



रेल भर्ती बोर्ड / RAILWAY RECRUITMENT BOARDS

सी ई एन - ०१/२०२५ - CEN - 01/2025

सहायक लोको पायलट की भर्ती/ Recruitment of Assistant Loco Pilot



Test Date	28/07/2026
Test Time	2:30 PM - 5:00 PM
Subject	ALP Stage 2 Heat Engine

* 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 : PART-A

Q.1 Why is a room thermometer generally mounted vertically on a wall?

- Ans
- ☒ A. It protects the thermometer from breaking easily.
 - ☒ B. It ensures accurate reading by keeping the bulb exposed to room air.
 - ☐ C. It prevents the liquid from freezing inside the thermometer.
 - ☐ D. It helps the thermometer measure body temperature faster.

Q.2 Which type of personal protective equipment is most suitable for tasks involving airborne chemical particles in confined spaces?

- Ans
- ☐ A. Hand protection using chemical-resistant gloves
 - ☐ B. Body protection with flame-retardant suits
 - ☐ C. Head protection with industrial-grade hard hats
 - ☒ D. Respiratory protection devices such as half-face masks

Q.3 A sum of money invested at simple interest amounts to ₹21,500 in 5 years and ₹26,000 in 8 years. Find the principal amount (in ₹).

- Ans
- ☒ A. 14,000
 - ☐ B. 12,000
 - ☐ C. 7,500
 - ☐ D. 15,500

Q.4 Which of the following pairs of numbers is co-prime?

- Ans
- ☒ A. (17, 54)
 - ☐ B. (28, 49)
 - ☐ C. (14, 28)
 - ☐ D. (21, 33)

Q.5 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair 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. HB-IC
 - ☐ B. FZ-GA
 - ☒ C. RL-SN
 - ☐ D. PJ-QK

Q.6 Which tool safety measure best prevents injuries when cleaning a workshop lathe after use?

- Ans**
- ☐ A. Wiping metal chips using bare hands directly
 - ☐ B. Using a rag to remove metal dust from the lathe
 - ☐ C. Blowing chips away with compressed air around the lathe
 - ☒ D. Using a brush to remove metal chips from the lathe

Q.7 The mean of 11 numbers is 10.9. If the mean of the first 6 numbers is 10.5 and the mean of the last 6 numbers is 11.4, then find the 6th number.

- Ans**
- ☐ A. 10
 - ☐ B. 11
 - ☐ C. 10.5
 - ☒ D. 11.5

Q.8 Let C be a circle, and AB and DE be two chords on C such that AB = BE. In the quadrilateral ABED, let AE and BD intersect at F, $\angle DBE = 55^\circ$ and $\angle BAE = 40^\circ$. Find $\angle FED$.

- Ans**
- ☐ A. 60°
 - ☐ B. 55°
 - ☒ C. 45°
 - ☐ D. 110°

Q.9 What information does a kilometer stone provide to travelers on a road?

- Ans**
- ☒ A. Distance from a reference point
 - ☐ B. Speed of the vehicle
 - ☐ C. Time taken to reach destination
 - ☐ D. Direction of travel

Q.10 Pipes A and B can fill an entire tank in 8 hours and 12 hours, respectively. The water tank is one-fourth full. If both the pipes are opened together, then how long will it take to fill the remaining part of the tank?

- Ans**
- ☐ A. 3 hours 6 minutes
 - ☐ B. 3 hours 16 minutes
 - ☐ C. 3 hours 26 minutes
 - ☒ D. 3 hours 36 minutes

Q.11 A cyclist travels from the kilometer stone marked 52 to the stone marked 79. How far has the cyclist traveled?

- Ans**
- ☐ A. 31 kilometers
 - ☐ B. 131 kilometers
 - ☐ C. 52 kilometers
 - ☒ D. 27 kilometers

Q.12 A cyclist rides 60 meters north, then 80 meters south, and finally 70 meters north. What is the total distance the cyclist has traveled?

- Ans**
- ☒ A. 210 meters
 - ☐ B. 10 meters
 - ☐ C. 60 meters
 - ☐ D. 150 meters

Q.13 If $3x - 2y + 3z = 8$, $4x - 3y + 2z = 4$ and $2x + y - z = 1$, then find x, y and z, respectively.

Ans ☒ A. 1, 2 and 3

☐ B. 3, 1 and 2

☐ C. 2, 3 and 1

☐ D. 2, 1 and 3

Q.14 Why are electric wires in household appliances usually covered with plastic or rubber coating?

Ans ☐ A. To make the wires heavier

☐ B. To increase the flow of current

☒ C. To prevent electric shocks by insulation

☐ D. To produce more heat

Q.15 In a certain code language,
A + B means 'A is the mother of B',
A - B means 'A is the brother of B',
A × B means 'A is the wife of B' and
A % B means 'A is the father of B'.

How is Satish related to Mayank if 'Satish + Deep × Piyush - Hitesh % Mayank'?

Ans ☐ A. Mother's brother's wife's mother

☐ B. Father's brother's wife's sister

☐ C. Mother's brother's wife's sister

☒ D. Father's brother's wife's mother

Q.16 A hiker lifts a backpack from the ground to a ledge 2 meters above the ground. Which situation would result in the greatest increase in the backpack's gravitational potential energy?

Ans ☐ A. Lifting the same backpack to a 1-meter ledge

☐ B. Carrying the same backpack horizontally for 2 meters

☐ C. Lifting a lighter backpack to the same 2-meter ledge

☒ D. Lifting a heavier backpack to the same 2-meter ledge

Q.17 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and select the most appropriate answer.

Question:

Among five trees N, O, R, S, and T, each having a different height, which tree is the tallest?

Statements:

(I) T is taller than R. N is taller than T.

(II) R is shorter than O but taller than S.

Ans ☐ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question

☒ B. Both statements I and II together are NOT sufficient to answer the question

☐ C. Data in Statement II alone is sufficient to answer the question while data in statement I is not

☐ D. Data in Statement I alone is sufficient to answer the question while data in statement II is not

Q.18 In a certain code language, 'SOIL' is coded as '1547' and 'COIL' is coded as '7124'. What is the code for 'C' in the given code language?

Ans ☐ A. 7

☐ B. 4

☒ C. 2

☐ D. 1

Q.19 Srinu starts from his home and drives 2 km towards the south, then takes a right turn and drives 5 km. He then takes a right turn and drives 6 km before taking a right turn again and driving 4 km further. Srinu finally takes a right turn and drives 4 km before stopping at his office. In which direction should Srinu drive to reach his home again? (All turns are 90-degree turns only unless specified.)

- Ans**
- ☒ A. East
 - ☐ B. West
 - ☐ C. South
 - ☐ D. North

Q.20 A ladder is leaning against a wall and makes an angle of 60° with the ground. If the length of the ladder is 24 m, find the distance of the foot of the ladder from the wall.

- Ans**
- ☐ A. 9 m
 - ☐ B. 15 m
 - ☒ C. 12 m
 - ☐ D. 18 m

Q.21 The salary of a person is increased by 10%, 20% and 25% successively in three consecutive years. Find the overall percentage increase in the salary at the end of the third year.

- Ans**
- ☐ A. 50%
 - ☐ B. 30%
 - ☒ C. 65%
 - ☐ D. 60%

Q.22 If a rectangular field is measured to be 120 meters long and 75 meters wide, what is its area in SI units?

