

Youth Competition Times
Railway Recruitment Board

RRB ALP
(Assistant Loco Pilot)
CBT Stage-Ist
SOLVED PAPERS

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Railway Recruitment Board

(Assistant Loco Pilot)-2024

Solved Papers with Explanation

Exam Date : 25-11-2024, Shift-I

1. Select the pair which follows the same pattern as that followed by the two pair given below. Both pairs follow the same pattern.

FIND : URMW

BENT : YVMG

(a) FILE : VROV

(b) HERO : SVIL

(c) BEAD : YVYW

(d) SAID : HZRV

Ans. (b) : Just as,

F	I	N	D
↓	↓	↓	↓
U	R	M	W

opposite letter

And

B	E	N	T
↓	↓	↓	↓
Y	V	M	G

opposite letter

same as,

H	E	R	O
↓	↓	↓	↓
S	V	I	L

opposite letter

2. Particles of matter are continuously moving due to their :

(a) nuclear energy

(b) kinetic energy

(c) chemical energy

(d) mechanical energy

Ans. (b) : Particles of matter are constantly in motion due to their kinetic energy. In all states of matter, particles are in constant motion, and at room temperature this is very rapid. Increasing temperature increases the kinetic energy of particles without weakening the forces between them.

3. Which of the following statements is/are related to ecosystem?

1. It consists of biotic components comprising living organisms

2. All green plants and certain bacteria are producers

3. Decomposers break-down complex organic into simple organic substance

(a) Only 1 and 3 (b) 1, 2 and 3

(c) Only 1 and 2 (d) Only 1

Ans. (b) : All organisms, such as plants, animals, microorganisms, and humans, interact with each other and maintain balance in nature. An ecosystem consists of both biotic and abiotic components. In decomposition, the complex organic components of detritus are converted by decomposers into carbon dioxide, water, and inorganic nutrients. Therefore, all three statements given above are related to ecosystems.

4. Electric devices like laundry iron, electronic toaster, electric oven, electric kettle and electric heater are based on which effect of electric current?

(a) Chemical effect

(b) Magnetic effect

(c) Physiological effect

(d) Heating effect

Ans. (d) : Electrical appliances such as irons, electric toasters, electric ovens, electric kettles, and electric heaters rely on the thermal effect of electric current. When an electric current flows through a wire, it heats up. This is called the thermal effect of electric current. The amount of heat generated by a wire depends on the material's metal, length, and thickness.

5. In which year did the Delhi High Court issue a notice regarding a plea for 33% reservation for women lawyers in Bar Council elections?

(a) 2023

(b) 2021

(c) 2024

(d) 2022

Ans. (c) : • In 2024, the Delhi High Court issued a notice on a petition seeking 33% reservation for women lawyers in bar council elections.

- The notice by the Delhi High Court signifies the judiciary's recognition of the need for gender equality in legal bodies.
- This plea was aimed at increasing the representation of Women in the Bar Council, ensuring gender diversity.

6. A man loses 20% of his money. After spending 25% of the remaining amount, he has ₹480 left. What is the amount of money he originally had?

(a) ₹800

(b) ₹600

(c) ₹720

(d) ₹840

Ans. (a) : Let's assume the principal amount = Rs. x

$$\therefore x \times \frac{80}{100} \times \frac{75}{100} = 480$$

$$x \times \frac{4}{5} \times \frac{3}{4} = 480$$

$$x \times \frac{12}{20} = 480$$

$$x = \text{Rs. } 800$$

7. The average of the first 25 multiples of 3 is:

(a) 39

(b) 36

(c) 30

(d) 25

Ans. (a) : The first 25 multiples of 3.
 3, 6, 9 75 (parallel series)
 First term (a) = 3
 last term (l) = 75
 Number of term (n) = 25

$$\begin{aligned} \text{The sum of the first 25 multiples of 3.} &= \frac{n}{2}(a+l) \\ &= \frac{25}{2}(3+75) \\ &= 975 \\ \text{Hence the required average} &= \frac{975}{25} \\ &= 39 \end{aligned}$$

8. If $9.6 : 16.8 :: 18 : x$, what is the value of x?
 (a) 20.4 (b) 25.5
 (c) 24.8 (d) 31.5

Ans. (d) : Given,
 $9.6 : 16.8 :: 18 : x$

$$\text{Fourth proportion (x)} = \frac{b \times c}{a}$$

$$x = \frac{16.8 \times 18}{9.6}$$

$$x = 31.5$$

9. The Government of India has come out with a new set of National Awards in the field of Science, Technology and Innovation known as 'Rashtriya Vigyan Puraskar' in categories.
 (a) two (b) four
 (c) three (d) five

Ans. (b) : The national science awards are one of the highest awards in the field of science, technology, and innovation. The National Science Awards ceremony was inaugurated on August 22, 2024, at the republic pavilion, rashtrapati bhavan, where president smt. Draupadi Murmu presented awards to 33 eminent scientists in four categories. Award categories:

1. Vigyan Ratna Award
2. Vigyan shri Award
3. Vigyan Yuva Shanti swarup Bhatnagar Award
4. Science Team Award.

10. The amount of force needed to accelerate a 10 kg mass at 2.5 m/s^2 is
 (a) 4 N (b) 7.5 N
 (c) 25 N (d) 12.5 N

Ans. (c) : The problem provides the following values:

- Acceleration (a) = 2.5 m/s^2
- Mass (m) = 10 kg

10 kg force required to accelerate the mass
 $(F) = ma$
 $= 2.5 \times 10 = 25 \text{ Newton}$

