



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	9:30 AM - 12:00 PM
Subject	ALP Stage 2 Machinist

* 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 A roller coaster at the top of its track has maximum potential energy. As it descends and speeds up, what principle explains why the sum of its kinetic and potential energies remains constant if we ignore friction and air resistance?

- Ans**
- ☒ A. Law of inertia
 - ☒ B. Principle of inertia
 - ☒ C. Law of conservation of energy
 - ☒ D. Principle of superposition

Q.2 A thermometer shows a reading of 37 degrees Celsius. What is the corresponding temperature in Kelvin?

- Ans**
- ☒ A. 270 K
 - ☒ B. 300 K
 - ☒ C. 310 K
 - ☒ D. 320 K

Q.3 A mechanical engineer must design a flange joint where two pipes are to be connected at a 45-degree angle. Which method should the engineer use to accurately represent the intersection line on a technical drawing of the two cylindrical pipes?

- Ans**
- ☒ A. Represent the intersection as a straight line in the side view
 - ☒ B. Use only standard orthographic projection without auxiliary views
 - ☒ C. Draw the true shape of the intersection using auxiliary projection
 - ☒ D. Draw a simple circle at the junction in the top view

Q.4 What is the simplified value of the expression $\left[\frac{\cos A}{(1 - \tan A)} \right] + \left[\frac{\sin A}{(1 - \cot A)} \right]$?

- Ans**
- ☒ A. 0
 - ☒ B. $\sin A - \cos A$
 - ☒ C. 1
 - ☒ D. $\cos A + \sin A$

Q.5 Which of the following statements correctly reflects the characteristics of a Local Area Network (LAN) and the role of Ethernet within it?

- Ans**
- ☒ A. Ethernet is a standard that governs how devices in a LAN communicate via wired connections, supporting speeds from 10 Mbps to 1000 Mbps.
 - ☐ B. Ethernet in a LAN provides low-speed data transfer and connects users over public Internet infrastructure.
 - ☐ C. LANs are designed for long-distance communication and use Ethernet primarily for wireless data exchange.
 - ☐ D. A LAN always requires Gigabit Ethernet to function and is insecure because it allows open access to all network devices.

Q.6 P, Q, R, S and T have different ages. T is elder than only one person. S is elder than P but younger than Q. R is elder than Q. Who is the youngest?

- Ans**
- ☐ A. Q
 - ☐ B. S
 - ☒ C. P
 - ☐ D. R

Q.7 What should come in place of the question mark (?) in the given series?

74, 83, 101, 128, ?, 209

- Ans**
- ☐ A. 155
 - ☐ B. 146
 - ☐ C. 176
 - ☒ D. 164

Q.8 Which approach most effectively reduces both nitrogen and phosphorus concentrations during wastewater treatment?

- Ans**
- ☒ A. Biological and chemical nutrient removal
 - ☐ B. Surface-flow constructed wetlands
 - ☐ C. UV disinfection following secondary treatment
 - ☐ D. Primary sedimentation with extended aeration

Q.9 Which integrated strategy best addresses soil pollution, falling crop yields, and low microbial activity near an industrial zone?

- Ans**
- ☐ A. Expand urban areas into farmland.
 - ☒ B. Control industrial waste for sustainability.
 - ☐ C. Ban all regional chemical fertilizers.
 - ☐ D. Reforestation in nearby urban centers.

Q.10 If Rohan's income increases by 20% and his expenditure increases by 10%, then his savings increase by ₹1,200. If his original income was ₹12,000, what was his original expenditure? (Assume that savings = income – expenditure.)

- Ans**
- ☐ A. ₹10,000
 - ☐ B. ₹9,000
 - ☒ C. ₹12,000
 - ☐ D. ₹11,000

Q.11 There are two types of silver–copper alloys. The first alloy contains $93\frac{1}{3}\%$ silver, while the second alloy contains $86\frac{2}{3}\%$ silver. Find the amount of the first alloy that should be mixed with some quantity of the second alloy to obtain a 100 kg mixture containing 90% silver.

- Ans**
- ☐ A. 48 kg
 - ☐ B. 52 kg
 - ☐ C. 45 kg
 - ☒ D. 50 kg

Q.12 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 conclusions logically follow(s) from the statements.

Statements:

Some glasses are spoons.
All spoons are forks.

Conclusions:

(I) Some glasses are forks.
(II) All forks are spoons.

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

Q.13 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?

$$28 \text{ A } 16 \text{ C } 3 \text{ B } 12 \text{ D } 4 = ?$$

- Ans**
- ☒ A. 70
 - ☒ B. 73
 - ☒ C. 72
 - ☒ D. 71

Q.14 Simplify: $60 - \{(-8) \times (-16 - 19 - 2)\} \div [5 \times \{2 + (-1) \times (-1)\}]$

- Ans**
- ☒ A. $\frac{614}{15}$
 - ☒ B. $\frac{594}{15}$
 - ☒ C. $\frac{604}{15}$
 - ☒ D. $\frac{608}{15}$

Q.15 E, F, G, H, L and M live on six different floors of the same building. The lowermost floor in the building is numbered 1, the floor above it, number 2 and so on, till the topmost floor is numbered 6. Only three people live above G. Only two people live between L and E. Only two people live between M and G. E lives below G but above F. How many people live below H?

- Ans**
- ☒ A. Four
 - ☒ B. Three
 - ☒ C. One
 - ☒ D. Two

Q.16 A worker's hand is at risk of injury from a mechanical shearing action. Which situation best describes a shearing hazard?

- Ans**
- ☒ A. A hand becoming entangled in a rotating machine shaft during operation
 - ☒ B. A hand touching a hot metallic machine surface during maintenance activity
 - ☒ C. A hand sliding repeatedly across a rough abrasive machine surface during work
 - ☒ D. A hand caught between a moving blade and a fixed machine surface during operation

Q.17 If the mean of the following data is 40, then what is the value of x?