- Ans**
- ☐ A. 19500 square meters
 - ☒ B. 9000 square meters
 - ☐ C. 1800 square meters
 - ☐ D. 15000 square meters

Q.23 A cyclist travels 120 km in 3 hours, rests for 1 hour, and then travels another 80 km in 2 hours. To determine the cyclist's average speed for the entire journey, which of the following quantities should be used?

- Ans**
- ☐ A. Change in velocity divided by total time taken
 - ☒ B. Total distance travelled divided by the total time taken
 - ☐ C. Distance travelled in a particular direction divided by time
 - ☐ D. Total displacement divided by total time taken

Q.24 A pump can fill a tank in 3 hours. Due to a leak in the tank, it takes 4.5 hours to fill the tank. In how much time can the leak empty the full tank if no other entry or exit routes are open?

- Ans**
- ☐ A. 6 hours
 - ☒ B. 9 hours
 - ☐ C. 7 hours
 - ☐ D. 8 hours

Q.25 Which one of the following statements correctly describes a characteristic of WANs?

- Ans**
- ☐ A. WANs are limited to connecting devices within a radius of 1 to 2 km.
 - ☐ B. WANs are always public networks managed solely by Internet Service Providers (ISPs).
 - ☐ C. WANs typically use only wireless media to connect distant LANs.
 - ☒ D. WANs can be built by connecting multiple LANs via wired or wireless links.

Q.26 An engineer is updating a schematic for a control panel and needs to indicate a normally closed push button. Which approach best ensures the symbol is universally understood among engineers referring to standard engineering drawings?

- Ans**
- ☒ A. Describe the normally closed push button in words within the schematic diagram clearly
 - ☒ B. Use the standardized symbol for a normally closed push button as per conventions
 - ☒ C. Substitute the normally closed push button symbol with a general switch symbol
 - ☒ D. Draw a hand made representation of the push button with a note explaining function

Q.27 A technician needs to select a fuse wire for a room heater. Which property should be considered most important for safety based on the heating effect of electric current?

- Ans**
- ☒ A. The fuse wire must have high resistance and be thick to prevent melting.
 - ☒ B. The fuse wire must have a low melting point to break the circuit during excess current.
 - ☒ C. The fuse wire must have a high melting point for durability.
 - ☒ D. The fuse wire must have a shiny surface for efficient cooling.

Q.28 What is the primary purpose of a Local Area Network (LAN)?

- Ans**
- ☒ A. To link wireless devices only
 - ☒ B. To connect computers within a small geographical area
 - ☒ C. To connect global networks
 - ☒ D. To connect social media accounts

Q.29 A plane parallel to the base divides a cone of height 40 cm into two parts. If the volume of the upper smaller cone formed is $\frac{1}{64}$ of the volume of the original cone, calculate the height of the plane from the base of the cone.

- Ans**
- ☒ A. 20 cm
 - ☒ B. 30 cm
 - ☒ C. 40 cm
 - ☒ D. 10 cm

Q.30 Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair 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. DG – EH
 - ☒ B. KE – LF
 - ☒ C. IT – KV
 - ☒ D. SJ – TK

Q.31 Seven boxes S, T, U, V, W, X, and Y are kept one over the other but not necessarily in the same order. U is kept exactly third from the top. Only one box is kept between U and T. W is kept immediately above T. Only three boxes are kept between X and S. V is kept on one of the positions below Y. Only two boxes are kept between U and S. Which box is kept second from the top?

- Ans**
- ☒ A. T
 - ☒ B. X
 - ☒ C. U
 - ☒ D. V

Q.32 Read the given statement(s) 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 conclusions logically follow(s) from the statement(s).

Statements:

Some rugs are fans.

No fan is a car.

Conclusion (I) : Some rugs are cars.

Conclusion (II) : Some fans are rugs.

- 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.33 An article is bought for ₹300 and its price is increased by 5.5%. The resulting price is then reduced by 8%. Find the final selling price.

- Ans**
- ☐ A. ₹296.46
 - ☒ B. ₹291.18
 - ☐ C. ₹288.24
 - ☐ D. ₹284.45

Q.34 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

MDB PHE SLH VPK ?

- Ans**
- ☒ A. YTN
 - ☐ B. ZTM
 - ☐ C. ZUO
 - ☐ D. XSM

Q.35 A boy uses a wheelbarrow to carry sand. The wheel acts as the pivot, the sand is placed in the tray, and the boy lifts the handles. In this arrangement, the sand represents _____.

- Ans**
- ☐ A. Fulcrum
 - ☒ B. Load
 - ☐ C. Arm
 - ☐ D. Effort

Q.36 Which statement best describes the front view in an engineering drawing?

- Ans**
- ☐ A. It shows only the object's bottom or right side
 - ☐ B. It shows the object's depth and height as seen from the side
 - ☐ C. It shows only one dimension of the object
 - ☒ D. It shows the object's height and width as seen from the front

Q.37 What is the primary role of the Central Processing Unit (CPU) in a computer system?

- Ans**
- ☒ A. To execute program instructions
 - ☐ B. To display output on the screen
 - ☐ C. To manage network connections
 - ☐ D. To store long-term data

Q.38 A ramp is used to lift a box to a platform 2 m high. To reduce the effort required, the ramp length is increased from 4 m to 8 m. Assuming negligible friction, what remains unchanged?

- Ans**
- ☒ A. The work done in raising the box
 - ☐ B. The mechanical advantage
 - ☐ C. The force required
 - ☐ D. The distance moved along the ramp

Q.39 The first shopkeeper allows two successive discounts of 3% and 7%, while a second shopkeeper allows two successive discounts of 2% and 8%. A third shopkeeper allows 10% discount on the same item. From which shopkeeper should a customer buy if the marked price is the same at the three shops?

- Ans**
- ☒ A. Buy from the third shopkeeper
 - ☐ B. Buy from the first shopkeeper
 - ☐ C. Buy from the first or the second shopkeeper as both are the same.
 - ☐ D. Buy from the second shopkeeper

Q.40 Simplify the following expression.

$$11 \text{ of } 7 + 125 \div 5 + 99 \div 11 \times 7 - 17 \text{ of } 7 + 7 \times 6 - (91 \div 7 + 7 \times 5)$$

- Ans**
- ☐ A. 44
 - ☐ B. 36
 - ☐ C. 48
 - ☒ D. 40

Q.41 Which statement best describes how the mass and speed of an object affect its kinetic energy?

- Ans**
- ☐ A. An object with same mass but higher speed will have less kinetic energy.
 - ☐ B. An object with greater mass but lower speed will have more kinetic energy.
 - ☒ C. An object with greater mass and higher speed will have more kinetic energy.
 - ☐ D. An object with less mass and lower speed will have more kinetic energy.

Q.42 Sohan covers a total distance of 760 km to reach his home, traveling partly by train and partly by car. He takes 8 hours when he travels 160 km by train and the rest by car. If he travels 240 km by train and the remaining distance by car, his journey takes 12 minutes longer. Find the difference between the speeds of the train and the car.

- Ans**
- ☐ A. 23 km/h
 - ☐ B. 27 km/h
 - ☐ C. 21 km/h
 - ☒ D. 20 km/h

Q.43 SANZ is related to YUTT in a certain way based on the English alphabetical order. In the same way, MTHM is related to SNNG. To which of the following is LJRE related to following the same logic?

- Ans**
- ☐ A. QEYZ
 - ☐ B. QDYY
 - ☒ C. RDX Y
 - ☐ D. REXZ

Q.44 Which of the following is the best example of municipal solid waste?

