

RRB Junior Engineer - 1st Stage Grand Test – RRB-JE-T1 – 190310

HINTS & SOLUTIONS

ANSWER KEY

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

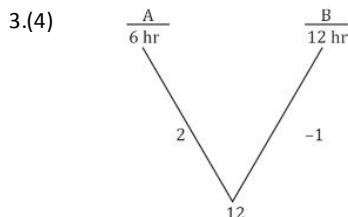
HINTS & SOLUTIONS

1.(1) Let age of Matt and his father be 'M' and 'F' resp.

Atq,
 $F - M = 26$... (i)
 $(F + 8) = 2(M + 8) - 2$
 $F + 8 = 2M + 14$
 $F - 2M = 6$... (ii)
 From (i) and (ii)
 $M = 20$ yrs

2.(1) $HCF \times LCM = 1^{st} \text{ no.} \times 2^{nd} \text{ no.}$

$12 \times 72 = 24 \times x$
 $\Rightarrow \frac{12 \times 72}{24} = 36$



Time = $\frac{12}{2-1} = 12$ hours

4.(4) $600 + L = \left(72 \times \frac{5}{18}\right) \times 180$

$L = 3600 - 600$
 $L = 3000$ meter = 3km

5.(4) By using formula of SIN C + SIN D

$= \frac{2 \sin 30^\circ \times \cos 10^\circ}{\cos 10^\circ} = 1$

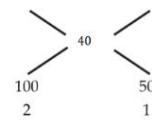
6.(4)

$\frac{2}{8}$	$\frac{3}{5}$	$\frac{8}{11}$	$\frac{12}{17}$
↓	↓	↓	↓
0.25	0.60	0.72	0.705

Biggest fraction

7.(4)

All question attempted Correctly	All Question Attempted Wrong
30×3	-2×30



\Rightarrow Total no. of question = 3 \rightarrow 30
 Correct questions \Rightarrow 2 \rightarrow 20
 Incorrect questions = 1 \rightarrow 10

8.(3) $(x_1, y_1) = (-5, 5)$ $m : n = 3 : 1$

$(x_2, y_2) = (7, -3)$

$x = \frac{m x_2 + n x_1}{m+n} = \frac{21-5}{4} = 4$

$y = \frac{m y_2 + n y_1}{m+n} = \frac{-9+5}{4} = -1$

Required co-ordinates = (4, -1)

9.(2) Let size of cube = 'x'

Atq,

Part of 5th friend = $x - \left(\frac{x}{8} + \frac{x}{6} + \frac{5x}{12} + \frac{x}{12}\right)$

$= x - \left(\frac{3x+4x+10x+2x}{24}\right)$
 $= \frac{5x}{24}$

10.(4)

	Ram	Shyam
Efficiency	2	1

Total work = $8 \times 1 = 8$

Days = $\frac{8}{2+1} = \frac{8}{3}$ days

11.(2) $A \times 2 = B \times 3$... (i)

$\Rightarrow A = \frac{3}{2}B$

& $B = 4C$

$C = \frac{B}{4}$

$A : B : C = \frac{3}{2}B : B : \frac{B}{4}$

$= \frac{3}{2} : 1 : \frac{1}{4}$

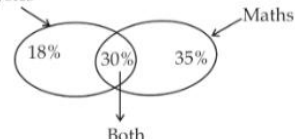
$= \frac{3 \times 2}{4} : \frac{4}{4} : \frac{1}{4}$

$= 6 : 4 : 1$

\therefore Share of B = $\frac{4}{11} \times \text{Rs } 297,000$

= Rs 1,08,000

12.(1) Physics



Total passed % = 30 + 35 + 18

= 83%

\therefore Total fail = (100 - 83)% = 17%

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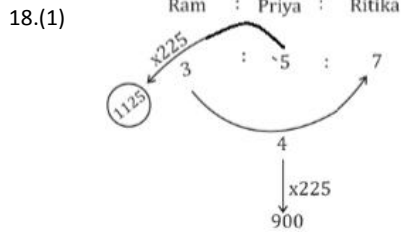
13.(3) $a^2 + \frac{1}{a^2} = 3$
 $a + \frac{1}{a} = \sqrt{9-4} = \sqrt{5}$
 Now,
 $a^3 + \frac{1}{a^3} = (\sqrt{5})^3 - 3\sqrt{5}$
 $= 5\sqrt{5} - 3\sqrt{5} = 2\sqrt{5}$

14.(3) Age of class teacher = $25 \times 16 - 24 \times 15$
 $= 400 - 360 = 40$ yrs

