सत्यमेव जयते

रेलवे भर्ती बोर्ड / RAILWAY RECRUITMENT BOARD

CEN 07/2024 - मिनिस्ट्रियल और आइसोलेटेड कोटियाँ / CEN 07/2024 - Ministerial & Isolated Categories

Test Date	12/09/2025
Test Time	12:45 PM - 2:15 PM
Subject	Lab Assistant Grade III Chemist and Metallurgist

*** Note**
Correct Answer will carry 1 mark per Question.
Incorrect Answer will carry 1/3 Negative mark per Question.

1. Options shown in green color with a tick icon are correct.
2. Chosen option on the right of the question indicates the option selected by the candidate.

Section : **Professional Ability**

Q.1 **Which of the following tests is commonly used to detect water contamination in lubricating oils?**

Ans
- A. Shore Hardness test
- B. Taber Abrasion test
- C. Izod Impact test
- D. Karl Fischer test ✓

Q.2 **The glass envelope in which X-rays are produced is called the _____.**

Ans
- A. X-ray chamber
- B. X-ray tube ✓
- C. X-ray cell
- D. X-ray casing

Q.3 **Which of the following characteristics is NOT typically assessed during the visual finish evaluation of ROZ Primer and Synthetic Enamel coatings on railway coaches?**

Ans
- A. Dry film thickness measurement ✓
- B. Texture uniformity of the coating
- C. Smoothness of the paint film
- D. Colour uniformity across surfaces

Q.4 **Which of the following quantities is measured in abrasion resistance test?**

Ans
- A. Percentage of change in Phase fraction
- B. Percentage of change in length
- C. Percentage of weight loss ✓
- D. Percentage of change in density

Q.5 **Which of the following is NOT a defect in electroplating?**

Ans
- A. Pitting
- B. Smoothness ✓
- C. Porosity
- D. Blistering

Q.6 **Which filler is commonly added to rubber to enhance its mechanical properties?**

Ans

A. Titanium dioxide

B. Carbon black

C. Silica

D. Calcium carbonate

Q.7 **Which type of extensometer works on the principle of variation in electrical resistance due to strain?**

Ans

A. optical extensometer

B. strain gauge extensometer

C. magnetic extensometer

D. clip-on extensometer

Q.8 **Which paint application method is commonly employed for precise touch-up work in small or intricate areas of railway coaches?**

Ans

A. Spray painting

B. Dip coating

C. Brush painting

D. Electrostatic spray painting

Q.9 **Compared to a 3-point bend test, the 4-point bend test:**

Ans

A. requires less equipment accuracy

B. produces a larger region of uniform maximum bending moment

C. always causes shear failure instead of bending

D. produces no bending moment in the specimen

Q.10 **Which of the following ISO standards specifies the methods for determining the drying time of paints?**

Ans

A. ISO 2409

B. ISO 4624

C. ISO 4380

D. ISO 9117

Q.11 **Which of the following is NOT a way in which painting helps increase the durability and extend the service life of railway coaches?**

Ans

A. Forming a barrier against moisture and oxygen to prevent corrosion

B. Shielding the metal from industrial pollutants, acids, and alkalis

C. Protecting the surface from harmful chemicals and adverse weather

D. Absorbing heat and light, promoting thermal stress on materials

Q.12 **The component that is NOT a part of an electroplating bath setup is/are _____.**

Ans

A. resistance coil

B. heaters

C. anode

D. cathode

Q.13 **In tensile tests, the specimen is deformed up to what point or limit?**

Ans

A. Up to the elastic limit

B. Up to the plastic limit

C. Up to fracture

D. Up to the yielding limit

Q.14 **What is the function of wearing gloves during the electroplating process?**

Ans

A. To protect hands from chemical burn

B. To make hands look more attractive

C. To improve grip

D. To keep hands warm

Q.15 **Which device is used to receive and display ultrasonic signals?**

Ans

A. Optical microscope

B. Cathode ray oscilloscope

C. Photodiode sensor

D. Electromagnetic coil

Q.16 **Which of the following types of steel is most suitable for making cutting tools?**