11. A 3-digit number is such that its units digit, tens digit and hundreds digit are in the ratio 2 : 3 : 4. The sum of this number and the number obtained by reversing its digits is 1332. Find the positive difference between the 3-digit number and the number formed by reversing its digit.
 (a) 594 (b) 323
 (c) 396 (d) 414

Ans. (c) : From the question, let the unit's digit, ten's digit and hundreds digit be $2x$, $3x$ and $4x$ respectively.

$$\begin{aligned} \text{Number} &= 400x + 30x + 2x = 432x \\ \text{Number obtained on reversing the number} &= 200x + 30x + 4x = 234x \end{aligned}$$

According to the question,

$$\begin{aligned} 432x + 234x &= 1332 \\ 666x &= 1332 \\ x &= 2 \end{aligned}$$

∴ Positive difference between the 3 digit number and the number obtained by reversing its digits = $432x - 234x$

$$\begin{aligned} &= 198x \\ &= 198 \times 2 \\ &= 396 \end{aligned}$$

12. In case of jelly, which of the following is the dispersed phase?

- (a) Both solid and liquid phase
- (b) Gas phase
- (c) Solid phase
- (d) Liquid phase

Ans. (d) : A colloidal solution is a heterogeneous system in which very fine particles of one substance (dispersed phase) are dispersed in another substance called the dispersion medium.

- In Jelly, the dispersed phase is the liquid phase while the dispersion medium is the solid phase.
- The liquid phase in Jelly provides the fluidity and moisture content of the gel.

During the jelly-making process, the liquid phase solidifies upon cooling forming a semi-solid structure.

13. If $x + \frac{1}{x} = 5$, then $x^2 + \frac{1}{x^2} = ?$
 (a) 25 (b) 24
 (c) 23 (d) 26

Ans. (c) : Given,

$$x + \frac{1}{x} = 5$$

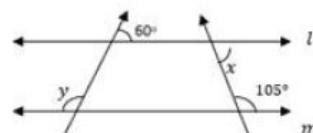
Squaring both sides,

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

$$x^2 + \frac{1}{x^2} + 2 = 25$$

$$x^2 + \frac{1}{x^2} = 23$$

14. In the adjoining figure line l is parallel to line m . What is the value of $x + 2y$?



- (a) 340°
- (b) 225°
- (c) 270°
- (d) 315°

(Note: Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

X : 346 :: 9 : Y

- (a) X = 8, Y = 756
- (b) X = 5, Y = 612
- (c) X = 7, Y = 732
- (d) X = 6, Y = 729

Ans. (c) : Just as,

$$X : 346 \rightarrow (X)^3 + 3 = 346$$

$$(X)^3 = 346 - 3$$

$$X^3 = 343$$

$$X = 7$$

Same as,

$$9 : Y \rightarrow (9)^3 + 3 = Y$$

$$729 + 3 = Y$$

$$\therefore Y = 732$$

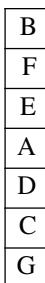
21. Seven boxes A, B, C, D, E, F and G are kept one over the other but not necessarily in the same order. D is kept third from the bottom. Only one box is kept between F and A. Only three boxes are kept between G and E. B is kept immediately above F. E is kept on one of the positions above D.

How many boxes are kept between E and C?

- (a) One
- (b) None
- (c) Two
- (d) Three

Ans. (c) : According to question,

The order in which the boxes are placed is as follows.



So, there are two boxes between E and C.

22. Refer to the given number and symbol series and answer the question that follows. Counting to be done from left to right only. How many such symbols are there, each of which is immediately preceded by an even number and also immediately followed by an even number? (Left) 2 & % 4 6 @ & 3 Ω 9 # 1 * 8 £ 6 1 7 # (Right)

- (a) None
- (b) One
- (c) Two
- (d) More than two

Ans. (b) : Given

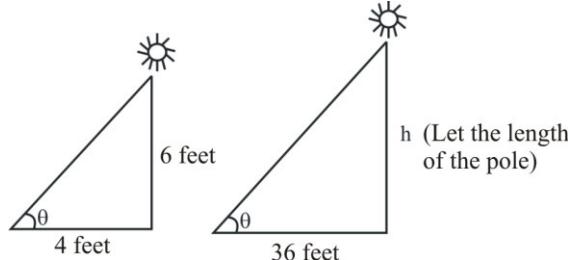
(Left) 2 & % 4 6 @ & 3 Ω 9 # 1 * 8 £ 6 1 7 # (Right)

So, there is only one such pair in the series 8 £ 6

23. At a particular time during the day, owing to the position of the sun, a 6 feet tall man casts a shadow of 4 feet, where was a pole next to the man casts a shadow of 36 feet. What is the height of the pole?

- (a) 56 feet
- (b) 54 feet
- (c) 63 feet
- (d) 60 feet

Ans. (b) : Separately.



∴ The distance between the pole and the person is not clear here. Therefore, their figures are drawn separately.

$$\therefore \tan \theta = \frac{6}{4} \quad \dots(i)$$

$$\tan \theta = \frac{h}{36} \quad \dots(ii)$$

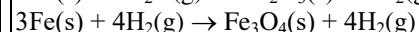
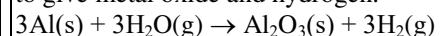
From (i) and (ii)

$$\frac{6}{4} = \frac{h}{36} \Rightarrow h = 54 \text{ feet}$$

24. Which of the following options represents metals that do not react with cold water?

- (a) Sodium, calcium and zinc
- (b) Sodium, iron and potassium
- (c) Sodium, calcium and potassium
- (d) Aluminium, iron and zinc

Ans. (d) : Metals like aluminium, iron and zinc do not react with either cold or hot water, but react with steam to give metal oxide and hydrogen.



