

# Prepp

## Your Personal Exams Guide



NDA



CDS



SSC CGL



CBSE UGC NET



IAS



SSC CHSL



CTET



MPSC



AFCAT



CSIR UDC NET



IBPS PO



UP POLICE



SSC MTS



SBI PO



BPS



UPTET



IBPS RRB



IBPS CLERK



IES



UPSC CAPF



SSC Stenogr..



RRB NTPC



SSC GD



RBI GRADE B



RBI Assistant



DSSSB

# RRB Group D 2022 Prev. Yr. Paper (18 Aug 2022) (Shift 3)

Total Time: 1 Hour : 30 Minute

Total Marks: 100

## Instructions

Sl No.	Section Name	No. of Question	Maximum Marks
1	CBT	100	100

- 1.) A total of 90 minutes is allotted for the examination.
- 2.) The server will set your clock for you. In the top right corner of your screen, a countdown timer will display the remaining time for you to complete the exam. Once the timer reaches zero, the examination will end automatically. The paper need not be submitted when your timer reaches zero.
- 3.) There will, however, be sectional timing for this exam. You will have to complete each section within the specified time limit. Before moving on to the next section, you must complete the current one within the time limits.

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## CBT

1. A car can cover 275 km in 5 hours. If its speed is reduced by 5 km/h, then how much time will the car take to cover a distance of 250 km? **(+1, -0.33)**
- a. 5 hr
  - b. 5 hr 30 min
  - c. 4 hr 30 min
  - d. 6 hr

2. The Scheme of Assistance to National Sports Federations (NSFs) has been extended to train and field national teams for national and international competitions between: **(+1, -0.33)**
- a. 2022 and 2025
  - b. 2021 and 2025
  - c. 2022 and 2024
  - d. 2022 and 2026

3. In this question, a group of numbers/symbols is coded using letters as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer. **(+1, -0.33)**

Number/Symbol	4	%	7	3	#	*	9	@	6
Code	X	N	B	J	H	L	Y	F	R

Conditions:

1. If the first element is an even number and the last a number, the codes for these two (the first and the last elements) are to be interchanged.
2. If the first element is an odd number and the last an even number, the first and last elements are to be retained as it is (i.e., first and last elements won't get coded).

**Question:** 7 \* % 3 @ 6

- a. 7LNJF6
- b. BLN3FR
- c. BLNJFR
- d. 7YNJF6

4. Match the following:

(+1, -0.33)

Substance	pH
i. Lemon juice	a. 14
ii. Gastric juice	b. 1.2
iii. Milk of magnesia	c. 2.2
iv. Sodium hydroxide solution	d. 10

- a. i - c, ii - b, iii - d, iv - a
- b. i - d, ii - b, iii - c, iv - a
- c. i - c, ii - b, iii - a, iv - d
- d. i - a, ii - b, iii - c, iv - d

5. Which of the following rules is used to determine the force on a current carrying conductor kept inside a magnetic field? (+1, -0.33)
- a. Maxwell's corkscrew rule
  - b. Fleming's left-hand rule
  - c. Right hand thumb rule
  - d. Fleming's right-hand rule
- 

6. As of July 2022, PM-VIKAS is aligned to the 15th Finance Commission cycle period up to \_\_\_\_\_ and is a Central Sector (CS) scheme under the Ministry of Minority Affairs. (+1, -0.33)
- a. 2024-27
  - b. 2025-26
  - c. 2022-23
  - d. 2021-23
- 

7. Select the option that represents the letters that, when placed from left to right in the same sequence in the blanks below, will complete the letter series. (+1, -0.33)
- B \_ X T \_ \_ H Y \_ M B \_ Z \_ M
- a. BMHHTT
  - b. MHBHTT
  - c. HMBTHT
-

d. TMHBHT

---

8. Select the set in which the numbers are related in the same way as are the numbers of the following sets. (+1, -0.33)

**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 are not allowed.

(80, 16, 20)

(144, 36, 24)

- a. (512, 25, 16)
- b. (122, 12, 6)
- c. (224, 36, 40)
- d. (189, 49, 27)

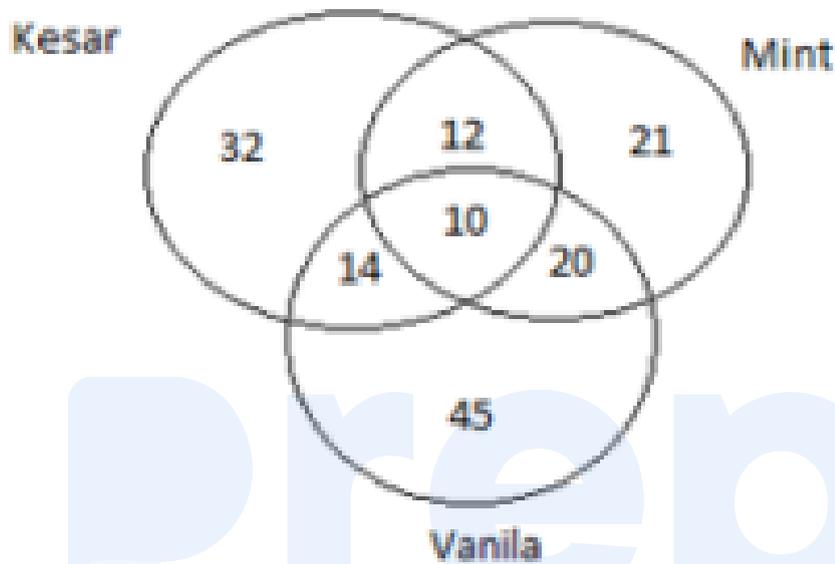
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9. Find the roots of the equation  $6p^2 - 5p - 6 = 0$ . (+1, -0.33)

- a.  $3/4$  and  $3/2$
  - b.  $-2/3$  and  $3/2$
  - c.  $-1/3$  and  $4/3$
  - d.  $2/3$  and  $2/3$
-

10. Study the given diagram carefully and answer the following question. The numbers in different sections indicate the number of people who like different flavors of ice-cream. (+1, -0.33)



How many people like Mint but NOT Kesar flavored ice-cream?

- a. 51
  - b. 21
  - c. 33
  - d. 41
- 
11. When was Bandhan Bank formed? (+1, -0.33)
- a. 2015
  - b. 2017

c. 2011

d. 2013

---

12. Seven boxes, A, B, C, D, E, F, and G, are kept one over the other but not necessarily in the same order. Only two boxes are kept between G and B. B is kept at the bottom. C is kept on one of the positions above D. F is kept immediately above D. A is kept fifth from the bottom. E is kept at the top. How many boxes are kept between D and A? (+1, -0.33)

a. One

b. Three

c. Four

d. Two

---

13. Article 243E of the Indian Constitution is related to which feature of Panchayat? (+1, -0.33)

a. Constitution of Panchayats

b. Reservation of seat

c. Composition of Panchayats

d. Duration of Panchayat

---

14. A group of people contains men, women, and children. If 40% of them are men, 35% are women and the rest are children, and their average weights are 70 kg, 60 kg, and 30 kg, respectively. The average weight of the group is: (+1, -0.33)

- a. 45.5 kg
  - b. 56.5 gm
  - c. 45.5 gm
  - d. 56.5 kg
- 

15. Three statements are given, followed by two conclusions numbered I and II. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follows from the statements. (+1, -0.33)

Statements:

- 1. All jokers are circuses.
- 2. All circuses are equestrians.
- 3. Some jokers are spectacles.

Conclusions:

- I. Some equestrians are spectacles.
- II. Some circuses are jokers.

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

16. Study the given number series and answer the question that follows. (+1, -0.33)

2 6 7 4 9 3 6 5 1 9 5 2 4 5 9 4 2 3 7 1

How many even numbers are immediately preceded by an odd number and immediately followed by a prime number?

- a. 3
- b. 2
- c. 4
- d. 1

17. Which of the following chemical reactions represents the chlor-alkali process? (+1, -0.33)

- a.  $\text{NaHCO}_3 + \text{H}^+ \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Sodium salt of acid}$
- b.  $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \rightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$
- c.  $2 \text{NaCl} (\text{aq}) + 2 \text{H}_2\text{O} (\text{l}) \rightarrow 2 \text{NaOH} (\text{aq}) + \text{Cl}_2 (\text{g}) + \text{H}_2 (\text{g})$
- d.  $\text{Ca}(\text{OH})_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$

18. If '+' means '÷', '-' means '×', '×' means '+', and '÷' means '-', what will come in place of the question mark (?) in the following equation? (+1, -0.33)

$$9 \times 8 + 4 - 8 \div 5 = ?$$

- a. 23
- b. 18
- c. 20

d. 35

---

19. The focal length of a diverging lens is 50 cm. The power of the lens is: **(+1, -0.33)**

a. -5 D

b. -2 D

c. 5 D

d. 2 D

---

20. In which of the following years was a joint venture signed between the Government of India and Suzuki Motor Corporation, to launch the Maruti 800 car for the first time in India? **(+1, -0.33)**

a. 1986

b. 1978

c. 1998

d. 1982

---

21. A magnesium ribbon burns with a dazzling flame in air (oxygen) and changes into a white substance 'X'. The X is: **(+1, -0.33)**

a.  $\text{MgCO}_3$

b. Mg

c.  $\text{Mg(OH)}_2$

d. MgO

---

22. The current through a horizontal straight wire flows from west to east. The direction of the magnetic field lines as viewed from the east end will be: (+1, -0.33)
- a. anticlockwise in a plane perpendicular to the wire
  - b. clockwise in a plane perpendicular to the wire
  - c. anticlockwise in the plane of the wire
  - d. clockwise in the plane of the wire
- 

23. Which of the following has the largest atomic radius? (+1, -0.33)
- a. Chlorine
  - b. Fluorine
  - c. Iodine
  - d. Oxygen
- 

24. Which state has become India's first state to launch AVGC (Animation, Visual Effects, Gaming, and Comics) Centre of Excellence? (+1, -0.33)
- a. Karnataka
  - b. Kerala
  - c. Jharkhand
  - d. Haryana
- 

25. Planets do not twinkle because: (+1, -0.33)
-

- a. they scatter less light
  - b. they act as extended sources of light
  - c. they act as point sources of light
  - d. they scatter more light
- 

26. Which Article of the Constitution of India deals with duties of Prime Minister as respects the furnishing of information to the President, etc.? (+1, -0.33)

- a. Article 78
  - b. Article 73
  - c. Article 69
  - d. Article 62
- 

27. Which of the following pairs is NOT coprime? (+1, -0.33)

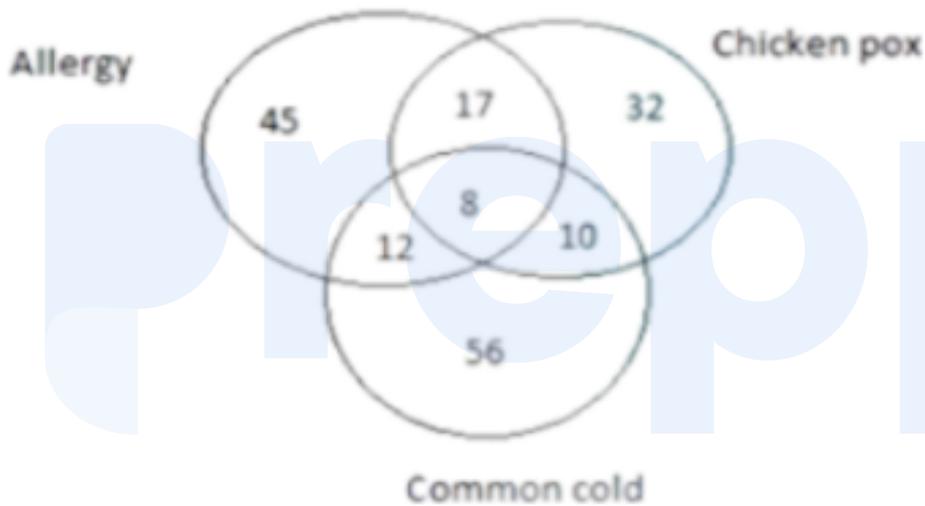
- a. (17, 34)
  - b. (11, 13)
  - c. (15, 17)
  - d. (17, 23)
- 

28. In a certain code language, 'SIGMA' is written as 'FVTZN' and 'FNRYQ' is written as 'SALED'. How will 'ARJUN' be written in that language? (+1, -0.33)

- a. WENAH

- b. BPWAH
- c. EWNAH
- d. NEWHA

29. Study the given diagram carefully and answer the following question. The numbers in different sections indicate the number of persons who have suffered from different diseases. (+1, -0.33)



How many people have suffered from both Allergy and Chickenpox but NOT Common Cold?