15.(4) $(x+1)^2 - x^2 = 1371$
 $2x+1 = 1371$
 $x = 685$
 Sum = $6+8+5=19$

16.(4) New average = $12 \times 7 = 84$

17.(2) $\frac{M_1 D_1}{W_1} = \frac{M_2 D_2}{W_2}$
 $\Rightarrow M_2 = \frac{M_1 D_1 W_2}{D_2 W_1} = \frac{45 \times 200 \times 7.5}{150 \times 4.5} = 100$ men
 $\Rightarrow M_2 = 100$
 Extra men = $100 - 45 = 55$ men
 Ram : Priya : Ritika



19.(1)

	Ist case	2nd case
Speed	4	5
Time	5	4

1 \rightarrow 36min

So, total distance = $\frac{36}{60} \times 5 \times 4 = 12$ km

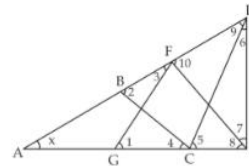
Now,
 In 2nd case time taken = $12/5 = 2\frac{2}{5} = 144$ min when he missed the train by 24 min.
 It means original time taken = 120 min = 2 hrs.

Now,
 Required speed = $\frac{12}{2} = 6$ km/hr

20.(4) $\frac{0.0432}{1.8} = \frac{4320}{180000} = 0.024$

21.(1) Let the distance covered by car be $3x$ km
 \therefore Average speed = $\frac{\text{total distance travelled}}{\text{Total time taken}}$
 $= \frac{\frac{3x}{10} + \frac{3x}{20} + \frac{3x}{60}}{\frac{3x}{60} + \frac{3x}{60} + \frac{3x}{60}}$
 $= \frac{3x \times 60}{10x} = 18$ km/h

22.(3)



$\because AB = BC$
 $\angle 4 = x$
 $\therefore \angle 2 = x + \angle 4$ (exterior angle)
 $= 2x$
 $\therefore \angle 9 = \angle 2 = 2x$ ($\because BC = CD$)
 $\therefore \angle 3 = x$ ($\because FG = GA$)
 $\therefore \angle 1 = x + \angle 3 = 2x$ (exterior angle)
 $\because EF = FG$ & $\angle 8 = \angle 1 = 2x$
 $\angle 5 = \angle A + \angle 9 = x + 2x = 3x$ (exterior angle)
 $\because CD = DE$ $\therefore \angle 7 + \angle 8 = \angle 5$
 $\Rightarrow \angle 7 = 3x - 2x = x$
 $\angle 10 = \angle A + \angle 8 = 3x$ (exterior angle)
 $\because DE = EF$ $\therefore \angle 9 + \angle 6 = \angle 10$
 $\Rightarrow \angle 6 = 3x - 2x = x$
 Now in $\triangle ADE$
 $\angle A + \angle D + \angle E = 180$
 $x + 3x + 3x = 180$
 $x = \frac{180}{7}$

23.(4) $x^2 - 6x + k = 0$ has two roots 2 and x

now,
 $\alpha + \beta = \frac{-b}{a}$
 $\Rightarrow 2 + x = 6$
 $\Rightarrow x = 4$

$\frac{x \times 8 \times 5}{100} = \frac{y \times 75 \times 6}{100 \times 10}$
 $\frac{x}{y} = \frac{75 \times 6}{8 \times 50} = \frac{9}{8}$
 $\Rightarrow x : y = 9 : 8$

25.(2)

26.(2)

27.(2)

Collection of movie c = 150
 Collection of movie (B + D + F) = 150

28.(3)

$= \frac{60}{100} (100 + 200)$
 $= 180$ crore

29.(4)

In $\triangle ABC$ and $\triangle AED$
 $\angle BAC = \angle DAE$
 $= 180 - (75^\circ + 65^\circ) = 40$
 $\angle AED = 75^\circ = \angle ABC$
 $\therefore \triangle AED \sim \triangle ABC$
 $\therefore \frac{DE}{BC} = \frac{AE}{AB} = \frac{AD}{AC} = \frac{2}{3} \Rightarrow AB = 18$ cm

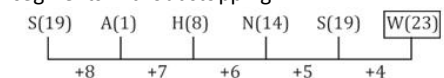
30.(3)

$T_3 - T_2 = \frac{\sin^3 \theta + \cos^3 \theta - (\sin^5 \theta + \cos^5 \theta)}{T_1}$
 $= \frac{(\sin^3 \theta - \sin^5 \theta) + (\cos^3 \theta - \cos^5 \theta)}{\sin \theta + \cos \theta}$
 $= \frac{\sin^3 \theta (1 - \sin^2 \theta) + \cos^3 \theta (1 - \cos^2 \theta)}{\sin \theta + \cos \theta}$
 $= \frac{\sin^3 \theta \cdot \cos^2 \theta + \cos^3 \theta \cdot \sin^2 \theta}{\sin \theta + \cos \theta}$
 $= \frac{\sin^2 \theta \cdot \cos^2 \theta (\sin \theta + \cos \theta)}{\sin \theta + \cos \theta}$
 $= \sin^2 \theta \cdot \cos^2 \theta$

31.(2)

The series follows the pattern of draw in three line segments without stopping.