Ans

A. Low-carbon steel

B. High-carbon steel

C. Medium-carbon steel

D. Stainless steel

Q.17 **The constant of proportionality used for Hooke's law is known as ____.**

Ans

A. Hooke's modulus

B. Shear modulus

C. Bulk modulus

D. Young's modulus

Q.18 **After dissolving a steel sample in acid to estimate silicon, what is the insoluble compound that is filtered and weighed?**

Ans

A. Silicon molybdate complex

B. Silicon carbide (SiC)

C. Potassium silicon fluoride (K_2SiF_6)

D. Silica (SiO_2)

Q.19 **The primary function of pickling in surface preparation is to:**

Ans

A. remove oil and grease

B. increase the surface area

C. make surface smooth

D. remove scale and oxides

Q.20 **What is the primary source of natural rubber?**

Ans

A. Hevea brasiliensis tree

B. Petroleum

C. Coal tar

D. Synthetic polymers

Q.21 **In welding radiography, porosity will appear as a _____.**

Ans

A. cluster of dark spots

B. cluster of light spots

C. single dark band

D. uniform gray area

Q.22 **Which of the following test standards are applicable for evaluating the chemical and oil resistance of ROZ Primer and Synthetic Enamel coating systems used in railway coaches?**

Ans

A. ISO 2808

B. ISO 2812

C. ISO 7784

D. ISO 2409

Q.23 **What is the unit of the engineering strain?**

Ans

A. m/s

B. mm

C. Independent of the unit

D. MPa

Q.24 **Which equipment is used for magnetic particle testing?**

Ans

A. Magnaflux

B. Ultrasonic tester

C. Spectrometer

D. X-ray machine

Q.25 **In welding radiography, a darker area on the film usually indicates _____.**

Ans

A. a region with less dense material than the weld

B. only surface ripples in the weld

C. no difference in density compared to the weld

D. a region with higher density than the weld

Q.26 **Which heat treatment process is used to soften steel for machining?**

Ans

A. Annealing

B. Quenching

C. Case hardening

D. Tempering

Q.27 **What type of defects is dye penetrant testing used to detect?**

Ans

A. Electrical faults

B. Small surface cracks or flaws

C. Colour changes in metals

D. Internal cracks only

Q.28 **Which of the following instruments is most widely used for measuring the viscosity of lubricants?**

Ans

A. Thermocouple

B. Barometer

C. Redwood viscometer

D. Bomb calorimeter

Q.29 **Which of following test methods is commonly used to determine the oxidation induction time (OIT) of lubricants?**

Ans

A. Karl Fischer water test

B. Penetration test ASTM D217

C. Rotating Pressure Vessel Oxidation test ASTM D2272

D. Flash point test ASTM D93

Q.30 **Which of the following mechanical properties is obtained from tensile test?**

Ans

A. Hardness number

B. Phase fraction

C. Fracture toughness

D. Ultimate tensile strength

Q.31 **Which famous Indian Standard (IS) specifies synthetic enamel paints commonly used for finishing railway coaches?**

Ans

A. IS: 8662 - 2004

B. IS: 456 - 2000

C. IS: 1239 - 2003

D. IS: 101 - 2011

Q.32 **In a 3-point bend test, the maximum bending stress in the specimen occurs:**

Ans

A. at one-third length from the support

B. uniformly along the specimen length

C. at the midpoint between the supports

D. at the supports

Q.33 **The energy of X-rays and gamma rays is usually expressed in _____.**

Ans

A. calories

B. lumens

C. ergs or electron volts

D. newtons

Q.34 **In a Charpy Impact Testing Machine, the specimen is supported:**

Ans

A. vertically between two supports

B. horizontally as a simply supported beam

C. vertically as a cantilever

D. horizontally as a fixed beam

Q.35 **What does oxidation stability of a lubricant primarily measure?**

Ans

A. Resistance to water contamination

B. Resistance to mechanical wear

C. Resistance to thermal expansion

D. Resistance to chemical degradation by oxygen exposure

Q.36 **What does a higher Brinell Hardness Number (BHN) primarily indicate about a metal?**

Ans

A. The metal is more brittle.

B. The metal is more conductive.

C. The metal is harder.

D. The metal is more ductile.

Q.37 **Which of the following properties is obtained from area under the stress vs strain curve up to yield point?**