- a. 32
- b. 45
- c. 25
- d. 17

30. How will the plant be affected if the rate of respiration becomes more than the rate of photosynthesis? (+1, -0.33)
- a. Plant growth will slow down.
  - b. Plants will store a lot amount of food.
  - c. More food will be oxidized than that produced, and the plant will starve and die.
  - d. Plant growth will increase due to more energy produced.
- 

31. Ramakrishna Mission was founded in 1897 by \_\_\_\_\_ (+1, -0.33)
- a. Ramkrishna Paramhansa
  - b. Dayanand Saraswati
  - c. Swami Vivekanand
  - d. Raja Ram Mohan Roy
- 

32. Which of the following is the storage carbohydrate in plants? (+1, -0.33)
- a. Glucose
  - b. Glycogen
  - c. Starch
  - d. Sucrose
- 

33. The Constitution of India has \_\_\_\_\_ parts and \_\_\_\_\_ schedules. (+1, -0.33)
-

- a. 12; 25
  - b. 22; 10
  - c. 25; 12
  - d. 10; 22
- 

34. A statement is given followed by two assumptions numbered I and II. You have to assume everything in the statement to be true and decide which of the given assumptions is/are implicit in the statement. (+1, -0.33)

Statement:

Due to the failure of the main grid, power supply to many parts of the city was affected.

Assumptions:

I. The main grid is responsible for transmission of power to different parts of the city.

II. Most people have backup power installations at their homes to manage during times when power supply is disrupted.

- a. Both assumptions I and II are implicit
  - b. Only assumption II is implicit
  - c. Neither assumption I nor II is implicit
  - d. Only assumption I is implicit
- 
35. Which of the following is NOT a unit of heat energy? (+1, -0.33)
- a. Calorie

- b. Watt second
  - c. Kilowatt
  - d. Joule
- 

36. Which two banks have merged with Punjab National Bank in 2020? (+1, -0.33)

- a. Syndicate Bank and Allahabad Bank
  - b. Dena Bank and Vijaya Bank
  - c. Oriental Bank of Commerce and United Bank of India
  - d. Andhra Bank and Corporation Bank
- 

37. Find the value of  $325 \times 5 + 31 \times 21 - 22 \times (63 - 52)$ . (+1, -0.33)

- a. 2044
  - b. 2034
  - c. 2024
  - d. 2014
- 

38. The bends formed in the river when river water erodes its banks on the outside of the channel are known as: (+1, -0.33)

- a. Distributaries
- b. Braided channels
- c. Meanders

d. Tributaries

---

Simplify  $\frac{8^2 \times 3^3}{\sqrt{64} \times \sqrt{81}}$ .

39. a. 24 (+1, -0.33)  
b. 27  
c. 72  
d. 64
- 

40. The sum of the present ages of a father and his daughter is 80 years. (+1, -0.33)  
Eight years ago, the father's age was seven times the age of his daughter. Eight years from now, what will be the daughter's age?  
a. 20 years  
b. 18 years  
c. 22 years  
d. 24 years
- 

41. Based on the given statement, four conclusions are drawn. Find out which (+1, -0.33)  
conclusion is true based on the statement.
-

Statement:  $Y < O \leq G \leq K = U > L > P$

- a.  $O = P$
- b.  $G = Y$
- c.  $K > P$
- d.  $Y > L$

---

42. Where was the first Biosafety Level-3 (BSL-3) Containment Mobile Laboratory inaugurated in February 2022 to strengthen the healthcare infrastructure of South Asia? (+1, -0.33)

- a. Pune
- b. Nagpur
- c. Nashik
- d. Mumbai

---

43. The HCF of 108 and 144 is \_\_\_\_\_ (+1, -0.33)

- a. 12
- b. 24
- c. 16
- d. 36

---

44. Select the option that is related to the fifth number in the same way as the second number is related to the first number and the fourth number (+1, -0.33)

is related to the third number.

$$64 : 81 :: 121 : 144 : 169 : ?$$

- a. 196
- b. 216
- c. 225
- d. 200

---

45. The parallel sides of a trapezium and its height are in an arithmetic progression with a common difference of 4. If the height is the highest term and the area of the trapezium is 160 sq. units, find the ratio of length of greatest parallel side to that of the smallest parallel side. (+1, -0.33)

- a. 5 : 1
- b. 1 : 5
- c. 2 : 3
- d. 3 : 2

---

46. This question is based on the following 3-digit numbers: (+1, -0.33)

543 769 552 342 245

(Example - 697 - First digit = 6, second digit = 9 and third digit = 7)

If in each of the numbers, 1 is added to the first digit of every number, in how many numbers will the first digit be exactly divisible by the third digit of the same number?

- a. Three

- b. Five
- c. Two
- d. Four

---

47. A sum, when invested at 12.5% simple interest per annum, amounts to Rs. 8,250 after 2 years. What is the simple interest? **(+1, -0.33)**

- a. Rs. 1,820
- b. Rs. 1,650
- c. Rs. 1,910
- d. Rs. 1,700

---

48. What is the nature of the roots of the quadratic equation  $x^2 - 5x + 7 = 0$ ? **(+1, -0.33)**

- a. Not real
- b. Real, rational, equal
- c. Real, irrational, unequal
- d. Real, rational, unequal

---

49. Some features of genes are mentioned below. Which option states the INCORRECT feature of genes? **(+1, -0.33)**

- a. They do not undergo any change.
- b. They are segments of DNA.

- c. Each germ cell has one gene set.
  - d. They control traits by producing proteins.
- 

50. Which of the following famous churches of India is INCORRECTLY matched with its location? (+1, -0.33)

- a. St. Paul Cathedral - Kolkata
  - b. St. John in the Wilderness Church - Pondicherry
  - c. Santa Cruz Basilica - Kochi
  - d. Basilica of Bom Jesus - Goa
- 

51. Select the INCORRECT option with reference to the Chipko Andolan. (+1, -0.33)

- a. It involved the community in forest conservation efforts
  - b. It forced the government to rethink their priorities in the use of forest produce
  - c. It was a violent movement to save the trees
  - d. People realised that forests are needed to maintain the quality of soil
- 

52. The property/properties that must be possessed by a material to be chosen for making heating elements of heating devices is/are: (+1, -0.33)

- (i) high melting point
- (ii) high resistivity

(iii) low resistance

- a. Only (i) and (ii)
- b. Only (i) and (iii)
- c. (i), (ii), (iii)
- d. Only (ii) and (iii)

---

53. The difference between the selling price on a discount of 32% and two successive discounts of 20% each on a certain bill is Rs. 25. Find the actual amount of the bill. (+1, -0.33)

- a. Rs. 576
- b. Rs. 625
- c. Rs. 200
- d. Rs. 425

---

54. Find the number of sides in a regular polygon if each interior angle is  $160^\circ$ . (+1, -0.33)

- a. 17
- b. 14
- c. 18
- d. 15

---

55. The magnification produced by a spherical mirror is  $-0.5$ . The image formed by the mirror is: (+1, -0.33)

- a. real, inverted, and diminished
- b. real, inverted, and enlarged
- c. virtual, erect, and diminished
- d. virtual, erect, and enlarged

---

56. Raju and Raman can complete a piece of work in 12 days and 16 days, respectively. If they work on alternate days, starting with Raju, in how many days will the work be completed? (+1, -0.33)

- a.  $13 \frac{2}{3}$  days
- b.  $13 \frac{1}{3}$  days
- c.  $14 \frac{2}{3}$  days
- d.  $14 \frac{1}{3}$  days

---

57. If '+' means '-', '-' means '÷', '÷' means 'x', and 'x' means '+', what will come in place of the question mark (?) in the following equation? (+1, -0.33)

$$18 - 3 \times 14 \div 2 + 12 = ?$$

- a. 24
- b. 22
- c. 19
- d. 21

58. Which languages are to be used for all or any of the official purposes of the State of Tripura as per the Tripura Official Languages Act, 1964? (+1, -0.33)
- a. Konkani and English
  - b. Bengali and Kokborok
  - c. Telugu and Lepcha
  - d. Hindi and Bengali
- 

59. India is the third largest country in South Asia, with \_\_\_\_\_ of Earth's land area. (+1, -0.33)
- a. 4.3%
  - b. 2.3%
  - c. 6.5%
  - d. 5.7%
- 

60. The sum of two numbers is 32, and one of them exceeds the other by 18. Find the greater number. (+1, -0.33)
- a. 24
  - b. 28
  - c. 27
  - d. 25
-

61. Which of the following numbers will replace the question mark (?) in the given series? (+1, -0.33)

17, 30, 44, 59, 75, ?

- a. 111
- b. 102
- c. 92
- d. 85

62. Which of the following numbers will replace the question mark (?) and complete the given number series? (+1, -0.33)

4, 5, 12, 39, 160, ?

- a. 850
- b. 800
- c. 805
- d. 804

63. In which of the following years was the first Republic Day of India celebrated? (+1, -0.33)

- a. 1948
- b. 1949
- c. 1947

d. 1950

---

64. Who has developed the Tamanna tool related to education in India? (+1, -0.33)

- a. All India Council for Technical Education
  - b. University Grants Commission
  - c. Central Board of Secondary Education (CBSE) and National Council of Educational Research and Training (NCERT)
  - d. Indian Certificate of Secondary Education
- 

65. All 72 students of a class are standing in a row facing the north. Shalabh is standing at the extreme left end of the row. Only 8 students are standing between Shalabh and Kimaya. Vitali is 26th from the extreme right end of the row. How many students are standing between Vitali and Kimaya? (+1, -0.33)

- a. 37
  - b. 36
  - c. 35
  - d. 38
- 

66. From point X, a person walks 45 m towards the east. He then takes a left turn and walks 40 m. He then takes a right turn and walks 90 m. He then takes a right turn and walks 60 m. Finally, he takes a right turn and walks 135 m to reach point Y. How far and in which direction is point X from point Y? (All turns are 90 degree turns only) (+1, -0.33)

- a. 20 m, North
  - b. 15 m, North
  - c. 20 m, South
  - d. 15 m, South
- 

67. The \_\_\_\_\_ DOES NOT function as an excretory organ in humans. (+1, -0.33)

- a. small intestine
  - b. skin
  - c. large intestine
  - d. lungs
- 

68. If  $d^2 + 1/d^2 = 18$ , and  $d > 1/d$ , then the value of  $d^3 - 1/d^3$  is: (+1, -0.33)

- a. 64
  - b. 91
  - c. 76
  - d. 81
- 

69. Carbon is able to form stable compounds because of: (+1, -0.33)

- a. Its ability to form covalent bonds
- b. Its allotropic forms

- c. Its smaller atomic size
- d. The presence of p-orbital

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Simplify  $\left(\frac{1}{3}\right)^{-3} + \left(\frac{1}{5}\right)^{-4} + \left(\frac{1}{15}\right)^{-2}$