32.(2)



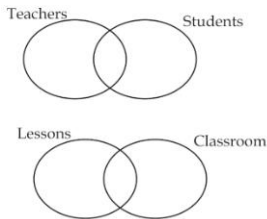
33.(2)

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34.(4)



35.(3) 3D structure of circle = sphere
3D structure of square = cube

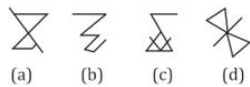
36.(3) + 3 series

37.(4) $1272/6 = 212$

$720/6 = 120$

38.(2) Both the conclusions do not logically follow the statement.

39.(3)



40.(1) As lawyer works cross-examining similarly, police work to enquiry about crimes.

41.(3) Clothes are kept in wardrobe. similarly, books are kept in bookcase.

42.(1) $5 \times 5 = 25$; $5 \times 7 = 35$
Similarly, $9 \times 5 = 45$; $9 \times 7 = 63$

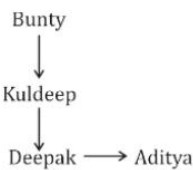
43.(1) 4 such pairs are possible which are A8, K6 Y0 and C1.

44.(2) $13 : 13 + 7 = 20 : 20 + 7 = 27$

Similarly,

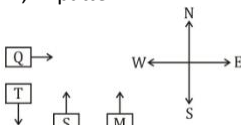
$18 : 18 + 7 = 25 : 25 + 7 = 32$

45.(3)

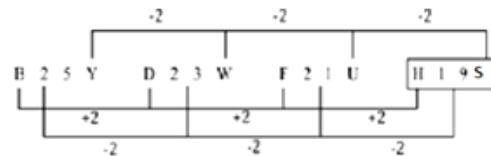


46.(1) +2, -2 pattern

47.(4)

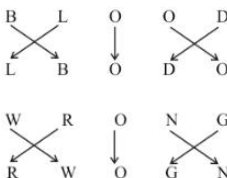


48.(4)



49.(2) All are different animals

50.(3)



51.(1) Input device comprises of mouse and keyboard

52.(1)

53.(2) Duck is a water bird

54.(2)

55.(3)

56.(1) Lord William Bentinck (1828-35) was the 1st Governor-General of British India. His tenure is known for the social reforms such as Abolition of Sati in 1829,

57.(2)

Suppression of Thugi, and Suppression of Infanticide etc. English was introduced as a medium of higher education, Charter act 1833 was passed by which East India Company ceased to be a trading company. Some corrective measures in civil services were taken. This seven years period was an epoch for administrative reforms in India.

The Fourth Buddhist Council was held at Kundalvana, Kashmir in 72 AD under the patronage of Kushan king Kanishka and the president of this council was Vasumitra, with Aśvaghosa as his deputy. This council distinctly divided the Buddhism into 2 sects Mahayana & Hinayana.

The iron and steel industry is one of the most important industries in India. Jamshedpur was the first city where iron and steel industry of India established by Jamsetji Nusserwanji Tata .

The Zonal Councils are the statutory bodies. They are established by an Act of the Parliament, that is, States Reorganisation Act of 1956. In India, at present, there are 6 Zonal Council. Originally five councils were created as per the States Reorganization Act 1956. Main objective of the Zonal Councils is to ensure cooperation between states.

Naomi Osaka won the women's singles 2019 Australian Open Tennis Tournament.

Megasthenes was born in Asia Minor and became an ambassador of Seleucus I Nicator of the Seleucid dynasty to Chandragupta Maurya in Pataliputra, India. Indica is an account of Mauryan India by Megasthenes.

The correctly matched list is as follows-
Battle of Haldighati - Akbar (against Rana Pratap)
Battle of Bilgram -Humayun (against Sher Shah)
Revolt of Khusrau - Jahangir
Battle of Khanwa -Babur

Tropical Grasslands are located near the equator, between the Tropic of Cancer and the Tropic of Capricorn. Most of the Tropical Grasslands are found in the interior part of continents between the Tropical Rain Forests and Tropical Deserts. Tropical Grasslands are also known as 'Savannas'.

The Attorney General for India is the Indian government's chief legal advisor. He has the right to speak and to take part in the proceedings of both the Houses of Parliament, but without a right to vote.

The Global Competitiveness Report (GCR) is a yearly report published by the World Economic Forum (WEF).

In South India rainfall decreases from the Western Ghats towards the East.

Rohtang Pass connects the valley of Kullu with Spiti and Lahaul.

Raja Todar Mal was Akbar's finance minister, who from 1560 onwards overhauled the revenue system in the kingdom.