Metals like lead, copper, silver and gold do not react with water at all.

25. In a certain code language, 'FROM' is coded as '4935' and 'MORE' is coded as '3154'. What is the code for 'E' in the given code language?

- (a) 5
- (b) 1
- (c) 9
- (d) 3

Ans. (b) : According to question,

Given,

F (R) (O) (M) → (4) 9 (3) (5)

(M) (O) (R) E → (3) 1 (5) (4)

Hence, it is clear that E will be written as 1 in the same code language.

26. Which Indian personality played the female protagonist in the movie Sister Midnight, showcased at the Cannes Film Festival in 2024?

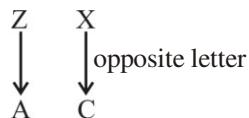
- (a) Radhika Apte
- (b) Kriti Sanon
- (c) Aditi Rao Hydari
- (d) Taapsee Pannu

Ans. (a) : Indian actress Radhika apte plays the lead role in the film sister midnight, which premiered at the 2024 cannes film festival. The film follows the lives of a couple living in a mumbai slum.

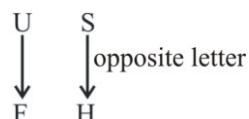
27. ZX is related to AC in a certain way. In the same way, US is related to FH. To which of the following options is PN related, following the same logic?

(a) KO (b) LM
(c) KM (d) ML

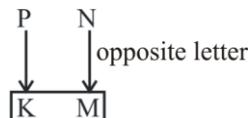
Ans. (c) : Just as,



and,

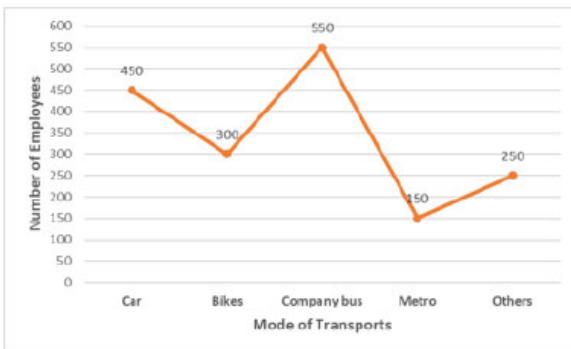


Some as,



28. Study the given graph and answer the question that follows.

The graph shows the number of employees who used different modes of transport in the year 2010.



What is the respective ratio between the number of employees who used Bike to the number of employees who used Metro?

(a) 4 : 5 (b) 2 : 1
(c) 3 : 2 (d) 5 : 2

Ans. (b) :

Numer of employees using bike = 300

Number of employees using metro = 150

$$\therefore \text{Required ratio} = 300 : 150 \\ = 2 : 1$$

29. If each vowel in the word CONSTRUCTION is changed to the letter following it in the English alphabetical order and each consonant is changed to the letter preceding it in the English alphabetical order, then which of the following letters will be sixth from the right in the group of letter thus formed?

(a) S (b) B
(c) Q (d) V

Ans. (d) : Given word,

CONSTRUCTION

According to question,

B P M R S Q V B S J P M

sixth from the right

Therefore, it is clear that V is sixth from the right.

30. Select the number from among the given options that can replace the question mark (?) in the following series

26 78 36 108 66 198 ?

(a) 128 (b) 164
(c) 142 (d) 156

Ans. (d) : The given series is as follows-

26 78 36 108 66 198 156

↓ ↓ ↓ ↓ ↓ ↓ ↓

×3 -42 ×3 -42 ×3 -42

So, ? = 156

31. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster does not belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter cluster)

(a) RUY (b) KNS
(c) EHM (d) JMR

Ans. (a) : According to the options,

(a) R $\xrightarrow{+3} U \xrightarrow{+4} Y$
(b) K $\xrightarrow{+3} N \xrightarrow{+5} S$
(c) E $\xrightarrow{+3} H \xrightarrow{+5} M$
(d) J $\xrightarrow{+3} M \xrightarrow{+5} R$

So, it is clear that option (a) is different from all the Others.

32. Which natural disaster triggered storms, flash floods, and landslips in the northeastern states of India in 2024?

(a) Cyclone Remal
(b) Cyclone Yaas
(c) Cyclone Amphan
(d) Cyclone Fani

Ans. (a) : Cyclone Remal caused a natural disaster in India's northeastern states in 2024, triggering storm surges, flash floods, and landslides. Remal was added to Oman's list of tropical cyclones. Remal means sand in Arabic.

33. Which of the following numbers is divisible by 11?
 (a) 9248164 (b) 7247564
 (c) 9246864 (d) 8245964

Ans. (c) : Divisibility rule by 11-

∴ If the difference between the sum of the digits at odd places and the sum of the digits at even places of a number is 0 or is divisible by 11, then the given number will also be divisible by 11

∴ From option (c),

$$9246864 \rightarrow (9 + 4 + 8 + 4) - (2 + 6 + 6) \\ = 25 - 14 = 11$$

Hence, it is clear that 9246864 is completely divisible by 11.

34. Traits can be influenced by

(a) by both paternal DNA and maternal DNA
 (b) only paternal DNA
 (c) only maternal DNA
 (d) only maternal grandparent DNA

Ans. (a) : The laws of inheritance of traits in human are based on the fact that both parents pass on equal amounts of genetic material to their offspring. This means that each trait can be influenced by both the fathers and mothers DNA.