70. a. 856 (+1, -0.33)
- b. 756
- c. 877
- d. 777

- 
71. Mohit's salary is Rs. 15,000 per month. He spends Rs. 5,000 on house rent, Rs. 2,000 on bills and the rest of the amount is his monthly savings. Find his savings in a year, if in the month of his birthday he spent his complete monthly saving for birthday celebration. (+1, -0.33)
- a. Rs. 8,000
- b. Rs. 96,000
- c. Rs. 88,000
- d. Rs. 17,000

- 
72. The 36th National Games of India took place in \_\_\_\_\_ cities of Gujarat between 27 September and 10 October 2022. (+1, -0.33)
- a. six

- b. five
- c. eight
- d. four

73. Find the median class of:

(+1, -0.33)

CI	0-50	50-100	100-150	150-200
F	12	15	13	10

- a. 100-150
- b. 150-200
- c. 0-50
- d. 50-100

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74. Some effects of large production of biodegradable waste are mentioned below. Choose the INCORRECT statement. (+1, -0.33)

- a. Amount of waste sent to landfills increases
- b. Gives out foul smell
- c. Acts as breeding ground for mosquitoes and spreads diseases
- d. Replenishment of soil nutrients

75. Each vowel in the word "EXPLAIN" is changed to the letter following it in the English alphabetical order, and each consonant is changed to the letter preceding it. If each letter, thus formed, is arranged in alphabetical order, which letter will be third from the right end? (+1, -0.33)

- a. Q
- b. O
- c. M
- d. Y

76. A shadow of a tower standing on level ground is found to be  $40\sqrt{3}$  meters longer when the Sun's altitude is  $30^\circ$  than when it is  $60^\circ$ . The height of the tower is: (+1, -0.33)

- a. 50 m
- b. 60 m
- c. 70 m
- d. 40 m

77. Simplify:  $6(x^3 - 2x^2 + 3x) - (x^3 + 2x - 3)$ . (+1, -0.33)

- a.  $5x^3 - 12x^2 + 16x + 3$
- b.  $5x^3 - 12x^2 + 16x - 3$
- c.  $5x^3 + 12x^2 + 16x - 3$
- d.  $5x^3 + 12x^2 + 16x + 3$

---

78. Umesh is standing facing the south-west direction. He then takes a  $90^\circ$  clockwise turn. After that, he takes a  $135^\circ$  clockwise turn. He finally takes a  $90^\circ$  anticlockwise turn. In which direction is he facing now? (+1, -0.33)

- a. West
- b. North-west
- c. North
- d. North-east

---

79. Compounds  $C_2H_6$  and  $C_3H_8$  differ by \_\_\_\_\_ unit and belong to \_\_\_\_\_ series. (+1, -0.33)

- a.  $CH_2$ , heterogeneous
- b.  $CH_3$ , homologous
- c.  $CH_3$ , heterogeneous
- d.  $CH_2$ , homologous

---

80. \_\_\_\_\_ aids in the emulsification of fat. (+1, -0.33)

- a. Bile salts
- b. Pepsin
- c. HCl
- d. Vit-K Trypsin

81. In a queue of travelers at the emigration counter facing north, Pankaj is 9th from the extreme left end and Puja is 17th from the extreme right end. If the positions of Pankaj and Puja are interchanged, then the new position of Pankaj will be 15th from the extreme left end. Find the number of travelers between Puja and Pankaj. (+1, -0.33)
- a. 4
  - b. 3
  - c. 5
  - d. 6

- 
82. How many spherical solid marbles, each having a radius of 0.3 cm, can be made from a solid sphere having a radius of 6 cm? (+1, -0.33)
- a. 7500
  - b. 8000
  - c. 8500
  - d. 9000

- 
83. A shopkeeper sells an item at a profit of 25% and dishonestly uses a weight that is 30% less than the actual weight. Find his total profit %. (+1, -0.33)
- a. 78.57%
  - b. 65.75%
  - c. 42%

d. 23%

---

84. The Dam Rehabilitation and Improvement Project was started in which year? (+1, -0.33)

- a. 2009
  - b. 2012
  - c. 2021
  - d. 2002
- 

85. If '+' means 'x', 'x' means '÷', '÷' means '-', and '-' means '+', what will come in place of the question mark (?) in the following equation? (+1, -0.33)

$$13 - 17 + 24 \div 54 \times 18 + 28 \times 14 = ?$$

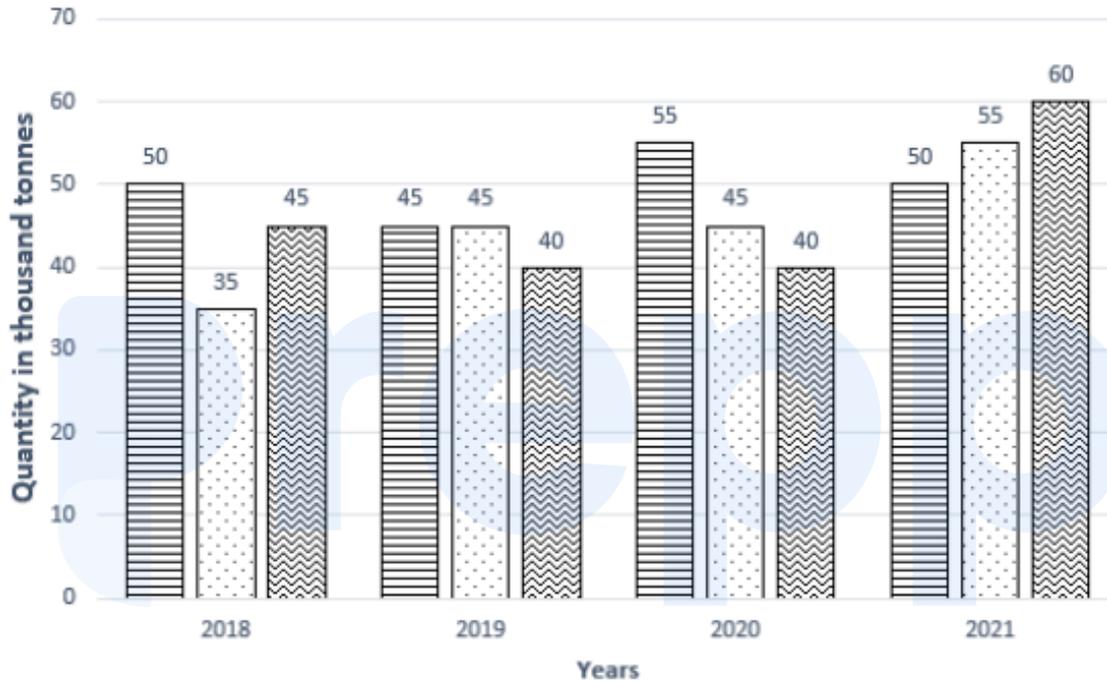
- a. 380
  - b. 510
  - c. 415
  - d. 225
- 

86. The total surface area of a cylinder of diameter 10 cm is 330 square centimeters. Find the height of the cylinder? (+1, -0.33)

- a. 10.5 cm
- b. 6.5 cm
- c. 5.5 cm

d. 2.5 cm

87. The bar graph given below shows the data on the production of milk products (in thousand tonnes) by three branches, X, Y, and Z, of a dairy product company over the years. Study the graph and answer the question. (+1, -0.33)



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For which branch(es) of the dairy product company was the average production for the given 4 years the minimum?

- a. Branch Z
- b. Branch Y
- c. Branch X
- d. Branches Y and Z

88. Which of the following is an independent financial institution established in 1990 under an Act of the Indian Parliament, with the objective of assisting in the growth and development of the Micro, Small, and Medium Enterprises (MSMEs) sector? (+1, -0.33)
- a. SIDBI
  - b. NBFC
  - c. MSS
  - d. FSDC
- 

89. If  $40 : 35 :: 35 : x$ , find the value of  $x$ . (+1, -0.33)
- a.  $49/8$
  - b.  $49/14$
  - c.  $245/8$
  - d.  $49/16$
- 

90. If 1 January 2011 was a Saturday, then what day of the week was 31 December 2011? (+1, -0.33)
- a. Saturday
  - b. Sunday
  - c. Monday
  - d. Friday
-

91. Five friends A, B, C, D, and E are sitting in a straight row, facing north. A is not at the exact center position of the row. C is second from one extreme end, while fourth from the other extreme end. B and D sit at the extreme ends of the row. Who sits at the exact center position of the row? (+1, -0.33)
- a. D
  - b. E
  - c. A
  - d. C
- 

92. Which of the following line(s) act as a normal to a spherical mirror? (+1, -0.33)
- (i) Line joining the pole and center of curvature
  - (ii) Line joining the center of curvature and point of incidence
  - (iii) Line joining focus and point of incidence
- a. Both (i) and (iii)
  - b. (i), (ii), and (iii)
  - c. Both (i) and (ii)
  - d. Both (ii) and (iii)
- 

93. What happens when sodium metal reacts with water? (+1, -0.33)
- a. Chlorine gas and sodium hydroxide solution are produced.
  - b. No reaction takes place.

- c. Only sodium hydroxide solution is produced.
  - d. Hydrogen gas and sodium hydroxide solution are produced.
- 

94. Some plants can also produce new plants from their roots. An example of such a plant is \_\_\_\_\_ ( +1, -0.33)

- a. Sweet Potato
  - b. Cactus
  - c. Ginger
  - d. Bryophyllum
- 

95. Select the option that is related to the fifth letter-cluster in the same way as the second letter-cluster is related to the first letter-cluster and the fourth letter-cluster is related to the third letter-cluster. ( +1, -0.33)

PORTUGAL : TROPLAGU :: URANUS : ARUSUN :: AMRITSAR : ?