Ans

A. Tensile strength

B. Ductility

C. Modulus of Toughness

D. Modulus of Resilience

Q.38 **Which manufacturing process produces the strongest plastic parts with fibre reinforcement?**

Ans

A. Blow moulding

B. Pultrusion

C. Injection moulding

D. Compression moulding

Q.39 **Which of the following properties is obtained from area under the stress vs strain curve up to fracture?**

Ans

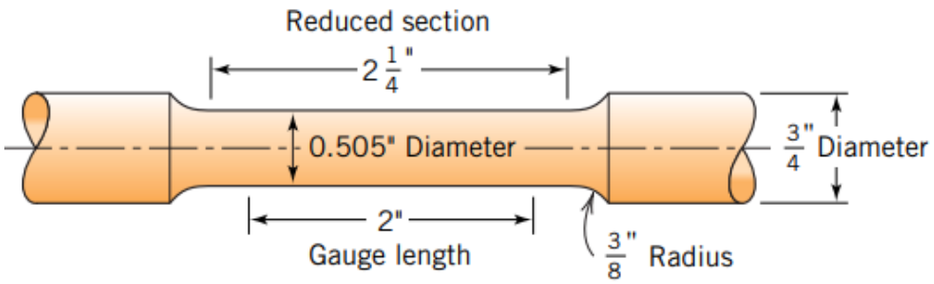
A. Tensile strength

B. Ductility

C. Toughness

D. Resilience

Q.40 **The specimen shown is used in which of the following tests?**



Ans

A. Torsion test

B. Tensile test

C. Bending test

D. Fatigue test

Q.41 **What does a lower impact energy value in a Charpy test indicate about an aluminum alloy?**

Ans

A. More brittle behaviour

B. Increased hardness

C. Better conductivity

D. Higher toughness

Q.42 **In a Compression Testing Machine (CTM), the compression plates are used to:**

Ans

A. transfer load uniformly to the specimen

B. increase hydraulic pressure

C. support the load frame

D. measure load

Q.43 **When estimating carbon in high-alloy steels containing chromium (>5%), what special consideration is required in combustion analysis?**

Ans

A. Longer combustion time

B. Addition of tin capsules

C. Higher oxygen flow rate

D. Use of tungsten accelerators

Q.44 **Radiography techniques used in casting are primarily applied to _____.**

Ans

A. detect internal cracks and defects in materials and welds

B. measure hardness of materials

C. increase the strength of materials

D. detect only surface defects in metals

Q.45 **What is the typical colorimetric measurement wavelength used in the molybdenum blue method for phosphorus determination?**

Ans

A. 450 nm

B. 650-830 nm

C. 540 nm

D. 320-420 nm

Q.46 **How is the penetration value measured in the grease penetration test (ASTM D217)?**

Ans

A. The resistance to shear forces under working conditions

B. The depth a cone penetrates into a grease sample under standard conditions

C. The time taken for grease to flow through a capillary

D. The temperature at which grease melts

Q.47 **Which of the following surface preparation methods is generally not used in the painting process of coaches in Indian Railways?**

Ans

A. Abrasive cleaning

B. Solvent wiping

C. Electrical treatment

D. Hand cleaning

Q.48 **Engineering stress σ is defined by the relationship $\sigma=F/A_0$, where A_0 is the original cross-sectional area before any load is applied. What does the symbol F represent?**

Ans

A. Shear load

B. Impact load

C. Bending load

D. Instantaneous load

Q.49 **In ultrasonic testing, which of the following components generates and applies high-frequency sound waves to the test piece?**

Ans

A. Laser diode

B. Magnetic coil

C. Piezoelectric crystal

D. Cathode ray oscilloscope

Q.50 **Which of the following tests is used to measure abrasion resistance of rubber materials?**

Ans

A. Izod Impact Test

B. Charpy Test

C. Taber Abrasion Test

D. Shore Hardness Test

Section : **General Ability**

Q.51 **Which among the following states in India has the longest coastal boundary?**

Ans

A. Andhra Pradesh

B. West Bengal

C. Maharashtra

D. Gujarat

Q.52 **What happens when the vibration of a sound source becomes faster?**

Ans

A. The pitch stays the same regardless of the vibration speed.

B. The frequency and pitch both increase.

C. The frequency increases, but pitch decreases.

D. The frequency and pitch both decrease.

Q.53 **This question is based on the following words.**

(Left) ONE TWO BEN MUG (Right)

If 'C' is added before each word, which of these words will form meaningful English word(s)?