- Ans**
- ☐ A. Hospital biomedical waste
 - ☐ B. Mining tailings
 - ☒ C. Household kitchen garbage
 - ☐ D. Industrial process waste

Q.45 What should come in place of '?' in the given series?
11, 22, 44, 88, 176, ?

- Ans**
- ☒ A. 358
 - ☒ B. 352
 - ☒ C. 342
 - ☒ D. 356

Q.46 Which factor increases the amount of heat produced in a wire when an electric current flows through it for a fixed time?

- Ans**
- ☒ A. Making the wire thicker
 - ☒ B. Increasing the resistance of the wire
 - ☒ C. Reducing the current in the wire
 - ☒ D. Decreasing the length of the wire

Q.47 What should come in place of the question mark (?) in the given series?

1 2 7 20 61 ?

- Ans**
- ☒ A. 185
 - ☒ B. 182
 - ☒ C. 183
 - ☒ D. 181

Q.48 P, Q and R are three batsmen. The ratios of runs scored by them in a certain match were as follows:

$P : Q = 5 : 7$ and $Q : R = 2 : 3$.

If they scored a total of 765 runs, then find the number of runs scored by R.

- Ans**
- ☒ A. 350
 - ☒ B. 336
 - ☒ C. 357
 - ☒ D. 378

Q.49 Why does restricting certain chemical refrigerants effectively reduce damage to the ozone layer?

- Ans**
- ☒ A. Refrigerants contain particles that absorb harmful UV light.
 - ☒ B. Refrigerants increase oxygen production, supporting ozone recovery.
 - ☒ C. Refrigerants emit greenhouse gases that warm the stratosphere.
 - ☒ D. Refrigerants release substances that catalyze ozone breakdown.

Q.50 Find the compound interest on ₹5,70,000 for 1.5 years at 10% per annum compounded half-yearly.

- Ans**
- ☒ A. ₹88,846.25
 - ☒ B. ₹89,846.25
 - ☒ C. ₹92,846.25
 - ☒ D. ₹89,946.25

Q.51 The average of five numbers is 30. If four of the numbers are 25, 35, 28 and 32, then what is the fifth number?

- Ans**
- ☒ A. 30
 - ☒ B. 32
 - ☒ C. 28
 - ☒ D. 35

Q.52 Refer to the following letter series and answer the question that follows. (Counting to be done from left to right only.)

(Left) Q K Q N X K G G V M L A W T W K N G V (Right)

How many such consonants are there each of which is immediately preceded by a vowel and also immediately followed by a consonant?

- Ans**
- ☒ A. Two
 - ☒ B. Three
 - ☒ C. One
 - ☒ D. None

Q.53 Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number result(s) in the second number. Similarly, certain mathematical operation(s) on the second number result(s) in the third number and so on. Which of the given options follows the same set of operations as in the given 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 to/subtracting from/multiplying with 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

6 – 16 – 23 – 32; 7 – 19 – 26 – 35

- Ans**
- ☒ A. 12 – 34 – 41 – 50
 - ☒ B. 11 – 31 – 38 – 29
 - ☒ C. 8 – 22 – 15 – 24
 - ☒ D. 4 – 14 – 21 – 30

Q.54 What is the primary color used in warning signs to alert workers of potential hazards?

- Ans**
- ☒ A. Green with white symbol or text
 - ☒ B. Blue with white symbol or text
 - ☒ C. Red with white symbol or text
 - ☒ D. Yellow with black symbol or text

Q.55 Refer to the given letter series and answer the question that follows. Counting to be done from left to right only.

(Left) H S A N D D I A D F P A J O S K I O Z O T X (Right)

How many such consonants are there, each of which is immediately preceded by a consonant and also immediately followed by a vowel?

- Ans**
- ☒ A. Three
 - ☒ B. Five
 - ☒ C. Six
 - ☒ D. Four

- Q.56** A group of numbers/symbols is coded using letter codes as per the codes given below and the conditions that follow. The correct combination of codes following the conditions is your answer.
Note: If none of the conditions follow, then the codes for the respective number/symbol are to be followed directly as given in the table.

Number/symbol	3	@	8	4	\$	&	2	%	#	1	+	9	7	5
Code	U	G	B	K	M	F	X	R	E	Q	S	C	V	T

Conditions –

- (i) If the first element is a symbol and the last element an odd number, the codes for these two (the first and the last elements) are to be interchanged.
(ii) If the first element is an odd number and the last an even number, the first and the last elements are to be coded as ©
(iii) If both second and third elements are perfect squares, the third element is to be coded as the code for the second element.

What will be the code for the following group?
& 8 \$ 9 5

- Ans ☒ A. TCMBF
☒ B. FCBMT
☒ C. TBMCF
☒ D. FBMCT

- Q.57** Read the given statement(s) and conclusions carefully. Assuming that the information given in the statement(s) is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statement(s).

Statements:

All chocolates are paneers.
No paneer is a milk.

Conclusions:

- (I) No chocolate is a milk.
(II) Some milks are paneers.

- Ans ☒ A. Neither conclusion (I) nor (II) follows.
☒ B. Both conclusions (I) and (II) follow.
☒ C. Only conclusion (I) follows.
☒ D. Only conclusion (II) follows.

- Q.58** A 42-litre solution has sugar and water in the ratio 2 : 5. If, due to evaporation, the volume is reduced by 35%, and only water evaporates, what is the new ratio of sugar to water?

- Ans ☒ A. 51 : 42
☒ B. 40 : 51
☒ C. 40 : 41
☒ D. 31 : 50

- Q.59** An astronaut weighs 600 N on Earth. During a moon mission, she performs an experiment to measure her weight on the moon. Which value is closest to her expected weight on the moon, and why?

- Ans ☒ A. 600 N, because a person's weight remains unchanged on the Moon.
☒ B. 300 N, because the Moon's gravity is about one-half of Earth's.
☒ C. 200 N, because the Moon's gravity is about one-third of Earth's.
☒ D. 100 N, because the Moon's gravity is about one-sixth of Earth's.

Q.60 G is the mother of Y. Y is the sister of V. S is the father of L. L is the son of V. How is G related to L?

- Ans**
- ☐ A. Mother
 - ☐ B. Mother's sister
 - ☒ C. Mother's mother
 - ☐ D. Sister

Q.61 Which combination best describes the main environmental challenges associated with plastic waste management?

- Ans**
- ☐ A. Neutralization and easy recycling
 - ☐ B. Rapid biodegradation and chemical leaching
 - ☐ C. Thermal pollution and effective composting
 - ☒ D. Persistence in the environment and microplastic formation

Q.62 Why does biomedical waste require special handling compared to general municipal waste?

- Ans**
- ☐ A. It is more likely to be recycled than other types of waste.
 - ☒ B. It may contain infectious agents that pose health risks.
 - ☐ C. It has higher chemical content and is always toxic.
 - ☐ D. It is always radioactive and requires heavy shielding.

Q.63 When a cutting plane line passes through a hole and a rib, which feature should be sectioned in the resulting view according to standard conventions?

- Ans**
- ☐ A. Both the hole and the rib are shown sectioned
 - ☐ B. Both the hole and the rib are shown unsectioned
 - ☒ C. The hole is sectioned but the rib is shown unsectioned
 - ☐ D. The rib is sectioned but the hole is left unsectioned

Q.64 If 2 is subtracted from each odd digit and 2 is added to each even digit in the number 235234796423, what will be the sum of the digits that are third from the left and third from the right?