- a. TSRRMIAA
  - b. AATRRSMI
  - c. TRRSMIAA
  - d. TSMIRRAA
- 

96. A statement is given, followed by four conclusions given in the options. Find out which conclusion is true based on the given statement. ( +1, -0.33)

Statement:

$$J \leq H \leq G = R > Z = E > D$$

- a.  $D > R$
- b.  $J \leq G$
- c.  $Z < D$
- d.  $H > R$

---

97. Six friends, K, L, M, N, O, and P, are sitting around a circular table facing the center of the table. O is second to the left of N. P is second to the right of K. M is to the immediate right of L. N and L are immediate neighbors. Who is sitting to the immediate right of P? (+1, -0.33)

- a. N
- b. K
- c. O
- d. L

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98. Consider the below statements and identify the correct answer. (+1, -0.33)

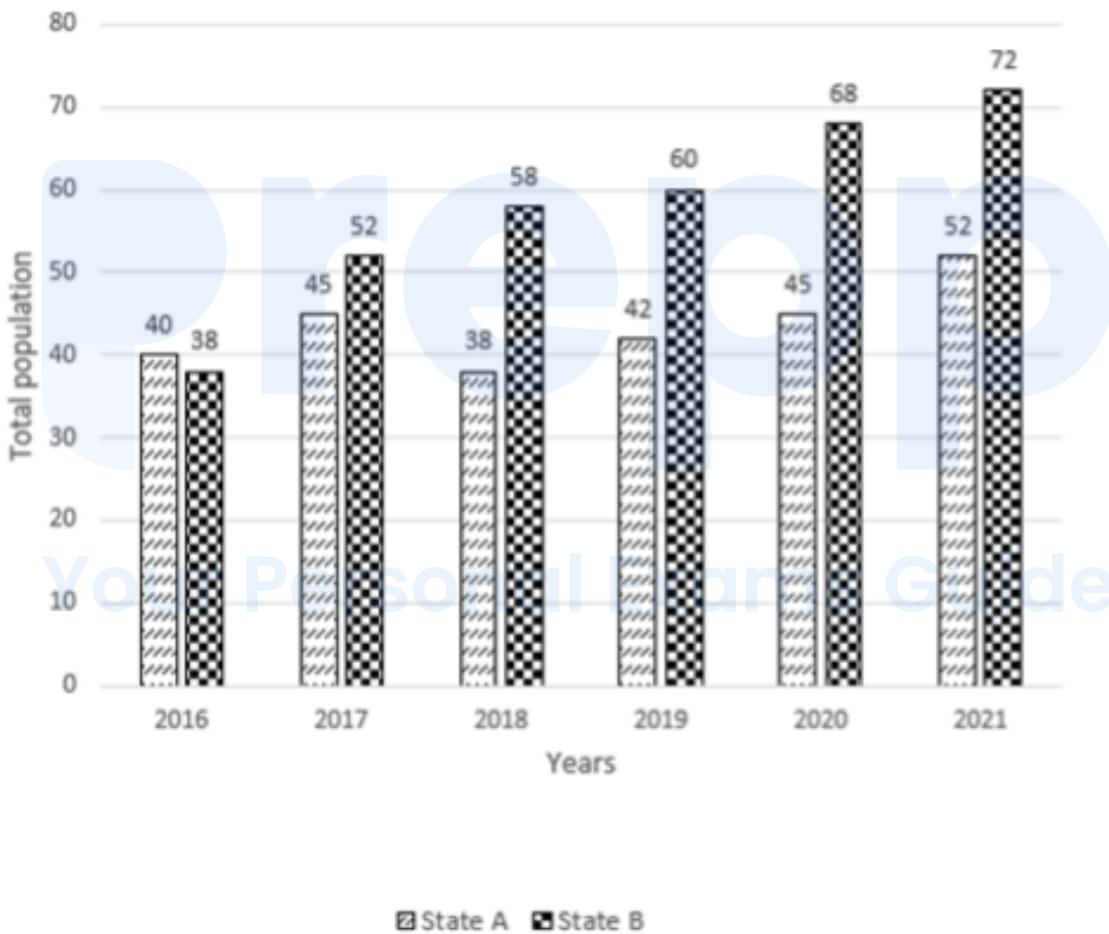
Statement I: Metallic character decreases across a period as we move from left to right.

Statement II: The effective nuclear charge acting on the valence shell electrons increases across a period, so the tendency to lose electrons will decrease.

- a. Both statements are correct. Statement I is the correct explanation of Statement II.

- b. Both statements are correct. Statement II is the correct explanation of Statement I.
- c. Only Statement II is correct.
- d. Only Statement I is correct.

99. The bar graph given below shows the population of two states, A and B (in lakhs) over the years. Study the graph and answer the question. (+1, -0.33)



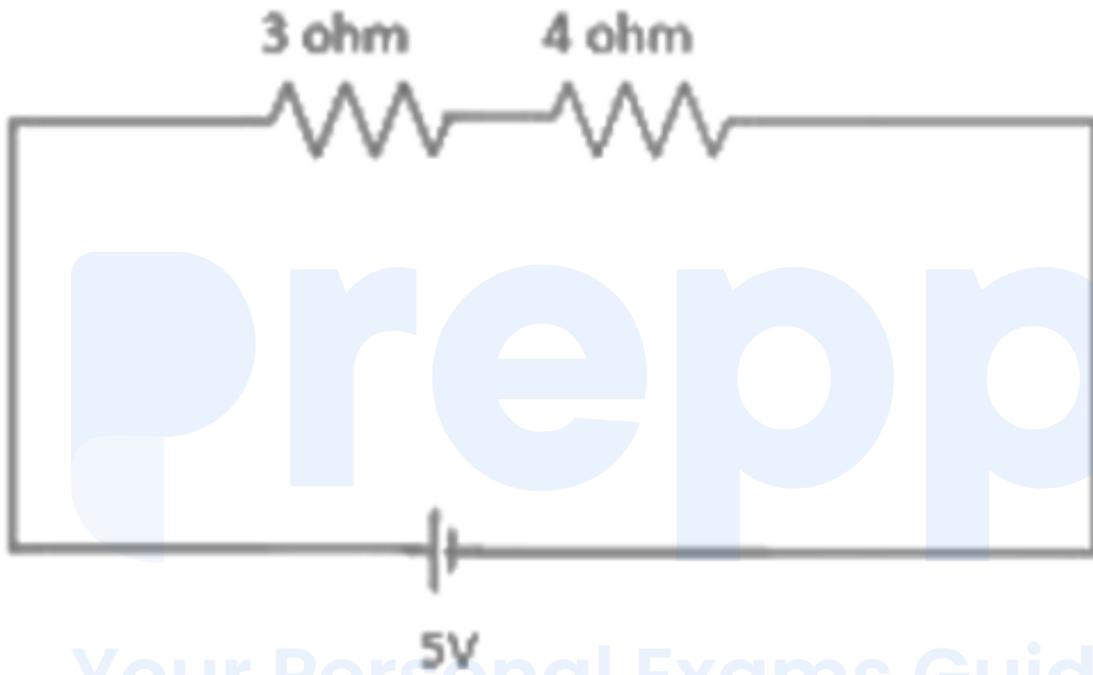
What is the approximate average population of state B for all the given years?

- a. 65 lakhs

- b. 62 lakhs
- c. 58 lakhs
- d. 70 lakhs

100. The current across the 3 ohm resistance in the given circuit is:

(+1, -0.33)



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- a.  $7/5$  A
- b.  $5/3$  A
- c.  $3/5$  A
- d.  $5/7$  A

## Answers

### 1. Answer: a

#### Explanation:

##### Solution:

To solve this problem, we first need to determine the initial speed of the car and then calculate the time it would take at the reduced speed to cover the new distance.

**Step 1:** Find the initial speed of the car.

The initial speed  $v$  can be calculated as:

$$v = \text{distance} / \text{time} = 275 \text{ km} / 5 \text{ hours} = 55 \text{ km/h}$$

**Step 2:** Calculate the reduced speed.

The speed is reduced by 5 km/h, so the new speed is:

$$\text{new speed} = 55 \text{ km/h} - 5 \text{ km/h} = 50 \text{ km/h}$$

**Step 3:** Calculate the time required to cover 250 km at the reduced speed.

Using the formula  $\text{time} = \text{distance} / \text{speed}$ :

$$\text{time} = 250 \text{ km} / 50 \text{ km/h} = 5 \text{ hours}$$

**Answer:** The car will take **5 hours** to cover 250 km at the reduced speed of 50 km/h.

### 2. Answer: d

#### Explanation:

The Scheme of Assistance to National Sports Federations (NSFs) has been extended to support the training and participation of national teams in both national and

international competitions during the XV Finance Commission Cycle, spanning from 2021-22 to 2025-26 (2022 and 2026)

This extension aims to prepare Indian athletes for major events, including the Commonwealth and Asian Games of 2022, the Olympics and Paralympics in 2024, and the Asian and Commonwealth Games in 2026.

---

### 3. Answer: a

#### Explanation:

According to the conditions, since the first element is an odd number and the last an even number, the first and last elements are retained as they are. Coding  $7 * \% 3 @ 6$ , we get 7 L N J F 6.

---

### 4. Answer: a

#### Explanation:

Lemon juice has a pH of 2.2,

gastric juice is very acidic with a pH of 1.2,

milk of magnesia has a pH of 10,

sodium hydroxide solution is very basic with a pH of 14.

Thus, the correct matching is i - c, ii - b, iii - d, iv - a.

---

### 5. Answer: b

#### Explanation:

Fleming's left-hand rule is used to find the direction of force on a current-carrying conductor placed within a magnetic field.

According to Fleming's Left-Hand Rule:

- Stretch the thumb, forefinger, and middle finger of your left hand so that they are mutually perpendicular.
- The forefinger represents the direction of the magnetic field.
- The middle finger represents the direction of the current.
- The thumb represents the direction of the force (or motion) on the conductor.

---

**6. Answer: b**

**Explanation:**

PM-VIKAS is aligned to the period of the 15th Finance Commission, extending up to 2025-26 under the Ministry of Minority Affairs.

---

**7. Answer: c**

**Explanation:**

The correct pattern for the letter series is obtained by filling in the blanks with the sequence HMBTHT. (B H X T M\_ \ B H Y T M \ B H Z TM)

---

**8. Answer: d**

**Explanation:**

$$80/20 = 4 \text{ and } 4^2 = 16$$

Similarly,

$$189/27 = 7 \text{ and } 7^2 = 49$$

## 9. Answer: b

### Explanation:

To find the roots of the quadratic equation:

$$6p^2 - 5p - 6 = 0$$

we use the quadratic formula:

$$p = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where  $a = 6$ ,  $b = -5$ , and  $c = -6$ .

### Step 1: Substitute values into the formula

$$p = \frac{-(-5) \pm \sqrt{(-5)^2 - 4 * 6 * (-6)}}{2 * 6}$$

$$p = \frac{5 \pm \sqrt{25 + 144}}{12}$$

$$p = \frac{5 \pm \sqrt{169}}{12}$$

### Step 2: Simplify the square root

$$p = \frac{5 \pm 13}{12}$$

### Step 3: Solve for both roots

1. For the positive case:

$$p = \frac{5 + 13}{12} = \frac{18}{12} = \frac{3}{2}$$

2. For the negative case:

$$p = \frac{5 - 13}{12} = \frac{-8}{12} = -\frac{2}{3}$$

### Final Answer

The roots of the equation  $6p^2 - 5p - 6 = 0$  are:

$$p = 3/2 \text{ and } p = -2/3$$

---

10. **Answer: d**

**Explanation:**

After analyzing the diagram, it is found that  $20 + 21 = 41$  people like Mint but not Kesar flavor (also include people who likes mint and vanilla)

---

11. **Answer: a**

**Explanation:**

Bandhan Bank was established in the year 2015 to provide banking services to the underserved and unbanked population.

---

12. **Answer: d**

**Explanation:**

Seven boxes, A, B, C, D, E, F, and G, are kept one over the other based on the following conditions:

1. Only two boxes are kept between G and B.
2. B is kept at the bottom.
3. C is kept on one of the positions above D.
4. F is kept immediately above D.
5. A is kept fifth from the bottom.
6. E is kept at the top.

## Step-by-Step Arrangement

Let's go through each condition:

- Since B is at the bottom, it is in the 7th position.
- Since E is at the top, it is in the 1st position.
- A is fifth from the bottom, which places it in the 3rd position from the top.
- With two boxes between G and B, G must be in the 4th position.
- F is immediately above D, so they occupy consecutive positions.
- C is positioned above D.

Based on these placements, we get the following arrangement:

Position (from top)	Box
1	E
2	C
3	A
4	G
5	F
6	D
7	B

### Answer to the Question

How many boxes are kept between D and A?

D is in the 6th position, and A is in the 3rd position. There are two boxes (G and F) between D and A.

**Final Answer:** The number of boxes kept between D and A is **2**.

13. Answer: d

## Explanation:

Article 243E of the Indian Constitution is related to the **duration of Panchayats** in India.

## Key Points of Article 243E:

- It specifies the **term of Panchayats**.
- The duration of a Panchayat is **five years** from the date of its first meeting.
- It includes provisions for **dissolution** of a Panchayat before the end of its term.
- Elections must be conducted **before the expiry** of the five-year term or **within six months** from the date of dissolution.