Ans

A. Both ONE and TWO

B. Both MUG and ONE

C. Only BEN

D. Only ONE

Q.54 **Which of the following statements are correct?**
(i) Solid CO_2 is called dry ice.
(ii) Solid CO_2 changes directly into gas at 1 atm pressure.
(iii) Pressure and temperature can change the state of matter.
(iv) Solid CO_2 melts into liquid CO_2 before becoming gas.

Ans

A. (i) and (iv) only

B. (i), (ii), (iii) and (iv)

C. (ii) and (iv) only

D. (i), (ii) and (iii) only

Q.55 **Select the option that is true regarding the following two statements labelled Assertion (A) and Reason (R).**

Assertion (A): Copper wire in iron sulphate solution shows no visible reaction.
Reason (R): Copper is less reactive than iron.

Ans

A. A is true, but R is false.

B. Both A and R are true, and R is the correct explanation of A.

C. A is false, but R is true.

D. Both A and R are true, but R is not the correct explanation of A.

Q.56 **Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.**

Statements:

All flies are insects.
All insects are lasers.

Conclusions:

(I) Some lasers are insects.
(II) All flies are lasers.

Ans

A. Only conclusion (I) follows.

B. Both conclusions (I) and (II) follow.

C. Neither conclusion (I) nor (II) follows.

D. Only conclusion (II) follows.

Q.57 **If 'I' stands for '+', 'J' stands for '×', 'K' stands for '÷', and 'L' stands for '−', then what will come in place of the question mark (?) in the following equation?**

6 K 2 J 4 L 3 I 9 = ?

Ans

A. 23

B. 30

C. 26

D. 18

Q.58 What is the mean of the following distribution?

Marks	14	37	60	79	97
No. of Students	11	41	56	55	32

Ans

A. 88

B. 64

C. 60

D. 86

Q.59 If $\left(\frac{7}{11}\right)^{k-5} = \left(\frac{11}{7}\right)^{k-9}$, find the value of 2^k.

Ans

A. 128

B. 256

C. 32

D. 64

Q.60 *Find the value of* $\frac{\sqrt{0.01}}{\sqrt{0.0025}}$.

Ans

A. 2

B. 16

C. 7

D. 22

Q.61 One pipe can fill the tank in 12 min while another pipe can empty completely filled tank in 21 min. If both the pipes are operated together on empty tank, how long (in min) will it take to fill one-fourth of the tank?

Ans

A. 28

B. 7

C. 21

D. 14

Q.62 Amit borrows a sum of money from Avinash for 2 years at 5% simple interest per annum. After 2 years, he repays ₹6,666 in full settlement of the loan. How much interest did Amit pay?

Ans

A. ₹606

B. ₹612

C. ₹600

D. ₹610

Q.63 In May 2025, ISRO's 101st launch attempt, which failed, was carrying which satellite?

Ans

A. EOS-09

B. EOS-02

C. EOS-08

D. EOS-01

Q.64 Which of the following statements correctly describes the relationship among the incident ray, the refracted ray, and the normal at the point of incidence when light passes from one transparent medium to another?

Ans

A. The incident ray, the refracted ray, and the normal all lie in the same plane at the point of incidence.

B. They all travel in different directions randomly.

C. The normal is always at a 90° angle to the refracted ray.

D. Only the incident and refracted rays lie in the same plane, excluding the normal.

Q.65 In a certain code language, NOSE is written as EPTN and NOTE as EPUN. How will NAME be written in the same code?

Ans

A. EBNN

B. NBNE

C. EMAN

D. NAME

Q.66 Select the set in which the numbers are related in the same way as are the numbers of the following sets.
(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13 – Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

(198, 170, 142)
(214, 186, 158)

Ans

A. (142, 114, 86)

B. (116, 98, 86)

C. (235, 207, 169)

D. (168, 140, 102)

Q.67 This question is based on the following words.
PAN YEW CRY URN
How many letters are there in the English alphabetical order between the second letter of the second word from the right and the third letter of the second word from the left?