- Ans**
- ☒ A. 9
 - ☐ B. 8
 - ☐ C. 7
 - ☐ D. 6

Q.65 A, B, C, D, X, Y and Z are sitting around a circular table facing the centre of the table. Only two people sit between Y and C when counted from the left of C. D sits third to the left of B. A sits to the immediate right of B. A sits second to the left of Y. Z is not an immediate neighbor of D. Who sits third to the right of X?

- Ans**
- ☒ A. A
 - ☐ B. D
 - ☐ C. Y
 - ☐ D. C

Q.66 A car travels from point A to point B in a zigzag path, covering a total distance of 200 meters. If the shortest straight-line distance between A and B is 120 meters, which statement best describes the car's distance and displacement?

- Ans**
- ☐ A. The distance is 200 meters; the displacement is 200 meters
 - ☒ B. The distance is 200 meters; the displacement is 120 meters
 - ☐ C. The distance is 120 meters; the displacement is 200 meters
 - ☐ D. The distance is 120 meters; the displacement is 120 meters

Q.67 Which of the following statements best describes a triangle as used in engineering drawing?

- Ans**
- ☐ A. A triangle is a polygon having three curved sides.
 - ☐ B. A triangle must always have all sides of equal length.
 - ☐ C. A triangle is a polygon with four straight sides and four angles.
 - ☒ D. A triangle is a polygon with three straight sides and three angles.

Q.68 The cost of a diamond varies directly with the square of its weight. A diamond broke into four pieces with weights in the ratio 2:4:1:3. If it had been broken into four equal pieces, the loss would have been ₹60,000. What was the original cost of the diamond?

- Ans**
- ☐ A. ₹78,000
 - ☒ B. ₹80,000
 - ☐ C. ₹75,000
 - ☐ D. ₹82,000

Q.69 What is a key feature of single stroke lettering in technical drawings?

- Ans**
- ☒ A. Each character is made with one continuous stroke.
 - ☐ B. Each character is outlined and then filled.
 - ☐ C. Each character is shaded after drawing.
 - ☐ D. Each character is made with several parallel lines.

Q.70 If the height of an object is doubled while its mass remains constant, its gravitational potential energy will be:

- Ans**
- ☐ A. halved
 - ☒ B. doubled
 - ☐ C. unchanged
 - ☐ D. decreased to one-fourth

Q.71 Which of the following correctly states the full form of CD and the technology used to store data on it?

- Ans**
- ☐ A. Compact Disc, Magnetic Storage
 - ☒ B. Compact Disc, Optical Storage
 - ☐ C. Compact Drive, Optical Storage
 - ☐ D. Compact Drive, Magnetic Storage

Q.72 What does the term 'HAZOP' stand for in occupational safety?

- Ans**
- ☐ A. Handling and Organizing Safety
 - ☐ B. Hazardous Operation Standard
 - ☒ C. Hazard and Operability Study
 - ☐ D. Hazardous Operations Safety

Q.73 A crane lifts a 200 kg load to a height of 15 meters in 10 seconds. Assuming acceleration due to gravity is 10 m/s^2 and energy loss is negligible, what is the power output of the crane during this operation?

- Ans**
- ☒ A. 3000 W
 - ☐ B. 1000 W
 - ☐ C. 2000 W
 - ☐ D. 1500 W

Q.74 Refer to the given letter series and answer the question that follows.

(Left) A X T N K R Q K C P S I D F J U D O R G Z M B E L (Right)

How many letters are there in the English alphabetical series between the letter that is fourth from the right end and the letter that is third from the left end of the series?

- Ans
- ☒ A. 4
 - ☒ B. 3
 - ☒ C. 6
 - ☒ D. 5

Q.75 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

GXM 5, JVN 11, MTO 24, PRP 51, ?

- Ans
- ☒ A. TPQ 107
 - ☒ B. SPQ 107
 - ☒ C. SPQ 106
 - ☒ D. TPQ 106

Q.76 If the mean of the following data is 45, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	23	30	31	45	X

- Ans
- ☒ A. 160
 - ☒ B. 180
 - ☒ C. 188
 - ☒ D. 162

Q.77 When drawing repeated 67° angles on an engineering sheet, which practice best helps minimize cumulative alignment errors?

- Ans
- ☒ A. Using the same reference line for all repeated angles
 - ☒ B. Relying solely on the initial protractor alignment for all angles
 - ☒ C. Drawing all angles continuously without intermediate verification
 - ☒ D. Marking all angles lightly with a pencil before finalizing

Q.78 A dealer buys a table for ₹2,750. He first marks it up by 28%, then allows a 12% discount to a customer. If the customer also pays 5% GST on the selling price, find the profit percentage (excluding GST) made by the dealer.

- Ans
- ☒ A. 13.81%
 - ☒ B. 10.36%
 - ☒ C. 15.12%
 - ☒ D. 12.64%

Q.79 Which of the following statements best describes a cuboid as used in engineering drawing?

- Ans
- ☒ A. A cuboid has all faces as squares of equal size.
 - ☒ B. A cuboid is a solid with six rectangular faces, and opposite faces are equal.
 - ☒ C. A cuboid is a solid where all faces are parallelograms but not necessarily rectangles.
 - ☒ D. A cuboid has all sides and angles equal, making it similar to a cube.

Q.80 Which color is universally associated with emergency exit signs in industrial workplaces under international standards?

- Ans**
- ☐ A. Blue background with white text or symbols
 - ☐ B. Red background with white text or symbols
 - ☐ C. Yellow background with black text or symbols
 - ☒ D. Green background with white text or symbols

Q.81 12 is related to 1730 following a certain logic. Following the same logic, 13 is related to 2199. To which of the given options is 11 related, following the same logic?
(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 etc. to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

- Ans**
- ☐ A. 1543
 - ☒ B. 1333
 - ☐ C. 1433
 - ☐ D. 1443

Q.82 If $x + \frac{1}{x} = 5$, then $\frac{x^3 - 5x^2 + 5x}{x^2 + 1}$ is equal to:

- Ans**
- ☒ A. $\frac{4}{5}$
 - ☐ B. $\frac{1}{5}$
 - ☐ C. $\frac{3}{5}$
 - ☐ D. $\frac{2}{5}$

Q.83 A laboratory thermometer has a range from -10 degrees Celsius to 110 degrees Celsius and 120 equal divisions. What is the smallest value that this thermometer can read?

- Ans**
- ☐ A. 0.5 degrees Celsius
 - ☐ B. 10 degrees Celsius
 - ☐ C. 2 degrees Celsius
 - ☒ D. 1 degree Celsius

Q.84 Five students, N, O, R, S and T, have different heights. T is taller than N. R is taller than S but shorter than O. S is taller than N. More than two people are taller than T. How many people are shorter than R?

- Ans**
- ☐ A. Two
 - ☒ B. Three
 - ☐ C. One
 - ☐ D. None

Q.85 What will come in the place of '?' in the following equation, if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $5 \div 3 + 15 \times 5 - 3 = ?$

- Ans**
- ☒ A. 15
 - ☐ B. 18
 - ☐ C. 12
 - ☐ D. 9

Q.86 Which of the following best describes the function of a speedometer in a vehicle?

- Ans**
- ☒ A. It calculates the average speed over a journey.
 - ☒ B. It displays the current speed at which the vehicle is moving.
 - ☒ C. It shows the rate at which the vehicle's speed changes.
 - ☒ D. It measures the total distance the vehicle has traveled.

Q.87 The price of sugar is increased by 20%. Manoj can increase his expenditure on sugar by only 15% from his income. In order to balance his expenditure, by what percentage should he reduce the quantity of sugar consumed?