35. Find the compound interest on ₹11,000 in 2 years at 4% p.a., interest compounded yearly.
 (a) ₹875.80 (b) ₹906.50
 (c) ₹786.60 (d) ₹897.60

Ans. (d) : $C.I = \text{amount} - \text{principal}$

$$= 11000 \left(1 + \frac{4}{100} \right)^2 - 11000 \\ = 11000 \left[\frac{26}{25} \times \frac{26}{25} - 1 \right] = 11000 \left[\frac{676 - 625}{625} \right] \\ = 11000 \times \frac{51}{625} \\ = ₹897.60$$

36. If 'I' stands for '+', 'J' stands for 'x', 'K' stands for ' \div ' and 'L' stands for ' $-$ ', what will come in place of the question mark '?' in the following equation?

$$38 I (3 J 4) L (16 K 2) I 11 = ?$$

(a) 34 (b) 47
 (c) 61 (d) 53

Ans. (d) : Given,

$$I \rightarrow +$$

$$J \rightarrow \times$$

$$K \rightarrow \div$$

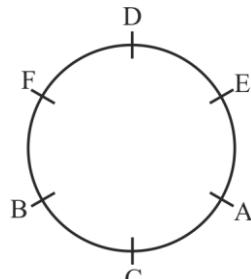
$$L \rightarrow -$$

$$\therefore 38 I (3 J 4) L (16 K 2) I 11 = 38 + (3 \times 4) - (16 \div 2) + 11 \\ = 38 + 12 - 8 + 11 \\ = 50 - 8 + 11 \\ = 61 - 8 = 53$$

37. A, B, C, D, E and F are sitting around a circular table facing the center. B sits second to the right of D. A is an immediate neighbour of E and C. E sits second to the left of F. What is the position of F with respect to B?

(a) Third to the right
 (b) Immediate right
 (c) Immediate left
 (d) Second to the left

Ans. (c) : According to question,



Hence, it is clear from the diagram that the position of F with respect to B is on the immediate left.

38. A car covers four successive 3 km stretches at speeds of 10 km/h, 20 km/h, 30 km/h and 60 km/h, respectively. Its average speed over this distance is

(a) 30 km/h (b) 15 km/h
 (c) 20 km/h (d) 25 km/h

Ans. (c) :

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time taken}}$$

$$\text{Average speed of the car} = \frac{3 + 3 + 3 + 3}{\frac{3}{10} + \frac{3}{20} + \frac{3}{30} + \frac{3}{60}} \\ = \frac{\frac{3 \times 4}{60}}{\frac{3(6+3+2+1)}{60}} \\ = \frac{4 \times 60}{12} = 20 \text{ km/h}$$

39. A series of compounds in which the same functional group substitutes for hydrogen in a carbon chain is called

(a) catenation
 (b) isomers
 (c) heterologous series
 (d) homologous series

Ans. (d) : A series of compounds in which the same function group replaces hydrogen at the carbon position in the chain is called a homologous series. As molecular mass increases in a homologous series, a gradation in physical properties is observed. This occurs because melting and boiling points increase with increasing molecular mass. Examples of homologous series are - CH_3OH , $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_3\text{H}_7\text{OH}$ and $\text{C}_4\text{H}_9\text{OH}$!

40. Read the given statements and conclusions carefully. You have to take the given statements to be true even if they seem to be at variance from commonly known facts and decide which conclusion(s) logically follow(s) from the given statements

Statements

All fishes are birds

All birds are animals

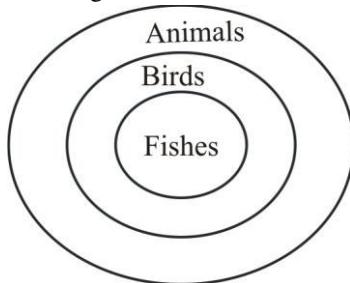
Conclusions

I. All animals are fishes

II. Some birds are fishes

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

Ans. (b) : According to statements.



Conclusions → I - ✗

II - ✓

Hence, it is clear from the above venn-diagram that only conclusion II follows.

41. Cranial nerves arising from the brain and spinal nerves arising from the spinal cord together constitute the:

- (a) peripheral nervous system
- (b) autonomic nervous system
- (c) central nervous system
- (d) endocrine system

Ans. (a) : The cranial nerves that arise from the brain and the spinal nerves that arise from the spinal cord together from the peripheral nervous system.

The human nervous system is divided into two parts: the central nervous system and the peripheral nervous system. The peripheral nervous system is divided into two parts:

1. The somatic nervous system
2. Autonomic nervous system.

42. If the HCF and the LCM of two numbers are 7 and 245, respectively, then their product is:

- (a) 1517
- (b) 1175
- (c) 1751
- (d) 1715

Ans. (d) : Given-

$$\text{HCF} = 7$$

$$\text{LCM} = 245$$

We know that

$$\text{LCM} \times \text{HCF} = \text{product of two numbers}$$

Hence, the product of the two numbers = $245 \times 7 = 1715$

43. The atomic number of an atom is equal to the

- (a) total number of protons present in the nucleus of an atom
- (b) sum of the number of electrons and that of neutrons
- (c) half of the number of electrons present in the nucleus of an atom
- (d) sum of the number of protons and that of neutrons

Ans. (a) : The atomic number of an atom is equal to the total number of protons in the nucleus of the atom. It is denoted by 'Z'. All atoms of an element have the same atomic number. For hydrogen, Z=1 because the nucleus of a hydrogen atom contains only one proton.

44. In a certain code language,

$A + B$ means 'A is the brother of B',

$A - B$ means 'A is the son of B',

$A \times B$ means 'A is the wife of B' and

$A \div B$ means 'A is the father of B'

Based on the above, how is Q related to S if $P - Q \div R \times S + T$?