---

## 14. Answer: d

## Explanation:

A group of people contains men, women, and children. If 40% of them are men, 35% are women, and the rest are children, and their aver

## Given Data:

- **Percentage of men: 40%, Average weight of men: 70 kg**
- **Percentage of women: 35%, Average weight of women: 60 kg**
- **Percentage of children: 25% (100% - 40% - 35%), Average weight of children: 30 kg**

## Solution:

The average weight of the group can be calculated as:

**Average weight of group** = (Percentage of men × Average weight of men + Percentage of women × Average weight of women + Percentage of children × Average weight of children) / 100

Substituting the values:

$$\text{Average weight of group} = (40 \times 70 + 35 \times 60 + 25 \times 30) / 100$$

### Calculations:

- $40 \times 70 = 2800$
- $35 \times 60 = 2100$
- $25 \times 30 = 750$

$$\text{Total weighted sum} = 2800 + 2100 + 750 = 5650$$

Now, divide by 100 to get the average weight:

$$\text{Average weight of group} = 5650 / 100 = 56.5 \text{ kg}$$

### Final Answer:

The average weight of the group is **56.5 kg**.

---

15. **Answer: d**

### Explanation:

Since all jokers are circuses, and all circuses are equestrians, it follows logically that some equestrians are spectacles. Thus, both conclusions follow.

---

16. **Answer: b**

### Explanation:

**Given Series:** 2 6 7 4 9 3 6 5 1 9 5 2 4 5 9 4 2 3 7 1

We need to find the count of even numbers that are immediately preceded by an odd number and immediately followed by a prime number.

## Prime Numbers within the Range:

Prime numbers under 10 are: 2, 3, 5, and 7.

## Step-by-Step Analysis:

We analyze each even number in the sequence to check if it has an odd number before it and a prime number after it.

- **2:** No preceding number (start of the sequence) → Does not meet condition.
- **6:** Preceded by 2 (even), followed by 7 (prime) → Does not meet condition.
- **4:** Preceded by 7 (odd), followed by 9 (not prime) → Does not meet condition.
- **6:** Preceded by 3 (odd), followed by 5 (prime) → **Meets condition.**
- **2:** Preceded by 5 (odd), followed by 4 (not prime) → Does not meet condition.
- **4:** Preceded by 9 (odd), followed by 5 (prime) → **Meets condition.**
- **4:** Preceded by 5 (odd), followed by 2 (not prime) → Does not meet condition.
- **2:** Preceded by 4 (even), followed by 3 (prime) → Does not meet condition.

## Summary of Results:

The even numbers that satisfy the condition (preceded by an odd number and followed by a prime number) are:

- The first **6** (preceded by 3, followed by 5)
- The first **4** (preceded by 9, followed by 5)

## Final Answer:

There are **2 even numbers** in the sequence that are immediately preceded by an odd number and immediately followed by a prime number.

---

17. **Answer: c**

**Explanation:**

The chlor-alkali process involves the electrolysis of brine (NaCl solution), producing NaOH, Cl<sub>2</sub>, and H<sub>2</sub>. Therefore, option 3 represents this process.

---

18. **Answer: c**

**Explanation:**

Substituting the given symbols, the equation becomes

$$9 + 8 \div 4 \times 8 - 5 = 9 + 2 \times 8 - 5 = 9 + 16 - 5 = 20$$

---

19. **Answer: b**

**Explanation:**

Power (P) = 1/f (in meters). Here, f = -0.5 m, so P = -5 D.

---

20. **Answer: d**

**Explanation:**

The joint venture to launch the Maruti 800 was signed in 1982, marking a significant moment in India's automobile industry.

---

21. **Answer: d**

**Explanation:**

When magnesium burns in oxygen, it forms magnesium oxide (MgO), a white powdery substance.

---

22. Answer: a

**Explanation:**

According to the **right-hand rule** for a current-carrying conductor, if you point your thumb in the direction of the current, your fingers will curl in the direction of the magnetic field lines around the conductor.

**Answer:**

The direction of the magnetic field lines as viewed from the east end will be **anticlockwise**.

---

23. Answer: c

**Explanation:**

Iodine has the largest atomic radius among the given elements because atomic radius increases down a group in the periodic table.

---

24. Answer: a

**Explanation:**

Karnataka has become India's first state to launch an **AVGC (Animation, Visual Effects, Gaming, and Comics) Centre of Excellence**. This initiative aims to promote the AVGC sector by providing infrastructure, resources, and training to foster growth in animation, gaming, and related industries.

25. Answer: b

**Explanation:**

Planets do not twinkle because they act as extended sources of light, so the variations due to atmospheric turbulence are averaged out.

---

26. Answer: a

**Explanation:**

Article 78 of the Indian Constitution specifies the duties of the Prime Minister regarding the furnishing of information to the President.

---

27. Answer: a

**Explanation:**

The pair (17, 34) is not coprime as they share a common factor of 17, whereas coprime pairs have no common factors other than 1.

---

28. Answer: d

**Explanation:**

In a certain code language:

- 'SIGMA' is written as 'FVTZN'
- 'FNYRQ' is written as 'SALED'

### Step 1: Analyze the Shift Pattern

For 'SIGMA' to 'FVTZN':

Original	S	I	G	M	A
Code	F	V	T	Z	N
Shift	-13	+13	+13	+13	+13

The shift pattern for encoding alternates between -13 (first letter) and +13 (subsequent letters).

### Step 2: Apply the Pattern to 'ARJUN'

Using the alternating shifts pattern (-13, +13):

Original	A	R	J	U	N
Shift	+13	-13	+13	-13	+13
Code	N	E	W	H	A

### Final Answer

The code for 'ARJUN' in this language is 'NEWHA'.

29. Answer: d

#### Explanation:

From the diagram, 17 people are identified as having suffered from both Allergy and Chickenpox but not Common Cold.

30. Answer: c

**Explanation:**

If respiration exceeds photosynthesis, the plant will consume more food than it produces, leading to starvation and eventually death.

---

**31. Answer: c**

**Explanation:**

Swami Vivekananda founded the Ramakrishna Mission in 1897 to promote spirituality and social service.

---

**32. Answer: c**

**Explanation:**

Starch is the main storage carbohydrate in plants, while glycogen serves this role in animals.

---

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**33. Answer: c**

**Explanation:**

The Indian Constitution is structured into 25 parts and includes 12 schedules that address various administrative and legislative areas.

---

**34. Answer: d**

**Explanation:**

Assumption I is implicit as the failure of the main grid affected power supply to the city. Assumption II is not necessarily implied by the statement.

---

35. **Answer: c**

**Explanation:**

Kilowatt is a unit of power, not heat energy, while Calorie, Watt second, and Joule are units of heat energy.

---

36. **Answer: c**

**Explanation:**

In 2020, Oriental Bank of Commerce and United Bank of India were merged with Punjab National Bank.

---

37. **Answer: b**

**Explanation:**

Calculating the expression:  $325 \times 5 + 31 \times 21 - 22 \times 11$

$$= 1625 + 651 - 242$$

$$= 2034.$$

---

38. **Answer: c**

**Explanation:**

The bends formed in a river, where the water erodes its banks on the outside of the channel, are known as **meanders**.

### Explanation:

- **Meanders** are curves or bends in a river that form as the water flows in a winding path.
- The outside of a meander (called the **cut bank**) experiences erosion due to the faster flow of water.
- The inside of a meander (called the **point bar**) experiences deposition as the water flow is slower.

Meanders are a common feature in the middle and lower courses of rivers where the gradient is gentler, allowing the river to flow more sinuously.

---

39. Answer: a

### Explanation:

#### Step 1: Simplify the Numerator

- $8^2 = 64$
- $3^3 = 27$

So, the numerator becomes:

$$64 \times 27 = 1728$$

#### Step 2: Simplify the Denominator

- $\sqrt{64} = 8$
- $\sqrt{81} = 9$

So, the denominator becomes:

$$8 \times 9 = 72$$

### Step 3: Divide the Numerator by the Denominator

Now we have:

$$1728 \div 72 = 24$$

---

#### 40. Answer: d

#### Explanation:

Let the present age of the father be **F** and the present age of the daughter be **D**.

1. **Given:** The sum of their ages is 80 years:
2. **Given:** Eight years ago, the father's age was seven times the age of the daughter:

#### Step 2: Solve the Equations

From the first equation:

$$F = 80 - D$$

Substitute this value of **F** in the second equation:

$$(80 - D) - 8 = 7(D - 8)$$

Simplify:

$$72 - D = 7D - 56$$

Add **D** and 56 to both sides:

$$128 = 8D$$

Divide by 8:

$$D = 16$$

Now, use the first equation to find **F**:

$$F = 80 - 16 = 64$$

### Step 3: Calculate the Daughter's Age Eight Years from Now

The daughter's current age  $D$  is 16. Eight years from now, her age will be:

$$D + 8 = 16 + 8 = 24$$

### Final Answer

The daughter's age eight years from now will be **24 years**.

---

#### 41. Answer: c

#### Explanation:

##### Given Statement:

$$Y < O \leq G \leq K = U > L > P$$

Let's break down each part of the statement:

- $Y < O$ :  $Y$  is less than  $O$ .
- $O \leq G$ :  $O$  is less than or equal to  $G$ .
- $G \leq K$ :  $G$  is less than or equal to  $K$ .
- $K = U$ :  $K$  is equal to  $U$ .
- $U > L$ :  $U$  is greater than  $L$ .
- $L > P$ :  $L$  is greater than  $P$ .
- $K = U$ , meaning  $K$  is equal to  $U$ .
- Since  $U > L > P$ , it follows that  $U$  (and therefore  $K$ ) is greater than  $P$ .

Therefore,  $K > P$  is a valid conclusion based on the statement.

### Final Answer

The correct conclusion is:

K > P

---

42. Answer: c

**Explanation:**

The first Biosafety Level-3 (BSL-3) Containment Mobile Laboratory was inaugurated in Nagpur in February 2022.

---

43. Answer: d

**Explanation:**

To find the HCF (Highest Common Factor) of 108 and 144, we can use the prime factorization method.

**Step 1: Prime Factorization**

- Prime factors of 108:
- Prime factors of 144:

**Step 2: Find the Common Factors**

The common prime factors of 108 and 144 are 2 and 3.

- The lowest power of 2 common to both numbers is  $2^2$ .
- The lowest power of 3 common to both numbers is  $3^2$ .

**Step 3: Multiply the Common Factors**

$$\text{HCF} = 2^2 \times 3^2 = 4 \times 9 = 36$$

**Final Answer**

The HCF of 108 and 144 is **36**.

---

**44. Answer: a**

**Explanation:**

64 : 81 :: 121 : 144 : 169 : ?

**Step-by-Step Analysis**

1. **64 and 81**

- $64 = 8^2$
- $81 = 9^2$
- The relationship: The second number (81) is the square of the next integer after the square root of the first number (64). That is,  $\sqrt{64} + 1 = 9$ , and  $9^2 = 81$ .

2. **121 and 144**

- $121 = 11^2$
- $144 = 12^2$
- The relationship: The second number (144) is the square of the next integer after the square root of the first number (121). That is,  $\sqrt{121} + 1 = 12$ , and  $12^2 = 144$ .

3. **169 and ?**

- $169 = 13^2$
- Following the same pattern, the next integer after the square root of 169 is 14, and  $14^2 = 196$ .

**Final Answer**

The missing number is **196**.