- Ans**
- ☒ A. 6.5%
 - ☒ B. $4\frac{1}{6}\%$
 - ☒ C. $5\frac{1}{3}\%$
 - ☒ D. 5%

Q.88 Which symbol best represents a battery in an electric circuit diagram according to standard conventions?

- Ans**
- ☒ A. A pair of long and short parallel lines placed alternately
 - ☒ B. Two circles connected in series
 - ☒ C. A single long line only
 - ☒ D. Two short lines placed together

Q.89 Which intervention most effectively reduces ground-level pollutant concentrations during a winter temperature inversion?

- Ans**
- ☒ A. Elevating emission sources above inversion layers
 - ☒ B. Enhancing vertical air mixing through artificial turbulence
 - ☒ C. Reducing local wind speed to minimize horizontal dispersion
 - ☒ D. Increasing surface temperatures near emission sources

Q.90 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

ZOT - TLP
NIL - HFH

- Ans**
- ☒ A. BCD - VZZ
 - ☒ B. VZZ - BCD
 - ☒ C. ABD - VZZ
 - ☒ D. BOC - VZT

Q.91 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. There are exactly two boxes between T and P. Only Q is kept above U. No box is kept below P. S is kept somewhere below W but above V. Based on the given information, which box is kept third above V?

- Ans**
- ☒ A. T
 - ☒ B. S
 - ☒ C. P
 - ☒ D. W

Q.92 What does CPU stand for in computing?

- Ans**
- ☒ A. Control Processing Unit
 - ☒ B. Computer Processing Unit
 - ☒ C. Core Processing Unit
 - ☒ D. Central Processing Unit

Q.93 Which scenario best demonstrates proactive workplace safety behavior?

- Ans**
- ☒ A. Waiting for a supervisor to notice hazards
 - ☒ B. Identifying and correcting hazards before accidents occur
 - ☒ C. Reporting hazards after incidents happen
 - ☒ D. Discussing only past safety problems in meetings

Q.94 A solid right circular cone is 7 cm high, and the radius of its base is 22.2 cm. It is melted and recast into a right circular cone with radius of its base 3.7 cm. Then the height (in cm) of the cone is _____.

- Ans**
- ☒ A. 252
 - ☒ B. 185
 - ☒ C. 267
 - ☒ D. 159

Q.95 A, B, C, D and E have different heights. E is taller than C but shorter than A. Only one person is taller than A. D is shorter than C. Who amongst them is the third tallest?

- Ans**
- ☒ A. E
 - ☒ B. B
 - ☒ C. A
 - ☒ D. C

Q.96 An engineering firm is tasked with creating a set of technical drawings for a large-scale project. The client specifies that all components must fit on a single sheet without reducing the drawing scale, and the total drawing area required is approximately 1 square meter. Based on standard drawing sheet sizes, which sheet should the firm select to best meet these requirements?

- Ans**
- ☒ A. A1 size sheet
 - ☒ B. A2 size sheet
 - ☒ C. A3 size sheet
 - ☒ D. A0 size sheet

Q.97 Two trains are moving in opposite directions. The first train is 120 m long and runs at 54 km/h. The second train is 180 m long and runs at 72 km/h. How much time will they take to cross each other completely? (Rounded up to two decimal places)

- Ans**
- ☒ A. 7.57 seconds
 - ☒ B. 9.25 seconds
 - ☒ C. 8.57 seconds
 - ☒ D. 8.43 seconds

Q.98 A question is followed by two statements numbered (I) and (II). You have to decide whether the data provided in the statements are sufficient to answer the question. Read both the statements and decide the appropriate answer.

Among 5 sticks, B, U, N, M and D, each having a different height, which stick is the shortest?

- (I) D is shorter than U. M is shorter than B.
(II) M is taller than D.

- Ans**
- ☒ A. Both statements I and II together (and not statement I alone or statement II alone) are sufficient to answer the question
 - ☒ B. Data in statement I alone is sufficient to answer the question while data in statement II is not
 - ☒ C. Both statements I and II together are NOT sufficient to answer the question
 - ☒ D. Data in statement II alone is sufficient to answer the question while data in statement I is not

Q.99 Which statement best describes the side view in engineering drawing?

- Ans**
- ☐ A. It shows the object as seen from above or below
 - ☐ B. It shows a combination of all views of the object
 - ☒ C. It shows the object as seen from left or right side
 - ☐ D. It shows the object as seen clearly from the front

Q.100 What will come in place of the question mark (?) in the following equation if '+' and '-' are interchanged and 'x' and '÷' are interchanged?
 $42 \times 6 \div 7 - 35 + 19 = ?$

- Ans**
- ☒ A. 65
 - ☐ B. 63
 - ☐ C. 67
 - ☐ D. 69

Section : **PART-B**

Q.1 What component is responsible for pressurizing the brake fluid when the brake pedal is applied?

- Ans**
- ☐ A. Brake drum
 - ☒ B. Master cylinder
 - ☐ C. Wheel cylinder
 - ☐ D. Pedal return spring

Q.2 Which material is most commonly used to manufacture a solid frame hacksaw?

- Ans**
- ☐ A. Brass
 - ☐ B. Stainless steel
 - ☒ C. High carbon steel
 - ☐ D. Aluminum

Q.3 Why is Polyvinyl Chloride (PVC) commonly used as a covering material on household electrical wires?

- Ans**
- ☒ A. Because it acts as insulator to protect from electric shock
 - ☐ B. Because it is a good conductor of electricity
 - ☐ C. Because it increases the current in the wire
 - ☐ D. Because it reduces the supply voltage to a safe value

Q.4 Which of the following is a direct result of poor cylinder head design in diesel engines?

- Ans**
- ☐ A. Increased vibration due higher unbalance force
 - ☒ B. Frequent cylinder head gasket failures and leaks
 - ☐ C. Lower emissions and improved environment
 - ☐ D. Difficulties in gear shifting and transmission operation

Q.5 Magnetic permeability is a measure of a material's ability to _____.

- Ans**
- ☐ A. conduct electric current.
 - ☐ B. produce heat.
 - ☐ C. store electric charge.
 - ☒ D. carry magnetic flux.

Q.6 If a welded joint lacks sufficient strength and fails under design load, which process requirement was most likely overlooked?

- Ans**
- ☐ A. Post-weld grinding for smooth surface finish
 - ☐ B. Marking the weld center line with a scribe
 - ☒ C. Correct edge preparation before welding
 - ☐ D. Using the maximum available nozzle size

Q.7 While inspecting a finished part for flatness, which property of the surface plate makes it suitable for this task?

- Ans**
- ☐ A. Its weight compared to the workpiece
 - ☒ B. Its high degree of flatness and stability
 - ☐ C. Its light color for visibility
 - ☐ D. Its polished and shiny surface

Q.8 Which material is commonly used for manufacturing gears in automotive transmission systems due to its strength and durability?

- Ans**
- ☒ A. Alloy steel
 - ☐ B. Brass
 - ☐ C. Cast iron
 - ☐ D. Plastic

Q.9 Which sensor provides input to the Automated Manual Transmission (AMT) electronic control unit for deciding gear shifts?

- Ans**
- ☐ A. Clutch position sensor
 - ☒ B. Vehicle speed sensor
 - ☐ C. Oxygen sensor
 - ☐ D. Fuel injector

Q.10 A technician sets a digital multimeter to the 10 A current range and inserts the red probe into the 10 A terminal. He then accidentally connects the probes directly across a 24 V battery. What is the best evaluation of this action?