- (a) Husband's brother
- (b) Wife's father
- (c) Wife's brother
- (d) Father

Ans. (b) : According to the question,

On establishing the relationship diagram in the given expression,



Hence, it is clear from the above diagram that Q is the father S wife.

45. Evaluate the given expression

$$2^3 \times (-9)^0 \times 3^3$$

- (a) 81
- (b) 216
- (c) 36
- (d) 9

Ans. (b) : $2^3 \times (-9)^0 \times 3^3$

$$= 8 \times 1 \times 27 = 216$$

46. If each vowel in the word REALISM is changed to the letter following it in the English alphabetical order and each consonant is changed to the letter following it in the English alphabetical order and then arrange in reverse order of English alphabetical order, then which of the following letters will be fourth from the left in the group of letter thus formed?

- (a) N
- (b) F
- (c) J
- (d) M

Ans. (d) :

According to the question,

After interchanging the position of vowels and consonants,

S F B M J T N

(Left) T S N M J F B (Right)

Hence, it is clear that M is fourth from the left.

55. Match the following

A. The swollen bottom part of the pistil is	1. stigma
B. The middle elongated part of the pistil is	2. ovule
C. The terminal part of the pistil is	3. ovary
D. The ovary contains	4. style

A	B	C	D
(a) 3	4	1	2
(b) 1	4	3	2
(c) 2	3	1	4
(d) 3	2	1	4

Ans. (a) : Correctly Matched:-

The Swollen lower part of the pistil	Ovary
The long central part of the pistil	style
The top part of the pistil	stigma
Ovary	Ovule

56. Twinkling of stars is related to the phenomenon of

- (a) interference of light
- (b) reflection of light
- (c) refraction of light
- (d) dispersion of light

Ans. (c) : Twinkling of stars is mainly due to refraction when a ray of light travels from one medium to another it bends', this phenomenon is referred to as refraction.

phenomena caused by the refraction of light:

A straight rod partially immersed in a liquid appears crooked.

Stars appear to twinkle.

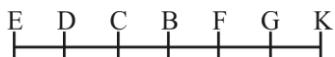
The sun is visible before sunrise and after sunset. A fish submerged in water appears to be raised slightly above its actual depth.

57. Seven people, B, C, D, E, F, G and K, are sitting in a straight line, facing north. Only three people sit to the left of B. Only K sits to the right of G. Only three people sit between G and D. C sits at some place to the left of F but at some place to the right of E.

How many people sit between E and F?

- (a) One
- (b) Four
- (c) Three
- (d) Two

Ans. (c) : According to the question, the order in which the seven people sit facing north is as follows:



So, it is clear that three people sit between E and F

58. In which state is the Gingee Fort, which was recently nominated for the UNESCO World Heritage status, located?

- (a) Gujarat
- (b) Rajasthan
- (c) Karnataka
- (d) Tamil Nadu

Ans. (d) : Recently the Gingee fort in Tamil Nadu's Villupuram district has been nominated for UNESCO'S world Heritage site list as part of the Maratha Military Landscapes proposal. which includes 11 other forts.

- Gingee Fort is renowned for its historical importance and strategic location a top three hillocks: Rajagiri, Krishnagiri, and chandragiri.
- It is also known as the "Troy of the East", as it is one of the most impregnable fortresses in peninsular India.

59. In the Union Budget 2024, which initiative did the Finance Minister announce to enhance productivity in agriculture?

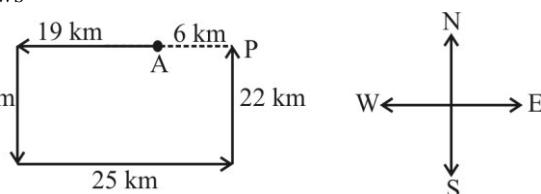
- (a) Introduction of genetically modified crops
- (b) Expansion of irrigation facilities nationwide
- (c) A new subsidy program for farmers
- (d) A comprehensive review of the agriculture research setup

Ans. (d) : In the Union Budget 2024, finance minister nirmala sitaraman announced a comprehensive review of the agricultural research system and initiatives to increase productivity in agriculture and focus on developing climate-resilient varieties. As part of measures to increase productivity and resilience in agriculture, the union budget 2024-25 announced several measures, including an emphasis on agricultural research, promotion of natural farming, and a national cooperative policy.

60. Brinda starts from point A and drives 19 km towards West. She then takes a left turn, drives 22 km, turns left and drives 25 km. She takes a final left turn, drives 22 km and stops at point P. How far (shortest distance) and towards which direction should she drive to reach point A again? (All turns are 90 degrees turns only unless specified)

- (a) 7 km towards the West
- (b) 7 km towards the South
- (c) 6 km towards the West
- (d) 6 km towards the East

Ans. (c) : As per the question, the path of Brinda is as follows



So, it is clear from the figure diagram that to reach point A again Bindra has to drive 6 km, towards west.