---

**45. Answer: d**

## Explanation:

Let:

- Smallest parallel side =  $a$
- Second parallel side =  $a + 4$
- Height =  $a + 8$

### Step 2: Set Up the Area Formula for a Trapezium

The area  $A$  of a trapezium with parallel sides  $a$  and  $b$ , and height  $h$  is given by:

$$A = (1/2) \times (\text{sum of parallel sides}) \times \text{height}$$

Given:

- Area  $A = 160$
- Sum of parallel sides =  $a + (a + 4) = 2a + 4$
- Height =  $a + 8$

### Step 3: Substitute Values into the Area Formula

$$160 = (1/2) \times (2a + 4) \times (a + 8)$$

Multiply both sides by 2:

$$320 = (2a + 4)(a + 8)$$

### Step 4: Expand and Simplify

$$320 = 2a^2 + 20a + 32$$

$$0 = 2a^2 + 20a - 288$$

Divide by 2:

$$0 = a^2 + 10a - 144$$

### Step 5: Solve the Quadratic Equation

Using the quadratic formula:

$$a = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$a = \frac{-10 \pm \sqrt{10^2 + 4 \times 144}}{2}$$

$$a = 8 \text{ (selecting the positive value as length cannot be negative)}$$

### Step 6: Determine Lengths of the Parallel Sides

- Smallest parallel side =  $a = 8$
- Greatest parallel side =  $a + 4 = 12$

### Step 7: Calculate the Ratio

$$\text{Ratio} = \frac{\text{Greatest Parallel Side}}{\text{Smallest Parallel Side}} = \frac{12}{8} = \frac{3}{2}$$

### Final Answer

The ratio of the length of the greatest parallel side to that of the smallest parallel side is **3:2**.

46. Answer: a

Explanation:

543, 769, 552, 342, 245

1. Add 1 to the first digit of each number:

- 543 → 643
- 769 → 869
- 552 → 652
- 342 → 442
- 245 → 345

**2. Check divisibility of the modified first digit by the third digit:**

- 643: First digit = 6, Third digit = 3. 6 is divisible by 3.
- 869: First digit = 8, Third digit = 9. 8 is not divisible by 9.
- 652: First digit = 6, Third digit = 2. 6 is divisible by 2.
- 442: First digit = 4, Third digit = 2. 4 is divisible by 2.
- 345: First digit = 3, Third digit = 5. 3 is not divisible by 5.

**Conclusion:**

In **3 numbers** (643, 652, and 442), the modified first digit is exactly divisible by the third digit.

**Final Answer:**

The answer is **3**.

---

**47. Answer: b**

**Explanation:**

**Given:**

- Rate of interest = 12.5% per annum
- Time = 2 years
- Amount after 2 years = Rs. 8,250

**To Find:** Simple Interest (S.I.)

**Step 1: Use the Simple Interest Formula**

The formula for the amount (A) in terms of principal (P), rate (R), and time (T) with simple interest is:

$$A = P + S.I.$$

Since  $S.I. = (P \times R \times T) / 100$ , we can write:

$$A = P + (P \times R \times T) / 100$$

### Step 2: Substitute the Values and Solve for Principal (P)

We know the amount (A) after 2 years is Rs. 8,250:

$$8,250 = P + (P \times 12.5 \times 2) / 100$$

Simplify:

$$8,250 = P + (P \times 25) / 100$$

$$8,250 = P (1 + 0.25)$$

$$8,250 = P \times 1.25$$

Now, divide both sides by 1.25 to find P:

$$P = 8,250 / 1.25 = 6,600$$

### Step 3: Calculate the Simple Interest (S.I.)

Now that we know the principal (P) is Rs. 6,600, we can find the simple interest:

$$S.I. = (P \times R \times T) / 100$$

$$S.I. = (6,600 \times 12.5 \times 2) / 100$$

Calculate the simple interest:

$$S.I. = (6,600 \times 25) / 100 = 1,650$$

### Final Answer:

The simple interest is **Rs. 1,650**.

48. Answer: a

Explanation:

To determine the nature of the roots of the quadratic equation:

$$x^2 - 5x + 7 = 0$$

we use the **discriminant**. For a quadratic equation of the form  $ax^2 + bx + c = 0$ , the discriminant  $D$  is given by:

$$D = b^2 - 4ac$$

### Given Values

- $a = 1$
- $b = -5$
- $c = 7$

### Step 1: Calculate the Discriminant

Substitute the values of **a**, **b**, and **c** into the discriminant formula:

$$D = (-5)^2 - 4 \times 1 \times 7$$

$$D = 25 - 28$$

$$D = -3$$

### Step 2: Determine the Nature of the Roots

The nature of the roots depends on the value of the discriminant  $D$ :

- If  $D > 0$ , the roots are real and distinct.
- If  $D = 0$ , the roots are real and equal.
- If  $D < 0$ , the roots are complex (non-real).

Since  $D = -3$ , which is less than zero, the roots of the equation are **complex (non-real)**.

### Final Answer

The roots of the quadratic equation  $x^2 - 5x + 7 = 0$  are **complex (non-real)**.

49. Answer: a

**Explanation:**

The statement "They do not undergo any change" is incorrect, as genes can undergo mutations or changes over time.

---

50. Answer: b

**Explanation:**

St. John in the Wilderness Church is located in McLeod Ganj, Himachal Pradesh, not Pondicherry, making option 2 incorrectly matched.

---

51. Answer: c

**Explanation:**

The Chipko Andolan was a non-violent movement where people hugged trees to protect them from being cut down.

---

52. Answer: a

**Explanation:**

**Properties Required**

1. **High Melting Point:** The material must have a high melting point to withstand high temperatures without melting or deforming. This ensures that the heating element remains intact during operation.

2. **High Resistivity:** High resistivity is important because it allows the material to generate more heat when an electric current passes through it. Higher resistivity means the material will resist the flow of electricity more, causing more heat to be produced, which is desirable for heating elements.
3. **Low Resistance:** Low resistance is not a desirable property for heating elements. Low resistance would result in less heat generation, which is inefficient for heating devices. Instead, a material with higher resistance (or resistivity) is preferred to generate adequate heat.

## Conclusion

The properties that must be possessed by a material to be chosen for making heating elements of heating devices are:

- (i) High melting point
- (ii) High resistivity

## Final Answer

The correct properties are (i) high melting point and (ii) high resistivity.

---

### 53. Answer: b

#### Explanation:

Given:

- A single discount of 32%
- Two successive discounts of 20% each
- The difference between the selling prices after applying these discounts is Rs. 25

**To Find:** The actual amount of the bill

Let the actual amount of the bill be **Rs. x**.

### Case 1: Single Discount of 32%

The selling price after a single discount of 32% is:

$$\text{Selling Price} = x - (32\% \text{ of } x) = x - 0.32x = 0.68x$$

### Case 2: Two Successive Discounts of 20%

The selling price after the first discount of 20% is:

$$\text{First Discounted Price} = x - (20\% \text{ of } x) = x - 0.2x = 0.8x$$

Now, applying the second 20% discount on the first discounted price:

$$\text{Selling Price} = 0.8x - (20\% \text{ of } 0.8x) = 0.8x - 0.16x = 0.64x$$

### Difference Between the Two Selling Prices

According to the problem, the difference between the two selling prices is Rs. 25:

$$0.68x - 0.64x = 25$$

Solving for x:

$$0.04x = 25$$

Divide both sides by 0.04:

$$x = 25 / 0.04 = 625$$

### Final Answer

The actual amount of the bill is **Rs. 625**.

54. Answer: c

### Explanation:

Given: Each interior angle of a regular polygon is  $160^\circ$ .

**To Find:** The number of sides of the polygon (denoted as  $n$ ).

### Step-by-Step Solution

For a regular polygon with  $n$  sides, the measure of each interior angle is given by the formula:

$$\text{Interior Angle} = \frac{(n - 2) \times 180^\circ}{n}$$

We are given that each interior angle is  $160^\circ$ , so:

$$160 = \frac{(n - 2) \times 180}{n}$$

#### Step 1: Cross Multiply

$$160n = (n - 2) \times 180$$

#### Step 2: Expand and Simplify

$$160n = 180n - 360$$

Move  $160n$  to the right side:

$$0 = 20n - 360$$

#### Step 3: Solve for $n$

$$20n = 360$$

$$n = 360 / 20$$

$$n = 18$$

#### Final Answer

The number of sides in the regular polygon is **18**.

---

55. Answer: a

### Explanation:

A negative magnification indicates a real and inverted image, and a value less than 1 indicates it is diminished.

---

### 56. Answer: a

### Explanation:

Formula used:

Raju's work rate =  $1/12$

Raman's work rate =  $1/16$

Combined work rate over 2 days =  $(1/12) + (1/16)$

Solution:

Combined work rate over 2 days =  $(1/12) + (1/16)$

=  $(4/48) + (3/48)$

=  $7/48$

Work completed in 2 days =  $7/48$

Total work = 1 (complete work)

Calculating the number of 2-day cycles needed to finish the work:

=  $1 / (7/48)$

=  $48/7$

= 6 cycles (6 full 2-day cycles)

Work completed in 6 full cycles (12 days):

$$= 6 \times (7/48)$$

$$= 42/48$$

= 7/8 of the total work

$$\text{Remaining work} = 1 - 7/8 = 1/8$$

On the next day, Raju works (13th day):

$$\text{Raju's one-day work rate} = 1/12$$

To finish the remaining 1/8 of the work:

Let x be the fraction of the day Raju needs to work:

$$= (1/12) \times x = 1/8$$

$$x = (1/8) \times 12$$

$$x = 12/8$$

$$x = 3/2$$

Since Raju only works for 1 full day, he completes his share in that time, leaving:

$$= 1/8 - 1/12$$

$$= (3/24) - (2/24)$$

$$= 1/24$$

Raman completes the remaining 1/24 of the work in:

$$= (1/24) / (1/16)$$

$$= 16/24$$

$$= 2/3 \text{ of a day}$$

Total time taken:

$$= 12 \text{ days (for 6 cycles)} + 1 \text{ day (Raju's 13th day)} + 2/3 \text{ day (Raman's work)}$$

$$= 13 + 2/3$$

Final Answer:  $13\frac{2}{3}$  days

---

57. Answer: b

**Explanation:**

Substituting the symbols as per the question, the equation becomes  $18 \div 3 + 14 \times 2 - 12 = 6 + 28 - 12 = 22$

---

58. Answer: b

**Explanation:**

As per the Tripura Official Languages Act, 1964, Bengali and Kokborok are designated for official use in the state.

---

59. Answer: b

**Explanation:**

India covers approximately 2.3% of the Earth's total land area.

---

60. Answer: d

**Explanation:**

Let the numbers be  $x$  and  $x + 18$ .

Solving  $x + (x + 18) = 32$  gives  $x = 7$ ,

so the greater number is  $7 + 18 = 25$ .

---

61. **Answer: c**

**Explanation:**

## Solution

We are given the following series:

17, 30, 44, 59, 75, ?

To find the pattern, let's examine the differences between consecutive numbers:

### Step-by-Step Analysis

- $30 - 17 = 13$
- $44 - 30 = 14$
- $59 - 44 = 15$
- $75 - 59 = 16$

We observe that the differences between the consecutive numbers are increasing by 1 each time: 13, 14, 15, 16, ...

Following this pattern, the next difference should be 17.

### Calculate the Next Term

Add 17 to the last term in the series (75):

$$75 + 17 = 92$$

### Final Answer

The number that will replace the question mark in the series is 92.

62. Answer: c

**Explanation:**

4, 5, 12, 39, 160, ?

To find the pattern, let's examine how each term relates to the previous term.