The main federal features of the Indian Constitution are Written Constitution, Supremacy of the Constitution, Rigid Constitution, Division of Powers between federal and state government, Independent Judiciary, Bicameral Legislature and Dual Government Polity.

National Agricultural Cooperative Marketing Federation(NAFED) of India Ltd is an apex organization of marketing cooperatives for agricultural produce in India, under Ministry of Agriculture, Government of India.

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- 71.(1) A genetically engineered form of brinjal known as the BT-brinjal has been developed. The objective of this is to make it pest resistant. It is created by inserting a crystal protein gene from the soil bacterium *Bacillus thuringiensis* into the genome of various brinjal cultivars.
- 72.(2) The Origin of Species published on 24 November 1859, is a work of scientific literature by Charles Darwin which is considered to be the foundation of evolutionary biology.
- 73.(3) Penicillin is a secondary metabolite of certain species of *Penicillium* and is produced when growth of the fungus is inhibited by stress.
- 74.(4) DTP vaccine is a combination of vaccine that confers immunity to diphtheria, tetanus, and pertussis.
- 75.(3) Tetraethyl Lead (CH_3CH_2)₄Pb is the chief antiknock agent for automotive gasoline or petrol.
76. (2) Electrolyte substance used in a car battery is Sulphuric acid (H_2SO_4). It is a strong acid.
77. (1) Tri Nitro Glycerin (TNG) also known as Nobel Oil, is an explosive fluid.
78. (3) The use of natural gas in power generation provides a cleaner alternative to coal and other fossil fuels.
79. (4) Cloud seeding is the process of spreading either dry ice or more commonly silver iodide into the upper part of clouds to try to stimulate the precipitation process and form rain.
80. (2) The safety matchbox ignites due to the extreme reactivity of phosphorus with the potassium chlorate on the match head. Phosphorus is a highly reactive, non-toxic-chemical used for making the head of a matchstick.
- 81.(4) Ultrasonic waves cannot be polarised, ultrasonic wave is an example of sound wave and it cannot be polarised.
- 82.(3) The color of a star which varies from bluish white and yellow to orange and red is primarily due to its composition and effective temperature.
- 83.(2) An anemometer is a device that is used to measure wind speed. There are many different types of anemometers suited for different environments.
- 84.(2) Centripetal force is a real force that counteracts the centrifugal force and prevents the object from "flying out," keeping it moving instead with a uniform speed along a circular path.
- 85.(1) Ethane has chemical formulae is C_2H_6 .
- 86.(4) Trypsin is one of the three principal digestive proteinases. Trypsin acts with the other proteinases to break down dietary protein molecules to their component peptides and amino acids.
- 87.(1) The ancient Egyptians used Willow bark to produce aspirin as a remedy for aches and pains.
- 88.(3) The acid present in lemon is citric acid.
- 89.(4) Urea is an organic compound having chemical formula $(\text{NH}_2)_2\text{CO}$. Also called as Carbonic diamide. It is a colourless, odorless solid and highly soluble in water.
- 90.(4) Atomic number of Magnesium is 12. While Atomic number of Fluorine is 9, Neon is 10, Sodium is 11 and Aluminium is 13.
- 91.(1) Respiration is the process in which energy is released.
- 92.(1) The technique of collecting information about an object from a distance without making physical contact with it, is Remote Sensing.
- 93.(4) Wavelength of red colour is largest and violet colour has the shortest wavelength.
- 94.(3) The cooling by a desert cooler is based on evaporative cooling. These coolers are also known as swamp coolers.
- 95.(2) Most of the air conditioner uses compressed gas, which can cool the room or other places.
- 96.(1) Red has the maximum wavelength. During sunrise and sunset, the rays have to travel a larger part of the atmosphere because they are very close to the horizon. Therefore light other than red is mostly scattered away. Most of the red light which is least scattered enters our eyes. Hence, the sun and the sky appear red.
- 97.(2) A convex lens is thicker in the middle and thinner at the edges. Rays of light that pass through the lens are brought closer together. A convex lens is also called a converging lens. A convex lens is also used in reading glasses & it also used to remove the defect of farsightedness.
- 98.(1) The refractive or bending power of the cornea and humor is constant. However, that of the lens can be changed by changing its shape. That is making it more or less convex so that light can be properly focused on the retina. The greater the lens convexity or bulge the more bends the light. The flatter the lens, the less it bends that light.
- 99.(1) Concave mirror is used in the headlights of cars and in searchlights. A light placed at the focus of a concave lens can form a parallel beam and is used in car headlights and searchlights.
- 100.(1) Energy Consumption of 100 watt electric bulb which is used for 10 hours = 100×10
= 1000 watt hour
= 1 kilo watt hour
= 1 unit.
According to question the cost of 1 unit of electricity = Rs. 5