61. The average height of 50 pupils in a class is 150 cm. Five of them whose average height is 146 cm, leave the class and five others whose average height is 156 cm, join. The new average height of the pupils of the class (in cm) is

- (a) 152
- (b) 153
- (c) 151
- (d) 149

Ans. (c) : Sum of heights of 50 students = 50×150
 $= 7500 \text{ cm}$

Let new average height = $(150 + x)$

As per question,

$$7500 - 5 \times 146 + 5 \times 156 = (150 + x) \times 50$$

$$7500 - 5(146 - 156) = 7500 + 50x$$

$$5 \times 10 = 50 \times x$$

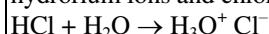
$$x = \frac{50}{50} = 1$$

$$\therefore \text{New average height} = (150 + x) = 151 \text{ cm}$$

62. Which of the following is produced when hydrochloric acid reacts with water?

- (a) Both H_3O^+ and Cl^-
- (b) Both HO^- and Cl^-
- (c) Only Cl^-
- (d) Only H_3O^+

Ans. (a) : When Hydrochloric acid reacts with water, hydronium ions and chloride ions are obtained.



63. In the case of reflection of the light from a convex mirror, when a parallel beam of light is incident on the reflecting surface, reflected light

- (a) appears to converge at the principal focus
- (b) appears to diverge from the principal focus
- (c) appears to converge at the center of curvature
- (d) appears to diverge from the center of curvature

Ans. (b) : In case of reflection of light from a convex mirror, when a parallel ray of light is incident on the reflecting surface, the reflected light appears to diverge from the principal focus.

64. The sum of two numbers is 36. Five times one number is equal to 4 times the other. The greater of the two numbers is:

- (a) 20
- (b) 12
- (c) 16
- (d) 15

Ans. (a) : Let the first number = x

second number = $(36 - x)$

As per question,

$$x \times 5 = (36 - x) \times 4$$

$$5x + 4x = 36 \times 4$$

$$9x = 36 \times 4$$

$$x = 16 \text{ (first number)}$$

$$\therefore \text{second number} = 36 - x = 36 - 16 = 20$$

it is clear that the largest number among the two numbers is 20.

65. Which of the following devices does not utilize the magnetic effects of electric current?

- (a) Magnetic compass
- (b) Electric generator
- (c) Electric motor
- (d) Microphone

Ans. (a) : A magnetic compass does not use the magnetic effect of electric current. A magnetic compass has a magnetized needle that always points north or south. A compass is an instrument used for navigation and orientation that indicates relative to geographical directions.

66. A man bought a number of oranges at 3 for a rupee and an equal number at 2 for a rupee. At what price per dozen should he sell them to make a profit of 20%?

- (a) ₹6
- (b) ₹5
- (c) ₹7
- (d) ₹4

Ans. (a) : ∵ A person buys equal number of oranges at the rate of 3 for Rs. 1 and 2 for Rs. 1.

∴ Cost of 2 dozen oranges bought by the person

$$= 12 \times \frac{1}{3} + 12 \times \frac{1}{2}$$

$$= ₹10$$

$$\text{cost of 1 dozen oranges bought by the person} = \frac{10}{2} = ₹5$$

$$\therefore \text{Selling price to make a profit of 20\%} = 5 \times \frac{120}{100}$$

$$= ₹6$$

67. Which cell organelle is associated with generation of ATP?

- (a) Lysosomes
- (b) Mitochondria
- (c) Chloroplast
- (d) Endoplasmic reticulum

Ans. (b) : ATP is produced in mitochondria. Their number in the cell is not fixed. Oxidation of energy-rich organic substances occurs in mitochondria, which provides a significant amount of energy. Therefore, Mitochondria are called the power house of the cell. Mitochondria divide by fission.

68. Dr. Shankarbaba Pundlikrao Papalkar is known for his dedication to improving the lives of:

- (a) those receiving education
- (b) farmers
- (c) disabled and destitute children
- (d) senior citizens

Ans. (c) : Dr. shankarbaba pundlikrao papalkar is renowned for his dedication to improving the lives of disabled and destitute children. A resident of Maharashtra's a Mravati district Shankarbaba Pundlikrao Papalkar, a social worker and a father figure to orphans, was awarded the padma shri in 2024.

69. Read the given statements and conclusions carefully. You have to take the given statements to be true even if they seem to be at variance from commonly known facts and decide which conclusion(s) logically follow(s) from the given statements

Statements

All plants are rhinos

All plants are animals

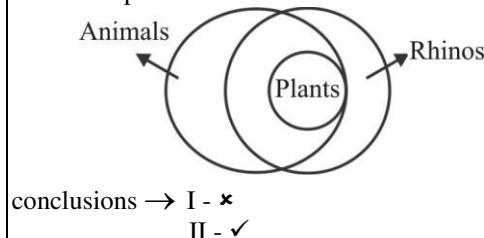
Conclusions

I. All rhinos are plants

II. Some animals are rhinos

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

Ans. (c) : According to the statement, the venn diagram relationship is as follows.



So, only conclusion II follows.

70. Anil spends 40% of his income on rent and 40% of the remaining income on medicines. If he saves ₹7,200 every month, then his monthly income is:

- (a) ₹22,000
- (b) ₹20,000
- (c) ₹36,000
- (d) ₹25,000

Ans. (b) : Let anil income = ₹ x

$$\therefore x \times \frac{60}{100} \times \frac{60}{100} = 7200$$

$$x = \frac{7200 \times 100}{36}$$

$$x = 20,000$$

∴ Anil monthly income = ₹20000

71. A statement is given below followed by two possible reasons numbered I and II. Read the statement carefully and decide which of the two reasons explains the event observation/information given in the statement.

Statement— Long queues were observed outside electricity bill payment counters in city X on 14th June 2023.

The last date for payment of electricity bills in city x 15th of every month.

Due to service failure in June, 2023, many people were not able to pay electricity bill online.