Ans
A. 4
B. 5
C. 6
D. 8

Q.68 A, B, C, D, P, Q and R are sitting around a circular table facing the centre of the table. A sits to the immediate left of R. B sits to the immediate left of D. D sits second to the left of Q. P sits third to the left of R.
Who sits fourth to the right of C?

Ans
A. Q
B. D
C. B
D. A

Q.69 The sum of the age of A and 5 times the age of B is 36 years. When 3 times the age of A is added to 7 times the age of B, the result is 62 years. The sum of the ages (in years) of A and B is:

Ans
A. 16
B. 12
C. 18
D. 13

Q.70 Which of the following Amendments has put a constitutional obligation upon states to enact the Panchayati Raj Acts as per the provisions of Part IX of the Indian Constitution?

Ans
A. 74^{th} Amendment 1992
B. 91^{st} Amendment 2003
C. 73^{rd} Amendment 1992
D. 86^{th} Amendment 2002

Q.71 What is a major risk associated with chewing tobacco?

Ans
A. Muscle cramps
B. Joint pain
C. Skin irritation
D. Pulmonary diseases and cancers

Q.72 GLAS is related to KPWO in a certain way based on the English alphabetical order. In the same way, OTSK is related to SXOG.
To which of the given options is WBKC related, following the same logic?

Ans
A. ZGFX
B. BEHZ
C. BDHY
D. AFGY

Q.73 Which of the following Articles of the Indian Constitution in Part VIII of the Constitution deals with the union territories?

Ans
A. Articles 235 to 239
B. Articles 239 to 241
C. Articles 259 to 271
D. Articles 249 to 261

Q.74 Which of the following Articles related to the Directive Principle of State Policy (DPSP) was implemented by the 73rd Amendment of 1992?

Ans

A. Article 46

B. Article 42

C. Article 44

D. Article 40

Q.75 Which of the following was the immediate cause for the rise of the Extremist movement in India?

Ans

A. The passing of the Rowlatt Act (1919)

B. Partition of Bengal (1905)

C. Jallianwala Bagh massacre (1919)

D. Arrest of Bal Gangadhar Tilak (1908)

Q.76 RIAL is related to HYQB in a certain way based on the English alphabetical order. In the same way, DUMX is related to TKCN. To which of the given options is ZQIT related, following the same logic?

Ans

A. PLKI

B. PGTY

C. PGTR

D. PGYJ

Q.77 Why is Cuscuta called a parasitic plant?

Ans

A. It grows in soil independently.

B. It depends on a host plant for nutrition.

C. It produces its own food via photosynthesis.

D. It traps insects for nitrogen.

Q.78 Seven boxes E, F, G, H, S, T and U are kept one over the other but not necessarily in the same order. Only three boxes are kept above G. Only one box is kept between E and G. Only three boxes are kept between E and U. U is kept at some place above G. T is kept immediately below U. S is kept at one of the places above F. H is not kept immediately above or below E.
Which box is kept at the lowermost position?

Ans

A. E

B. T

C. S

D. F

Q.79 In an eukaryotic cell, the thread-like structures carrying genetic information are mainly found in the:

Ans

A. Nucleus

B. Ribosome

C. Golgi body

D. Cytoplasm

Q.80 Which of the following ecological concepts best defines the process by which a body of water becomes overly enriched with nutrients, primarily nitrogen and phosphorus, leading to an excessive growth of algae and other simple plant life?

Ans

A. Biomagnification

B. Bioaccumulation

C. Ecological succession

D. Eutrophication

Q.81 In a certain code language, 'FIST' is coded as '3962' and 'SOFT' is coded as '3562'. What is the code for 'O' in the given code language?

Ans

A. 6

B. 9

C. 5

D. 2

Q.82 In July 2025, the Ministry of Skill Development and Entrepreneurship (MSDE) launched which AI-powered chatbot, developed jointly by META and NSDC?

Ans

A. Skill India Assistant

B. MSDE-AI

C. Power-AI

D. Power AI Assistant

Q.83 Who has written the book 'Siddhartha: The Boy Who Became the Buddha' (Novel) which was awarded with 2025 Sahitya Akademi Yuva Puraskar in English?