- **4 to 5:** Add 1
- **5 to 12:** Multiply by 2 and add 2 ( $5 \times 2 + 2 = 12$ )
- **12 to 39:** Multiply by 3 and add 3 ( $12 \times 3 + 3 = 39$ )
- **39 to 160:** Multiply by 4 and add 4 ( $39 \times 4 + 4 = 160$ )

We observe a pattern: each term is multiplied by an increasing integer (2, 3, 4, ...) and then the same integer is added to the result.

**Calculate the Next Term**

Following the pattern, to get the next term, we multiply the last term (160) by 5 and add 5:

$$160 \times 5 + 5 = 800 + 5 = 805$$

**Final Answer**

The number that will replace the question mark in the series is **805**.

---

63. Answer: d

**Explanation:**

The first Republic Day of India was celebrated on January 26, 1950, marking the adoption of the Indian Constitution.

---

64. Answer: c

**Explanation:**

The Tamanna tool, focused on assessing aptitude in students, was developed by CBSE in collaboration with NCERT.

65. Answer: b

**Explanation:**

We are given:

- There are 72 students in total.
- Shalabh is standing at the extreme left end of the row.
- There are 8 students between Shalabh and Kimaya.
- Vitali is 26th from the extreme right end.

**To Find:** The number of students standing between Vitali and Kimaya.

**Step-by-Step Solution**

**Step 1: Determine Kimaya's Position**

Since Shalabh is at the extreme left, he is in position 1. With 8 students between Shalabh and Kimaya, Kimaya is in position:

$$1 + 8 + 1 = 10$$

Therefore, Kimaya is in position 10 from the left.

**Step 2: Determine Vitali's Position from the Left**

Since Vitali is 26th from the right end in a row of 72 students, his position from the left is:

$$72 - 26 + 1 = 47$$

Therefore, Vitali is in position 47 from the left.

### Step 3: Calculate the Number of Students Between Kimaya and Vitali

The number of students standing between Kimaya (position 10) and Vitali (position 47) is:

$$47 - 10 - 1 = 36$$

### Final Answer

The number of students standing between Vitali and Kimaya is 36.

---

#### 66. Answer: a

#### Explanation:

**Given:** A person starts at point X and makes several turns while walking certain distances. We need to find the distance and direction from point Y back to point X.

Let's track the person's path based on the given directions:

- 1. From point X:** Walk 45 m east.
  - o Position after this step: 45 m east of X.
- 2. Left turn:** Walk 40 m north.
  - o Position after this step: 45 m east and 40 m north of X.
- 3. Right turn:** Walk 90 m east.
  - o Position after this step: (45 + 90) m = 135 m east and 40 m north of X.
- 4. Right turn:** Walk 60 m south.
  - o Position after this step: 135 m east and (40 - 60) m = -20 m (20 m south) of X.
- 5. Right turn:** Walk 135 m west.
  - o Position after this step: (135 - 135) m = 0 m east (directly west) and 20 m north of X.

### Final Position Relative to Point X

The person ends up 20 m north of the starting point X.

### Final Answer

Point Y is **20 meters north** of point X.

---

### 67. Answer: a

#### Explanation:

The small intestine is primarily involved in digestion and nutrient absorption, not excretion.

---

### 68. Answer: c

#### Explanation:

Given:

$$d^2 + (1/d^2) = 18, \text{ and } d > 1/d$$

**Concept Used:**

We need to find the value of  $d^3 - (1/d^3)$

**Calculation:**

$$\text{Given } d^2 + (1/d^2) = 18$$

$$\text{Let } x = d + (1/d)$$

$$\text{Then, } x^2 = d^2 + 2 + (1/d^2)$$

$$\rightarrow x^2 = 18 + 2 = 20$$

$$\rightarrow x = \sqrt{20} = 2\sqrt{5}$$

We need to find  $d^3 - (1/d^3)$

We know that  $(d - (1/d))^3 = d^3 - (1/d^3) - 3(d - (1/d))$

Let  $y = d - (1/d)$

Then,  $y = \sqrt{x^2 - 4}$

$\rightarrow y = \sqrt{(20 - 4)} = \sqrt{16} = 4$

Now,  $(d - (1/d))^3 = d^3 - (1/d^3) - 3(d - (1/d))$

$\rightarrow 4^3 = d^3 - (1/d^3) - 3 \times 4$

$\rightarrow 64 = d^3 - (1/d^3) - 12$

$\rightarrow d^3 - (1/d^3) = 64 + 12 = 76$

$\therefore$  The value of  $d^3 - (1/d^3)$  is 76.

---

**69. Answer: c**

**Explanation:**

**Correct Answer:** C) Its smaller atomic size

**Explanation:** Carbon's smaller atomic size allows it to form strong covalent bonds with other atoms, creating stable compounds. This property enables carbon to participate in forming diverse structures, including chains and rings, which is fundamental in organic chemistry.

---

**70. Answer: c**

**Explanation:**

$$\left(\frac{1}{3}\right)^{-3} + \left(\frac{1}{5}\right)^{-4} + \left(\frac{1}{15}\right)^{-2}$$

$$\rightarrow 3^3 + 5^4 + 15^2$$

$$\rightarrow 27 + 625 + 225$$

$$\rightarrow 27 + 625 = 652$$

$$\rightarrow 652 + 225 = 877$$

$\therefore$  The correct answer is **877**.

---

**71. Answer: c**

**Explanation:**

**Solution:**

1. Calculate Mohit's monthly expenses:
  - o House rent: Rs. 5,000
  - o Bills: Rs. 2,000
  - o Total expenses =  $5,000 + 2,000 = \text{Rs. } 7,000$
2. Calculate Mohit's monthly savings:
  - o Monthly savings = Salary - Total expenses
  - o Monthly savings =  $15,000 - 7,000 = \text{Rs. } 8,000$
3. Calculate his annual savings excluding his birthday month:
  - o Annual savings without birthday month =  $8,000 \times 11 = \text{Rs. } 88,000$
4. Since he spends his entire savings in the month of his birthday, his total savings for the year are:
  - o Total savings in a year = Rs. 88,000

**Answer:** Mohit's savings in a year are Rs. 88,000.

---

**72. Answer: a**

**Explanation:**

The 36th National Games were hosted across six cities in Gujarat in 2022.

---

**73. Answer: d**

**Explanation:**

**Solution:**

1. Calculate the cumulative frequency (C.F.) for each class interval:
  - For 0–50: C.F. = 12
  - For 50–100: C.F. = 12 + 15 = 27
  - For 100–150: C.F. = 27 + 13 = 40
  - For 150–200: C.F. = 40 + 10 = 50
2. Determine the total frequency (N):
3. Find  $(N/2)$ :  $50/2$
4. Identify the median class:
  - Since 25 falls within the cumulative frequency of 27, the median class is **50–100**.

**Answer:** The median class is 50–100.

---

**74. Answer: a**

**Explanation:**

While biodegradable waste does produce foul smells and can spread disease, it typically does not increase landfill usage as it is meant to decompose naturally.

---

**75. Answer: c**

**Explanation:**

Identify vowels and consonants in the word "EXPLAIN":

- Vowels: A, I
- Consonants: E, X, P, L, N

1. Apply the transformation rule:

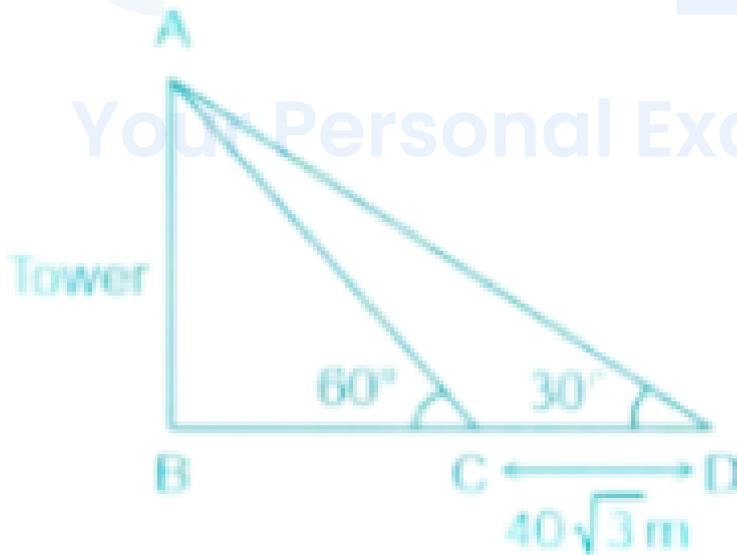
- For vowels, change to the next letter:
  - A becomes B
  - I becomes J
- For consonants, change to the previous letter:
  - E becomes D
  - X becomes W
  - P becomes O
  - L becomes K
  - N becomes M

2. Form the new letters: D, W, O, K, B, J, M
3. Arrange these letters in alphabetical order:
4. Find the third letter from the right end:

**Answer:** The letter third from the right end is M.

76. **Answer:** b

**Explanation:**



Let the height of the tower be  $h$   
i.e.  $h = AB$

In  $\triangle ABC$ ,  
 $\tan 60^\circ = AB/BC$   
 $\rightarrow \sqrt{3} = AB/BC$   
 $\rightarrow AB = BC\sqrt{3}$

Now,

In  $\triangle ABD$ ,  
 $\tan 30^\circ = AB/BD$   
 $\rightarrow 1/\sqrt{3} = BC\sqrt{3} / (BC + CD)$   
 $\rightarrow 3 BC = BC + CD$   
 $\rightarrow 3 BC - BC = CD$   
 $\rightarrow 2 BC = 40/\sqrt{3}$   
 $\rightarrow BC = 20/\sqrt{3}$

Now,

The height of the tower =  $AB = BC\sqrt{3} = 20/\sqrt{3} \times \sqrt{3} = 60$  m

$\therefore$  The height of the tower is 60 meters.

---

### 77. Answer: a

**Explanation:**

**Given:**

Simplify:  $6(x^3 - 2x^2 + 3x) - (x^3 + 2x - 3)$

**Concept Used:**

Distribute and combine like terms.

**Calculation:**

Expand the equation:

$\rightarrow 6(x^3 - 2x^2 + 3x) - (x^3 + 2x - 3)$

$\rightarrow 6x^3 - 12x^2 + 18x - x^3 - 2x + 3$

Combine like terms:

$$\rightarrow (6x^3 - x^3) + (-12x^2) + (18x - 2x) + 3$$

$$\rightarrow 5x^3 - 12x^2 + 16x + 3$$

$\therefore$  The simplified expression is  $5x^3 - 12x^2 + 16x + 3$ .

---

**78. Answer: c**

**Explanation:**

Umesh is standing facing the south-west direction. He then takes a  $90^\circ$  clockwise turn. After that, he takes a  $135^\circ$  clockwise turn. He finally takes a  $90^\circ$  anticlockwise turn. In which direction is he facing now?

**Solution:**

1. Initial direction: South-West.
2. First turn:  $90^\circ$  clockwise from South-West.
3. Second turn:  $135^\circ$  clockwise from North-West.
4. Third turn:  $90^\circ$  anticlockwise from East.

**Answer:** Umesh is now facing North.

---

Your Personal Exams Guide

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**79. Answer: d**

**Explanation:**

$C_2H_6$  and  $C_3H_8$  differ by a  $CH_2$  unit and belong to the homologous series.

---

**80. Answer: a**

**Explanation:**

Bile salts play a crucial role in the emulsification of fats, allowing them to be broken down and absorbed in the digestive system.

81. Answer: c

**Explanation:**

After analyzing the positions, it is found that there are 5 travelers between Puja and Pankaj.

$$14 - (8+1) = 14 - 9 = 5$$

82. Answer: b

**Explanation:**

The volume of a sphere is given by the formula:

$$V = (4/3)\pi r^3$$

**Step 1:** Calculate the volume of the larger sphere (radius = 6 cm).

Let the radius of the larger sphere,  $R = 6$  cm.

