting downwards, so only the vertical component of the velocity is affected by this and the horizontal component remains constant.