- Ans**
- ☐ A. It produces a stable reading without affecting the circuit
 - ☒ B. It creates a short circuit and may damage the multimeter
 - ☐ C. It correctly measures the current drawn by the battery
 - ☐ D. It increases the measured voltage due to range selection

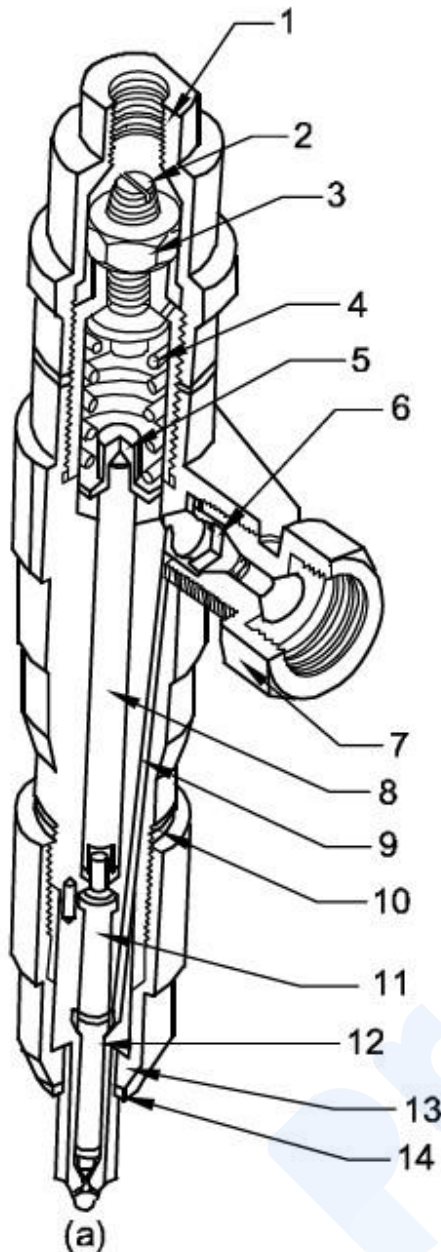
Q.11 How does the vertical down welding position influence weld speed and penetration compared to vertical up welding?

- Ans**
- ☐ A. Gives the same speed and penetration
 - ☒ B. Increases speed but reduces penetration
 - ☐ C. Increases penetration but reduces speed
 - ☐ D. Reduces speed but increases penetration

Q.12 A magnetic path has a reluctance of 5000 ampere-turns per weber. If the coil produces a magnetomotive force of 250 ampere-turns, what is the magnetic flux in the core?

- Ans**
- ☐ A. 1250000 Wb
 - ☐ B. 0.005 Wb
 - ☒ C. 0.05 Wb
 - ☐ D. 20 Wb

Q.13 In the given fuel injector figure of a three-wheeled diesel engine, what is the name of the part marked as number 8?



- Ans ☒ A. Spindle
☒ B. Fuel passage
☒ C. Needle valve
☒ D. Nozzle body

Q.14 Why does the electrical conductivity of an intrinsic (pure) semiconductor increase with an increase in temperature?

- Ans ☒ A. Because higher temperature converts the semiconductor directly into a superconductor
☒ B. Because higher temperature creates more free charge carriers by breaking some covalent bonds
☒ C. Because higher temperature reduces the atomic size of the crystal
☒ D. Because higher temperature permanently increases the number of valence electrons in each atom

Q.15 What is a key difference between 2-stroke and 4-stroke diesel engines?

- Ans ☒ A. A cooling system is absent in a 2-stroke engine
☒ B. Higher-viscosity lubrication is required in a 4-stroke engine
☒ C. Power stroke occurs in every revolution of a 2-stroke engine
☒ D. Different fuels are used in 2-stroke and 4-stroke engines

Q.16 A brake pedal that sinks too low or travels excessively before applying the brakes often indicates that the gap between brake lining and brake drum is _____.

- Ans**
- ☒ A. properly adjusted
 - ☒ B. excessive
 - ☒ C. too small
 - ☒ D. zero

Q.17 Which combination of parts is directly involved in the conversion of reciprocating motion to rotary motion in a diesel engine?

- Ans**
- ☒ A. Piston, connecting rod, crankshaft
 - ☒ B. Cylinder liner, rocker arm, injector
 - ☒ C. Valve, cylinder head, camshaft
 - ☒ D. Fuel injector, camshaft, flywheel

Q.18 During a real-life pipeline repair, what sequence ensures both safety and weld integrity?

- Ans**
- ☒ A. Tack welding, cleaning joint, aligning, isolating pipeline, final welding
 - ☒ B. Cleaning joint, aligning, tack welding, final welding, isolating pipeline
 - ☒ C. Isolating pipeline, cleaning joint, aligning, tack welding, final welding
 - ☒ D. Final welding, aligning, cleaning joint, isolating pipeline, tack welding

Q.19 Which liner material is commonly used in petrol engines because of its good wear resistance and heat dissipation properties?

- Ans**
- ☒ A. Cast iron
 - ☒ B. Copper
 - ☒ C. Brass
 - ☒ D. Pure aluminum

Q.20 Which combination of factors makes edge joints less suitable for high-load applications?

- Ans**
- ☒ A. Large weld area and high overall strength
 - ☒ B. Wide accessibility and significant reinforcement
 - ☒ C. High ductility and flexibility in the joint
 - ☒ D. Limited weld area and reduced joint strength

Q.21 Why is the piston head designed with a slightly concave or domed shape in petrol engines?

- Ans**
- ☒ A. To cool the cylinder walls and spark plug
 - ☒ B. To increase the overall piston weight
 - ☒ C. To strengthen the crankshaft and connecting rod
 - ☒ D. To improve combustion and reduce knocking

Q.22 How does a single cut file differ from a double cut file?

- Ans**
- ☒ A. Single cut has one set of parallel teeth while double cut has two
 - ☒ B. Single cut files have no teeth while double cut do
 - ☒ C. Single cut is used only for wood while double cut is used for metals
 - ☒ D. Single cut files are always round while double cut are always flat

Q.23 Which of the following can cause a gear to slip during operation in a manual transmission system?

- Ans**
- ☒ A. New locking pin
 - ☒ B. Proper gear lever adjustment
 - ☒ C. Excessive end float of gear
 - ☒ D. Tight selector rod

Q.24 Which sheet is most commonly used for roofing because it is both lightweight and corrosion-resistant?

- Ans**
- ☒ A. Aluminum sheet
 - ☐ B. Copper sheet
 - ☐ C. Tinplate
 - ☐ D. Stainless steel sheet

Q.25 If a file's length is measured from tip to heel, what does this exclude?

- Ans**
- ☐ A. The width
 - ☐ B. The Edge
 - ☐ C. The teeth
 - ☒ D. The tang

Q.26 Which feature of a depth gauge allows it to measure from a reference surface?

- Ans**
- ☐ A. Circular dial
 - ☐ B. Handle grip
 - ☒ C. Flat base
 - ☐ D. Sharp cutting edge

Q.27 Which part of a ball peen hammer head is located between the striking face and the peen?

- Ans**
- ☒ A. Cheek portion forming the main body of hammer head
 - ☐ B. Wedge inserted to secure handle tightly
 - ☐ C. Grip section provided at the handle end
 - ☐ D. Eye hole connecting hammer head to handle

Q.28 Which component is directly responsible for opening and closing the engine valves?