Ans

A. Anurag Bhaskar

B. Harleen Kaur

C. Advait Kottary

D. Koushik Goswami

Q.84 50 Ω, 50 Ω and 100 Ω resistors are connected in series in a circuit. They can be replaced with a single resistor of _____ in the circuit.

Ans

A. 20 Ω

B. 200 Ω

C. 100 Ω

D. 0.05 Ω

Q.85 Which of the following leaders is associated with the Extremist phase?

Ans

A. Mahatma Gandhi

B. Bal Gangadhar Tilak

C. Gopal Krishna Gokhale

D. Dadabhai Naoroji

Q.86 A mobile phone with a marked price ₹ 16,800 was sold for ₹ 13,944. What is the percentage discount given on the sale of the mobile phone.

Ans

A. 18%

B. 15%

C. 16%

D. 17%

Q.87 If 'A' stands for '÷', 'B' stands for '×', 'C' stands for '+' and 'D' stands for '−', then what will come in place of the question mark (?) in the following equation?

33 A 3 C 4 B 2 D 4 A 2 = ?

Ans

A. 11

B. 19

C. 17

D. 14

Q.88 Who became the first Indian wicketkeeper to score centuries in both innings of a Test match?

Ans

A. Mahendra Singh Dhoni

B. Dinesh Karthik

C. Wriddhiman Saha

D. Rishabh Pant

Q.89 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

FAT ZUN TOH NIB ?

Ans

A. HGT

B. HCV

C. HVC

D. HVG

Q.90 $tan\frac{20\pi}{21} - tan\frac{2\pi}{7} + \sqrt{3}tan\frac{2\pi}{7}\ tan\frac{20\pi}{21} = ?$

Ans

A. $\sqrt{3}$

B. $-\frac{1}{\sqrt{3}}$

C. $\frac{1}{\sqrt{3}}$

D. $-\sqrt{3}$

Q.91 A producer has 5000 J of energy. If only 10% of energy is transferred between trophic levels, how much energy will be available to the secondary consumer?

Ans

A. 5 J

B. 500 J

C. 50 J

D. 25 J

Q.92 What amount was allocated for the COVID-19 vaccine in the 2021-22 Budget?

Ans

A. ₹35,000 crore

B. ₹50,000 crore

C. ₹45,000 crore

D. ₹25,000 crore

Q.93 Refer to the number series given below and answer the question that follows. Counting to be done from left to right only. (All numbers are single-digit numbers only.)

(Left) 4 7 5 8 9 2 8 7 1 6 8 2 9 8 5 2 8 2 6 4 4 7 8 (Right)

How many such odd digits are there each of which is immediately preceded by an odd digit and also immediately followed by an odd digit?

Ans

A. One

B. None

C. Three

D. Two

Q.94 **Which of the following are compressed gases commonly used in daily life?**
(i) LPG for cooking
(ii) Oxygen in hospitals
(iii) CNG in vehicles
(iv) Water in bottles

Ans

A. (i) and (iii) only

B. (ii) and (iv) only

C. (i), (ii) and (iii) only

D. (i), (ii), (iii) and (iv)

Q.95 **Italia Gopal, who won the Visavadar (Gujarat) Assembly Constituency in the June 2025 bye-election, represents which political party?**

Ans

A. Bharatiya Janata Party

B. Indian National Congress

C. Aam Aadmi Party

D. Bahujan Samaj Party

Q.96 **A cyclist travels at 18 km/hr for 2.5 hours. What distance does he cover?**

Ans

A. 48 km

B. 45 km

C. 40 km

D. 43 km

Q.97 **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.)

Ans

A. LJN

B. AYC

C. GFI

D. USW

Q.98 **What is a budget deficit?**

Ans

A. When the fiscal deficit is zero

B. When government expenses exceed its income

C. When government income exceeds its expenses

D. When RBI prints extra currency

Q.99 **Majuli Island is located in which Indian state?**

Ans

A. West Bengal

B. Odisha

C. Andhra Pradesh

D. Assam

Q.100 **Three friends A, B, and C started a business by investing ₹6,000, ₹8,000, and ₹10,000 respectively. If their total profit at the end of the year is ₹12,000, what is C's share?**

Ans

A. ₹4,500

B. ₹5,500

C. ₹5,000

D. ₹4,000