Using the formula:

$$V_{\text{large}} = (4/3)\pi R^3$$

$$V_{\text{large}} = (4/3)\pi(6)^3$$

$$V_{\text{large}} = (4/3)\pi(216)$$

$$V_{\text{large}} = 288\pi \text{ cm}^3$$

**Step 2:** Calculate the volume of a small marble (radius = 0.3 cm).

Let the radius of each small marble,  $r = 0.3$  cm.

Using the formula:

$$V_{\text{small}} = (4/3)\pi r^3$$

$$V_{\text{small}} = (4/3)\pi(0.3)^3$$

$$V_{\text{small}} = (4/3)\pi(0.027)$$

$$V_{\text{small}} = 0.036\pi \text{ cm}^3$$

**Step 3:** Find the number of small marbles that can be made.

$$\text{Number of small marbles} = V_{\text{large}} / V_{\text{small}}$$

$$= 288\pi / 0.036\pi$$

$$= 288 / 0.036$$

$$= 8000$$

**Answer:** 8000 small marbles can be made from the larger sphere.

---

**83. Answer: a**

**Explanation:**

To calculate the total profit percentage, we need to consider both the profit margin of 25% and the dishonest practice of using a weight that is 30% less than the actual weight.

**Step-by-Step Solution:**

1. Let the Actual Cost Price (CP) of the item per kg be 100 units.
2. **Selling Price (SP):** Since the shopkeeper sells at a 25% profit, the SP for 1 kg would be:  
$$\text{SP} = \text{CP} + 25\% \text{ of CP} = 100 + 25 = 125 \text{ units.}$$
3. **Effective Weight:** The shopkeeper is using a weight that is 30% less than the actual weight. Therefore, he is actually giving only 70% of the weight.

So, instead of selling 1 kg, he is selling only  $1 \text{ kg} \times 0.70 = 0.70 \text{ kg}$ .

4. **Effective Selling Price per kg:** The shopkeeper charges for 1 kg (125 units) but only gives 0.70 kg.

Effective SP per kg =  $125 / 0.70 = 178.57$  units (approximately).

5. **Total Profit Percentage:** Now, we calculate the total profit percentage:

Total Profit % =  $((178.57 - 100) / 100) \times 100 = 78.57\%$ .

### Conclusion:

The shopkeeper's total profit percentage is approximately **78.57%**.

---

### 84. Answer: a

#### Explanation:

The Dam Rehabilitation and Improvement Project (DRIP) was initiated in 2009 to address the safety and rehabilitation of dams across India.

---

### 85. Answer: c

#### Explanation:

To solve the equation, we need to replace each operator with its assigned meaning:

- '+' means '×'
- '×' means '÷'
- '÷' means '-'
- '-' means '+'

#### Step 1: Substitute the Operators

The original equation is:

$$13 - 17 + 24 \div 54 \times 18 + 28 \times 14 = ?$$

After substitution, the equation becomes:

$$13 + 17 \times 24 - 54 \div 18 \times 28 \div 14$$

$$= 13 + 17 \times 24 - 3 \times 2$$

$$= 13 + 408 - 6$$

$$= 415$$

---

## 86. Answer: c

### Explanation:

Solution to Cylinder Height Problem

### Solution

To find the height of the cylinder, we use the formula for the total surface area of a cylinder:

$$\text{Total Surface Area} = 2\pi r (r + h)$$

### Given Data:

- Diameter = 10 cm, so radius  $r = 5$  cm.
- Total Surface Area =  $330 \text{ cm}^2$ .

### Solution:

1. Substitute the values into the formula:

$$330 = 2 \times \pi \times 5 \times (5 + h)$$

1. Simplify the equation:

$$330 = 10\pi (5 + h)$$

1. Divide both sides by  $10\pi$ :

$$330 / (10\pi) = 5 + h$$

1. Substitute  $\pi \approx 3.1416$ :

$$330 / 31.416 = 5 + h$$

$$10.5 = 5 + h$$

1. Solve for h:

$$h = 10.5 - 5 = 5.5$$

### Conclusion:

The height of the cylinder is **5.5 cm**.

---

87. **Answer: b**

**Explanation:**

### Solution

The question requires us to find the branch with the minimum average production of milk products (in thousand tonnes) over four years (2018 to 2021).

### Data Analysis:

From the bar graph, we note the production data for each branch:

- **Branch X:** 50 (2018), 45 (2019), 45 (2020), 55 (2021)
- **Branch Y:** 35 (2018), 45 (2019), 40 (2020), 45 (2021)
- **Branch Z:** 45 (2018), 50 (2019), 50 (2020), 60 (2021)

**Calculate the Average Production for Each Branch:**

- Branch X:  $(50 + 45 + 45 + 55) / 4 = 195 / 4 = 48.75$
- Branch Y:  $(35 + 45 + 40 + 45) / 4 = 165 / 4 = 41.25$
- Branch Z:  $(45 + 50 + 50 + 60) / 4 = 205 / 4 = 51.25$

### Conclusion:

The minimum average production over the four years is for **Branch Y**, with an average of 41.25 thousand tonnes.

---

### 88. Answer: a

#### Explanation:

SIDBI (Small Industries Development Bank of India) was established in 1990 to support MSMEs in India.

---

### 89. Answer: c

#### Explanation:

$$40 : 35 :: 35 : X$$

$$40 \times X = 35 \times 35$$

$$X = 1225 / 40 = 245 / 8$$

---

### 90. Answer: a

#### Explanation:

To find the day of the week on 31 December 2011, given that 1 January 2011 was a Saturday, we proceed as follows:

### Step-by-Step Solution:

1. **Calculate the total days in 2011:** 2011 was not a leap year, so it has 365 days.
2. **Find the remainder when 365 is divided by 7:** Dividing 365 by 7 gives a remainder of 1. This means that 31 December 2011 is exactly 1 day after 1 January 2011 in terms of the weekday.
3. **Determine the day:** Since 1 January 2011 was a Saturday, adding 1 day would make 31 December 2011 a **Saturday**.

### Conclusion:

The day of the week on 31 December 2011 was **Saturday**.

---

### 91. Answer: b

#### Explanation:

Five friends A, B, C, D, and E are sitting in a straight row, facing north. We need to determine who sits at the exact center position of the row based on the following clues:

1. A is not at the exact center position of the row.
2. C is second from one extreme end, while fourth from the other extreme end.
3. B and D sit at the extreme ends of the row.

### Step-by-Step Solution:

Since B and D are at the extreme ends, the possible arrangement is:

- B, \_, C, \_, D
- D, \_, C, \_, B

In both cases, C is positioned second from one end and fourth from the other, satisfying the given clue about C's position.

Since A is not at the center, the only possible candidate for the center position is E.

**Conclusion:**

Therefore, the friend sitting at the exact center position of the row is **E**.

---

**92. Answer: c****Explanation:**

The line(s) that act as a normal to a spherical mirror are:

**1. (i) Line joining the pole and center of curvature:**

This line passes through the center of curvature, making it the principal normal to the spherical mirror.

**1. (ii) Line joining the center of curvature and point of incidence:**

At any point on the mirror, the line joining that point to the center of curvature is perpendicular to the mirror surface, making it a normal at the point of incidence.

**1. (iii) Line joining focus and point of incidence:**

This line does not act as a normal because it does not pass through the center of curvature.

**Conclusion:**

The correct lines that act as normals to a spherical mirror are:

- (i) Line joining the pole and center of curvature
  - (ii) Line joining the center of curvature and point of incidence
- 

**93. Answer: d****Explanation:**

Sodium reacts vigorously with water, producing hydrogen gas and sodium hydroxide solution.

---

94. Answer: a

**Explanation:**

Sweet potato is an example of a plant that can produce new plants from its roots.

---

95. Answer: a

**Explanation:**

PORTUGAL : TROPLAGU :: URANUS : ARUSUN :: AMRITSAR : ?

**Pattern Analysis:**

Observe how each letter cluster is transformed:

- PORTUGAL is rearranged to form TROPLAGU.
- URANUS is rearranged to form ARUSUN.

The pattern involves rearranging letters in a specific way for each letter cluster.

**Applying the Pattern:**

Applying a similar rearrangement to AMRITSAR, we get:

TSRRMIAA

**Conclusion:**

Therefore, the correct answer is TSRRMIAA.

---

96. Answer: b

**Explanation:**

Given the statement:

$$J \leq H \leq G = R > Z = E > D$$

**Analysis:**

- $J \leq H$ : J is less than or equal to H.
- $H \leq G$ : H is less than or equal to G.
- $G = R$ : G is equal to R.
- $R > Z$ : R is greater than Z.
- $Z = E$ : Z is equal to E.
- $E > D$ : E is greater than D.

**Combined Order:**

Based on the given relationships, the order is:

$$J \leq H \leq G = R > Z = E > D$$

**Conclusion:**

From this order, we can conclude that:

- $J \leq G$ : J is less than or equal to G.

97. Answer: a

**Explanation:**

solution:

1. **Clue 1:** O is second to the left of N.
2. **Clue 2:** P is second to the right of K.
3. **Clue 3:** M is to the immediate right of L.
4. **Clue 4:** N and L are immediate neighbors.

Using these clues, we determine the seating arrangement and find that **N is sitting to the immediate right of P.**

---

98. **Answer: b**

**Explanation:**

Both statements are true, and Statement II explains why metallic character decreases across a period as nuclear charge increases, making it harder to lose electrons.

---

99. **Answer: c**

**Explanation:**

Population of state B over the years:

- 2016: 38 lakhs
- 2017: 45 lakhs
- 2018: 52 lakhs
- 2019: 60 lakhs
- 2020: 68 lakhs
- 2021: 72 lakhs

**Step 1:** Calculate the sum of the population values:

$$38 + 45 + 52 + 60 + 68 + 72 = 335 \text{ lakhs}$$

**Step 2:** Calculate the average population:

Average population =  $335 / 6 = 55.83 \approx 58$  lakhs (approximate)

Therefore, the approximate average population of state B for all the given years is **58 lakhs**.

---

**100. Answer: d**

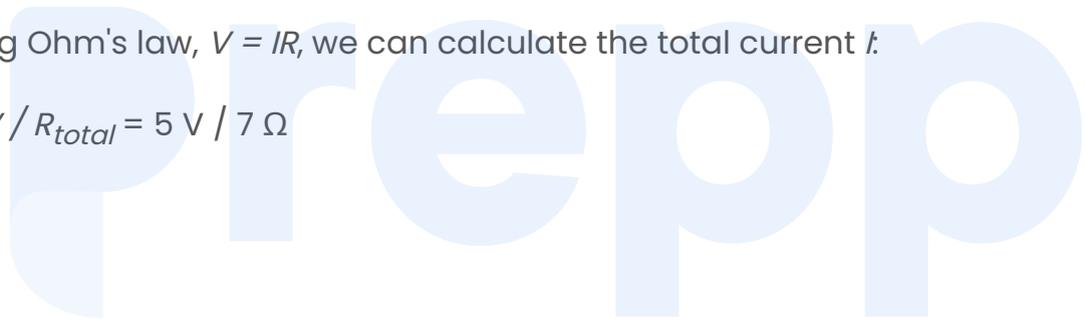
**Explanation:**

The resistors are connected in series, so the total resistance,  $R_{total}$ , is the sum of the individual resistances:

$$R_{total} = 3 \Omega + 4 \Omega = 7 \Omega$$

Using Ohm's law,  $V = IR$ , we can calculate the total current  $I$ :

$$I = V / R_{total} = 5 \text{ V} / 7 \Omega$$



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