- Ans**
- ☒ A. Camshaft
 - ☐ B. Crankshaft
 - ☐ C. Connecting rod
 - ☐ D. Piston

Q.29 Which of the following best describes the main purpose of occupational health in a workshop?

- Ans**
- ☐ A. To increase production output efficiently
 - ☒ B. To protect workers from health hazards at the workplace
 - ☐ C. To monitor workers' attendance records
 - ☐ D. To reduce the cost of machinery maintenance

Q.30 Which pair of components is directly connected in a parallelogram steering linkage system?

- Ans**
- ☐ A. Steering knuckle and pitman arm
 - ☐ B. Pitman arm and idler arm
 - ☒ C. Tie rod and center (relay) link
 - ☐ D. Steering column and center link

Q.31 Which statement correctly defines the temperature of a body?

- Ans**
- ☐ A. Quantity of temperature in a body
 - ☐ B. Ability to conduct heat
 - ☒ C. Degree of hotness or coldness of a body
 - ☐ D. Amount of heat in a body

Q.32 Which situation in engineering drawing typically requires the use of a dashed line?

- Ans**
- ☒ A. To indicate center lines for symmetry
 - ☒ B. To indicate hidden edges that are not directly visible
 - ☒ C. To indicate visible outlines of an object
 - ☒ D. To indicate dimension lines for measurements

Q.33 Which condition leads to disengagement of the overrunning clutch connection in an automatic transmission?

- Ans**
- ☒ A. Outer ring rotates in a clockwise direction
 - ☒ B. Outer ring rotates in an anticlockwise direction
 - ☒ C. Vehicle comes to a complete stop
 - ☒ D. Brakes are applied forcefully

Q.34 When evaluating timing synchronization, which symptom most directly suggests cam-crank misalignment in a diesel engine?

- Ans**
- ☒ A. Poor battery charge and slow cranking
 - ☒ B. Slipping fan belt and reduced alternator output
 - ☒ C. Low coolant level and high engine temperature
 - ☒ D. Difficulty in starting and abnormal engine noise

Q.35 Which type of material is commonly used for a drive plate to withstand engine torque?

- Ans**
- ☒ A. High-strength steel
 - ☒ B. Lightweight plastic
 - ☒ C. Copper alloy
 - ☒ D. Aluminum alloy

Q.36 A worker is required to weld steel frames for 7 hours a day. Which PPE combination ensures both respiratory and visual safety during this task?

- Ans**
- ☒ A. Welding helmet and safety shoes
 - ☒ B. Apron and dust mask
 - ☒ C. Welding helmet and respirator
 - ☒ D. Respirator and apron

Q.37 What kind of movement does the dial indicator detect in a dial bore gauge?

- Ans**
- ☒ A. Thermal contraction
 - ☒ B. Rotational movement
 - ☒ C. Thermal expansion
 - ☒ D. Linear movement

Q.38 What is the main purpose of valve seats in a diesel engine?

- Ans**
- ☒ A. To hold the piston rings securely in place
 - ☒ B. To support the camshaft in its position
 - ☒ C. To provide a sealing surface for the valves
 - ☒ D. To guide the movement of the rocker arm

Q.39 A technician is designing a safety checklist for petrol engine shutdown. Which combination of tasks ensures optimal safety and engine protection?

- Ans**
- ☒ A. Idle engine before shutdown, turn off ignition, inspect for leaks, secure battery terminals
 - ☒ B. Open radiator cap immediately, disconnect battery, check tyre pressure, adjust seat
 - ☒ C. Clean air filter, check seat belt, polish dashboard, refill coolant
 - ☒ D. Increase engine speed, turn off ignition, wash engine, inspect seat covers

Q.40 What is the least count of a standard metric micrometer depth gauge?

- Ans**
- ☒ A. 0.01 mm
 - ☐ B. 0.1 mm
 - ☐ C. 1 mm
 - ☐ D. 0.001 mm

Q.41 During lab practice, why does increasing the number of turns on a coil generally increase the magnetic field strength for the same current and magnetic path length?

- Ans**
- ☐ A. Because the iron core changes into an insulator
 - ☐ B. Because increasing turns always removes magnetic flux from the core
 - ☐ C. Because more turns reduce the supply voltage to zero
 - ☒ D. Because magnetomotive force increases as the product of turns and current

Q.42 Which tool is commonly used to check the backlash between old gears during inspection?

- Ans**
- ☒ A. Feeler gauge
 - ☐ B. Torque wrench
 - ☐ C. File
 - ☐ D. Hammer

Q.43 Which projection method is recommended by BIS (Bureau of Indian Standards) in India?

- Ans**
- ☒ A. First angle projection
 - ☐ B. Perspective projection
 - ☐ C. Third angle projection
 - ☐ D. Oblique projection

Q.44 A vehicle shows irregular engine output at the wheels despite a healthy combustion process. Which component's malfunction in the power transfer chain is most likely responsible?

- Ans**
- ☐ A. Radiator
 - ☐ B. Exhaust valve
 - ☐ C. Spark plug
 - ☒ D. Flywheel

Q.45 Which component interacts directly with the 2-3 shift valve to enable a gear change from second to third gear?

- Ans**
- ☐ A. Catalytic converter
 - ☐ B. Clutch pedal
 - ☒ C. Governor valve
 - ☐ D. Torque converter

Q.46 If chips are building up and not breaking during tapping, what should be done?

- Ans**
- ☐ A. Apply more torque to the tap
 - ☐ B. Reduce the amount of cutting fluid
 - ☐ C. Increase the tapping speed
 - ☒ D. Back off the tap to break and clear chips

Q.47 A mechanic observes poor wetting of solder on a cleaned iron component. Which corrective action is most effective?

- Ans**
- ☐ A. Cool the iron component before soldering
 - ☐ B. Increase the soldering iron wattage
 - ☐ C. Reduce the thickness of the solder
 - ☒ D. Apply an appropriate flux before soldering

Q.48 Which part of a gas regulator directly responds to changes in outlet pressure?

- Ans**
- ☐ A. The inlet connection of the regulator
 - ☐ B. The pressure gauge attached to the regulator
 - ☒ C. The diaphragm inside the regulator
 - ☐ D. The regulator body

Q.49 A sine bar with a 200 mm center distance is used with a 50 mm slip gauge height. Which principle is used to determine the angle?

- Ans**
- ☐ A. It is based on the ratio of center distance of sine bar to slip gauge height.
 - ☐ B. It is based on the product of slip gauge height and sine bar length.
 - ☒ C. It is based on the ratio of slip gauge height to the center distance of sine bar.
 - ☐ D. It is based on the sum of slip gauge height and sine bar length.

Q.50 Which practice is essential for producing accurate external threads using a die?

- Ans**
- ☐ A. Tilting the die slightly away from the workpiece axis
 - ☒ B. Ensuring the die is aligned squarely with the workpiece axis
 - ☐ C. Applying uneven pressure while rotating the die during cutting
 - ☐ D. Skipping lubrication during the external threading operation

Q.51 In an underground cable, why is a metallic sheath provided over the insulation?

- Ans**
- ☐ A. To increase the electrical conductivity of the phase conductor
 - ☐ B. To provide mechanical protection against heavy soil pressure
 - ☒ C. To protect the cable from moisture and damaging liquids in the soil
 - ☐ D. To reduce the initial cost of the underground cable system

Q.52 A silicon diode in a circuit has a forward voltage drop of 0.7 V. It is connected in series with a 1 ohm resistor to a 5 V supply. What is the current flowing through the resistor when the diode is forward biased?