- (a) Both I and II are possible causes
- (b) Only I is a possible causes
- (c) Neither I nor II is a possible cause
- (d) Only II is a possible cause

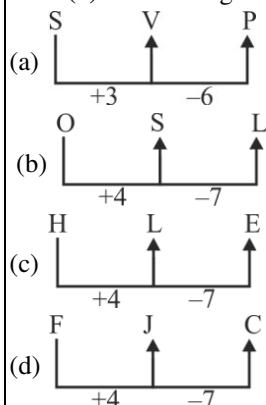
Ans. (a) : According to the statement both reasons I and II can be possible reasons hence both reasons I and II are possible.

72. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster does not belong to that group?

(Note: The odd one out is not based on the number of consonants/vowels or their position in the letter cluster)

- (a) SVP
- (b) OSL
- (c) HLE
- (d) FJC

Ans. (a) : According to option,



Hence, from the above explanation it is clear that option (a) is different from all other.

73. Who was appointed as the Director General of Sashastra Seema Bal (SSB) in September 2024?

- (a) Kuldeep Singh
- (b) Amrit Mohan Prasad
- (c) Subodh Kumar Jaiswal
- (d) Rakesh Asthana

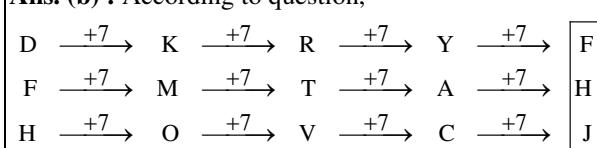
Ans. (b) : Amrit Mohan Prasad was appointed as the Director General of the Sashastra Seema Bal (SSB) in September 2024. He is a 1989 batch Indian Police Service officer from the Odisha Cadre. The Sashastra Seema Bal was established in 1963 after the Sino-Indian War.

74. Which of the following options should come in place of the question mark (?) in the given series based on the English alphabetical order?

DFH, KMO, RTV, YAC, ?

- (a) EGI
- (b) FHJ
- (c) FIL
- (d) EGK

Ans. (b) : According to question,



So, ? = FHJ

75. Energy possessed by a body by virtue of its position or configuration is

- (a) potential energy
- (b) nuclear energy
- (c) electromagnetic energy
- (d) kinetic energy

Ans. (a) : The energy acquired by an object due to a change in its position or configuration is called potential energy. The potential energy of any body is due to its position or orientation. When the body moves freely, the energy stored in it is released as Kinetic energy.

Example- include an object located at a height a stretched bowstring a twisted wire, etc.

Railway Recruitment Board

(Assistant Loco Pilot)-2024

Solved Papers with Explanation

Exam Date : 25-11-2024, Shift-II

1. Which award has been conferred to Ram Chet Chaudhary in the field of Science and Engineering in 2024?
 (a) Padma Vibhushan (b) Padma Shri
 (c) Padma Bhushan (d) Bharat Ratna

Ans. (b) : Gorakhpur agricultural scientist Ram Chet Chaudhary was awarded the Padma Shri in the field of science and engineering in 2024. Dr. Ram Chet Chaudhary has worked with the United Nations to preserve and promote the cultivation of black salt rice, and golden sweet potato. Dr Ram Chet Chaudhary is the president of the non-governmental organization Participatory Rural Development Foundation (PRDF).

2. The average of all the prime numbers between 30 and 50 is?
 (a) 40.2 (b) 40.4
 (c) 38.9 (d) 39.8

Ans. (d) : All prime numbers between 30 and 50.
 $= 31, 37, 41, 43, 47$

∴ Average of prime numbers

$$= \frac{31+37+41+43+47}{5} = \frac{199}{5} = 39.8$$

3. If $4 \sin^2 \theta = 1$ and θ is an acute angle, then the value of $\cos^2 \theta + \tan^2 \theta = \dots$.
 (a) 13/12 (b) 5/13
 (c) 1 (d) 1/4

Ans. (a) : Given,

$$4 \sin^2 \theta = 1$$

$$\sin^2 \theta = \frac{1}{4}$$

$$\sin \theta = \frac{1}{2}$$

$$\sin \theta = \sin 30^\circ \quad \left[\sin 30^\circ = \frac{1}{2} \right]$$

$$\theta = 30^\circ$$

According to the question,

$$\cos^2 \theta + \tan^2 \theta$$

$$\Rightarrow \cos^2 30^\circ + \tan^2 30^\circ$$

$$= \frac{3}{4} + \frac{1}{3}$$

$$\Rightarrow \frac{9+4}{12}$$

$$\Rightarrow \frac{13}{12}$$

4. The division of labour occurs in:
 (a) only unicellular organisms
 (b) only multicellular organisms
 (c) neither unicellular nor in multicellular organism
 (d) both unicellular and multicellular organism

Ans. (d) : Division of labour occurs in both unicellular and multicellular organisms. In a unicellular organism, division of labour occurs at the cell level. In a multicellular organism, on the other hand, division of labour occurs at the cellular, organ system, and organ levels. Reproduction in unicellular organisms occurs by asexual reproduction, while reproduction in multicellular organisms occurs by sexual reproduction.