- Ans**
- ☐ A. 3.5 A
 - ☐ B. 5.7 A
 - ☒ C. 4.3 A
 - ☐ D. 0.7 A

Q.53 What is the typical maximum temperature of an oxy-acetylene flame in gas welding?

- Ans**
- ☐ A. 2000 degree Celsius
 - ☒ B. 3100 degree Celsius
 - ☐ C. 2900 degree Celsius
 - ☐ D. 2400 degree Celsius

Q.54 A diesel engine provides excellent fuel economy and high thermal efficiency, but combustion noise is relatively high. Which combustion chamber design is most likely used?

- Ans**
- ☐ A. Air cell chamber with compressed air stored in a separate chamber
 - ☐ B. Pre-combustion chamber with initial combustion outside the cylinder
 - ☐ C. Swirl chamber with tangential air entry into an auxiliary chamber
 - ☒ D. Direct injection chamber with fuel injected into the main chamber

Q.55 Which pair of metals exhibits the highest electrical and thermal conductivities for engineering applications?

- Ans**
- ☐ A. Cast iron and wrought iron
 - ☒ B. Copper and aluminium
 - ☐ C. Mild steel and stainless steel
 - ☐ D. Lead and bronze

Q.56 A truck manufacturer must choose an engine suitable for heavy-duty transport applications. Based on a comparative study, which engine type is generally preferred?

- Ans**
- ☐ A. Two-stroke spark-ignition engine
 - ☒ B. Four-stroke compression-ignition engine
 - ☐ C. Four-stroke spark-ignition engine
 - ☐ D. Wankel rotary engine

Q.57 The geometrical figure of a triangle can be constructed using:

- Ans**
- ☐ A. Four sides
 - ☒ B. Two angles and one side
 - ☐ C. One angle only
 - ☐ D. One side and one angle only

Q.58 Which statement correctly expresses Ohm's law for an electrical conductor under constant physical conditions?

- Ans**
- ☒ A. Voltage is equal to current multiplied by resistance
 - ☐ B. Resistance is equal to voltage multiplied by current
 - ☐ C. Current is equal to power divided by voltage
 - ☐ D. Power is directly proportional to resistance

Q.59 What does reluctance represent in a magnetic circuit?

- Ans**
- ☐ A. The rate of change of magnetic field with time
 - ☐ B. The ability of a material to store magnetic flux
 - ☐ C. The power loss in the magnetic core
 - ☒ D. The opposition offered to the establishment of magnetic flux

Q.60 Which part of a vernier bevel protractor is used as the reference surface while measuring an angle?

- Ans**
- ☐ A. Blade
 - ☒ B. Stock
 - ☐ C. Vernier scale
 - ☐ D. Dial

Q.61 Which of the following auxiliary systems maintains engine temperature by circulating coolant and dissipating excess heat through the radiator?

- Ans**
- ☒ A. Cooling system
 - ☐ B. Lubrication system
 - ☐ C. Exhaust system
 - ☐ D. Fuel supply system

Q.62 Air entering the hydraulic brake system makes the brake pedal spongy because air is compressible and prevents proper transmission of force to the brakes. The corrective maintenance action is:

- Ans**
- ☒ A. System bleeding
 - ☐ B. Fluid topping
 - ☐ C. Cable tightening
 - ☐ D. Pad replacement

Q.63 Which use of calipers involves transferring a dimension from a workpiece to a scale?

- Ans**
- ☐ A. Setting out parallel lines
 - ☐ B. Comparing internal and external sizes
 - ☐ C. Direct measurement reading
 - ☒ D. Indirect measurement transfer

Q.64 When adjusting the brake valve spindle in the released position of the brake pedal, what is the correct procedure according to maintenance guidelines?

- Ans**
- ☐ A. Shorten the spindle by half its length and replace the gasket
 - ☒ B. Set the spindle length so the valve is fully pressed and secure the lock nut
 - ☐ C. Adjust the spindle until the pedal is flush with the floor and apply thread sealant
 - ☐ D. Extend the spindle until it contacts the pedal stop and loosen the jam nut

Q.65 For which application is a 32 Teeth Per Inch hacksaw blade ideal?

- Ans**
- ☐ A. Thin plastics bar
 - ☐ B. Thick steel bars
 - ☐ C. Thick plastics bar
 - ☒ D. Thin sheets

Q.66 How often should the die be backed off during external thread cutting?

- Ans**
- ☐ A. Only once at the beginning of the threading operation before cutting starts
 - ☐ B. Only at the end of the threading pass after reaching the required length
 - ☒ C. Periodically during cutting to break chips, depending on material conditions
 - ☐ D. After forming each complete thread along the workpiece to break chips

Q.67 Which characteristic of the crankshaft material plays a vital role in its performance?

- Ans**
- ☒ A. High fatigue strength
 - ☐ B. High electrical conductivity
 - ☐ C. High thermal expansion
 - ☐ D. High optical clarity

Q.68 Which component shares a similar operational principle with the wheel cylinder but operates in reverse?

- Ans**
- ☐ A. Brake booster
 - ☐ B. Brake drum
 - ☐ C. Proportioning valve
 - ☒ D. Master cylinder

Q.69 The distance of the effort from the fulcrum is called the _____.

- Ans**
- ☐ A. Mechanical arm
 - ☐ B. Lever length
 - ☒ C. Effort arm
 - ☐ D. Load arm

Q.70 Which of the following best describes the working principle of a 2-stroke diesel engine?

- Ans**
- ☒ A. Exhaust gases are expelled only during a separate exhaust stroke in the cycle
 - ☒ B. The engine completes one power cycle in two strokes with one crankshaft revolution
 - ☒ C. Air and fuel are mixed in the carburetor before entering the cylinder for combustion process
 - ☒ D. The engine completes one power cycle in four strokes with two crankshaft revolutions

Q.71 How do the compression ratios of conventional petrol engines generally compare with diesel engines?

- Ans**
- ☒ A. Conventional petrol engines have lower compression ratios than diesel engines.
 - ☒ B. Conventional petrol engines have higher compression ratios than diesel engines.
 - ☒ C. Conventional petrol engines have higher compression ratios at idling speeds only.
 - ☒ D. Conventional petrol engines have the same compression ratios as diesel engines.

Q.72 When soldering ferrous metals, which factor can cause a weak joint if not controlled?

- Ans**
- ☒ A. High melting solder
 - ☒ B. Insufficient surface preparation
 - ☒ C. Excessive solder application
 - ☒ D. Low flux boiling point

Q.73 What is the main function of belt and chain tensioners in a diesel engine timing system?

- Ans**
- ☒ A. To increase engine compression ratio by providing high tension
 - ☒ B. To eliminate the need for timing components completely
 - ☒ C. To keep the timing belt or chain rotating
 - ☒ D. To maintain proper tension in the drive

Q.74 Which scenario best demonstrates the benefit of electronic fuel injection in real-world driving conditions?

- Ans**
- ☒ A. Consistent engine performance at varying altitudes
 - ☒ B. Manual adjustment of fuel jets on highways
 - ☒ C. Frequent engine stalling in city traffic
 - ☒ D. Delayed ignition timing during acceleration

Q.75 Which of these is NOT a purpose of the drive plate in an automatic transmission system?

- Ans**
- ☒ A. Transmitting torque to the transmission
 - ☒ B. Storing rotational energy
 - ☒ C. Connecting torque converter to crankshaft
 - ☒ D. Handling flexing during rotation