5. The value of M in $(p/q)^{2M+2} = (q/p)^{9-M}$ is?
 (a) -7/2 (b) -11
 (c) 6 (d) 5

Ans. (b) : $(p/q)^{2M+2} = (q/p)^{9-M}$

$$\left(\frac{p}{q} \right)^{2M+2} = \left(\frac{p}{q} \right)^{m-9}$$

∴ Comparing the exponents,

$$2M+2 = m-9$$

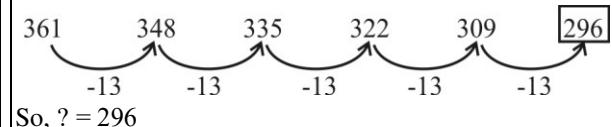
$$m = -11$$

6. Which of the following options should come in place of the question mark (?) in the given series to make it logically complete?

$$361, 348, 335, 322, 309, ?$$

(a) 290 (b) 300
 (c) 296 (d) 294

Ans. (c) : According to the question,



So, ? = 296

7. A man sold an article for ₹247.50, thereby gaining 12.5%. The cost of the article was-

(a) ₹220 (b) ₹225
 (c) ₹210 (d) ₹224

Ans. (a) :

$$\text{Cost price (CP)} = \text{SP} \times \frac{100}{(100 + P\%)}$$

$$\therefore \text{CP} = 247.50 \times \frac{100}{100 + 12.5} = \frac{247500}{1125} = \frac{49500}{225} = \text{Rs.} 220$$

Ans. (a) : The gastric glands located in the stomach wall do not secrete Saliva. The stomach is a large organ that expands upon the arrival of food. The muscular wall of the stomach helps mix food with other digestive juices. These digestive functions are carried out by the gastric glands located in the stomach wall. They secrete hydrochloric acid, a protein-digesting enzyme called pepsin, and mucus.

15. In the following number pairs, the second number is obtained by applying certain mathematical operations to the first number. Which numbers should replace X and Y so that the pattern followed by the two numbers on the left side of :: is the same as that on the right side of ::?

(Note: Operations should be performed on the whole numbers, without breaking down the numbers into its constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed)

X : 128 :: 146 : Y

(a) X = 164, Y = 92 (b) X = 168, Y = 98
(c) X = 174, Y = 84 (d) X = 156, Y = 86

Ans. (a) : In the same way as option (a),

$$\begin{array}{ccc} x : 128 & \rightarrow & 164 & : & 128 \\ & & \downarrow & & \downarrow \\ & & 1+6+4=11 & & 1+2+8=11 \end{array}$$

Same as,

$$\begin{array}{ccc} 146 : Y & \rightarrow & 146 & : & 92 \\ & & \downarrow & & \downarrow \\ & & 1+4+6=11 & & 9+2=11 \end{array}$$

16. Select the correct balanced equation for the reaction $\text{Al}_2(\text{SO}_4)_3 + \text{BaCl}_2 \rightarrow \text{AlCl}_3 + \text{BaSO}_4$

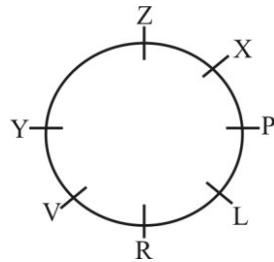
(a) $\text{Al}_2(\text{SO}_4)_3 + 3\text{BaCl}_2 \rightarrow 3\text{AlCl}_3 + 2\text{BaSO}_4$
(b) $2\text{Al}_2(\text{SO}_4)_3 + 3\text{BaCl}_2 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$
(c) $\text{Al}_2(\text{SO}_4)_3 + 2\text{BaCl}_2 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$
(d) $\text{Al}_2(\text{SO}_4)_3 + 3\text{BaCl}_2 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$

Ans. (d) : The correct balanced equation for $\text{Al}_2(\text{SO}_4)_3 + \text{BaCl}_2 \rightarrow \text{AlCl}_3 + \text{BaSO}_4$ is $\text{Al}_2(\text{SO}_4)_3 + 3\text{BaCl}_2 \rightarrow 2\text{AlCl}_3 + 3\text{BaSO}_4$

17. L, P, R, V, X, Y and Z are sitting around a circular table facing the center. Only one person sits between V and L, when counted from the right of V. Only one person sits between L and X. Only one person sits between V and Z. Only two person sits between R and X. Only one person sits between P and Z. Who sits to the immediate right and left of Y, respectively?

(a) Z and V (b) V and X
(c) V and Z (d) X and Z

Ans. (c) : According to the question,



Therefore, it is clear from the above that V and Z as sitting immediately to the right and left of Y respectively.

18. The discussion paper titled '.....' was released by NITI Aayog on 15 January 2024.

(a) Poverty Alleviation in India
(b) Multidimensional Poverty in India since 2005-06
(c) Economic Growth and Poverty Reduction
(d) Government Initiatives for Poverty Eradication

Ans. (b) : NITI Aayog released a discussion paper titled 'Multidimensional Poverty in India Since 2005-06' on January 15, 2024, which stated that 284.2 million people have escaped Multidimensional Poverty in the last nine years. National Multidimensional Poverty measures simultaneous deprivation in three equally weighted dimensions of health, education, and standard of living, which are represented by 12 Sustainable Development Goal-aligned indicators.

19. The tax on a commodity is reduced by 20% and its consumption is increased by 15%. What is the effect on tax revenue?

(a) It increases by 10%
(b) It decreases by 8%
(c) It increases by 8%
(d) No change

Ans. (b) : Tax on goods $\rightarrow 100 : 80$

Consumption $\rightarrow 100 : 115$

$$\begin{aligned} \text{Impact of revenue} &\rightarrow 100 \times 100 : 80 \times 115 \\ &= 100 : 92 \end{aligned}$$

$$\therefore \text{Required percentage} = \frac{8}{100} \times 100 = 8\%$$

Therefore, there will be an 8% decrease in revenue.

20. A diver rowing at the speed of 3 km/h in still water takes double the time going 50 km upstream compared to going 50 km downstream. The speed of the diver downstream is

(a) $9/2$ km/h (b) 4 km/h
(c) $7/2$ km/h (d) $10/3$ km/h