Class	10-20	20-30	30-40	40-50	50-60
Frequency	30	27	44	29	X

- Ans
- ☐ A. 93
 - ☐ B. 98
 - ☐ C. 99
 - ☒ D. 82

Q.18 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 conclusions logically follow(s) from the statements.

Statements: All girls are hens. No hen is a cat.

Conclusion (I): No girl is a cat.

Conclusion (II): Some cats are hens.

- 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.19 Which of the following scenarios best demonstrates the conversion of chemical energy to mechanical energy?

- Ans
- ☐ A. A stretched rubber band snaps back to its original shape
 - ☐ B. A flashlight turns on after inserting new batteries
 - ☒ C. A runner uses stored energy from food to sprint forward
 - ☐ D. A stone falls off a table to the ground

Q.20 G is the mother of Y. Y is the sister of V. S is the father of L. L is the husband of V. How is G related to S?

- Ans
- ☐ A. Son's wife
 - ☐ B. Son's wife's sister
 - ☐ C. Mother's mother
 - ☒ D. Son's wife's mother

Q.21 Three workers, X, Y, and Z, can complete a certain job in 10 days, 12 days, and 15 days, respectively. Determine the number of days required for them to complete the job when they work together.

- Ans
- ☐ A. 6 days
 - ☒ B. 4 days
 - ☐ C. 8 days
 - ☐ D. 5 days

Q.22 What do touch gestures in Microsoft Windows allow users to do?

- Ans
- ☐ A. Type faster on the keyboard
 - ☐ B. Connect external devices
 - ☒ C. Perform actions using finger movements
 - ☐ D. Increase screen brightness

Q.23 16 is related to 260 following a certain logic. Following the same logic, 25 is related to 630. To which of the following is 9 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 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.)

- Ans**
- ☒ A. 729
 - ☒ B. 84
 - ☒ C. 78
 - ☒ D. 732

Q.24 A car travels 90 km east and then 30 km west along the same straight road. If the entire journey takes 3 hours, what is the average velocity of the car?

- Ans**
- ☒ A. 20 km/h east
 - ☒ B. 30 km/h east
 - ☒ C. 40 km/h east
 - ☒ D. 50 km/h north

Q.25 An engineer is tasked with creating the front view of a mechanical part. The part has a rectangular base with a vertical circular hole passing through it and a triangular prism attached on top. Which of the following best describes what will be visible in the front view?

- Ans**
- ☒ A. Only the triangular prism will be clearly visible in the front view drawing
 - ☒ B. The outline of triangular prism and circular hole will be visible in front view only
 - ☒ C. Only the rectangular base outline will be visible in the front view drawing
 - ☒ D. The outline of rectangular base and triangular prism will be visible but hole is not shown

Q.26 Which line symbol is commonly used in engineering drawings to represent a hidden edge that is not directly visible?

- Ans**
- ☒ A. Chain thin line
 - ☒ B. Zigzag line
 - ☒ C. Solid thick line
 - ☒ D. Dashed line

Q.27 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 Shreya related to Mahak if 'Shreya + Dev – Taran × Harshit % Mahak'?

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

Q.28 What is an email used for?

- Ans**
- ☒ A. File storage
 - ☒ B. Data processing
 - ☒ C. Creating documents
 - ☒ D. Sending messages

Q.29 What is the primary function of a fire hydrant in a workplace safety system?

- Ans
- ☐ A. Removing hazardous fumes from the area
 - ☐ B. Activating fire alarms automatically in emergencies
 - ☐ C. Detecting smoke and warning employees
 - ☒ D. Supplying large quantities of water to fight fires

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. WQ-CG
 - ☒ B. QK-VA
 - ☐ C. TN-ZD
 - ☐ D. EY-KO

Q.31 If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^3 + \frac{1}{x^3}\right)$.

- Ans
- ☐ A. 16
 - ☐ B. 15
 - ☐ C. 20
 - ☒ D. 18

Q.32 Which of the following is both, an input and output device?

- Ans
- ☒ A. Touchscreen monitor
 - ☐ B. Projector
 - ☐ C. Keyboard
 - ☐ D. Printer

Q.33 In this question, a group of numbers/symbols is coded using letter codes as per the codes given below and the conditions which follow. The correct combination of codes following the conditions is your answer. 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	6	1	&	3	%	8	+	4	#	7	@	5	2	\$
Code	R	V	G	D	S	C	T	L	F	W	H	U	Y	N

Conditions:

- (i) If the first element is a symbol and the last element is 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 last elements are to be coded as @.
- (iii) If both the 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?
+ 6 \$ 2 7

- Ans
- ☐ A. STMWV
 - ☒ B. WRNYT
 - ☐ C. TSNWW
 - ☐ D. WSNYT

Q.34 In a spreadsheet application, a user selects a range of cells and presses Ctrl + C, followed by Ctrl + V in a different worksheet. What happens to the data?

- Ans
- ☒ A. The selected cells are copied to the new worksheet.
 - ☐ B. The selected cells are deleted from the original worksheet.
 - ☐ C. The selected cells are moved to the new worksheet.
 - ☐ D. The selected cells are saved to a new file.

Q.35 PJAE is related to JOWH in a certain way based on the English alphabetical order. In the same way, OIVC is related to INRF. To which of the following is NEZF related to following the same logic?

- Ans**
- ☐ A. HKVJ
 - ☒ B. HJVI
 - ☐ C. IJVJ
 - ☐ D. IKUH

Q.36 When a moving car suddenly applies brakes, its kinetic energy is transformed mainly into which form of energy?

- Ans**
- ☒ A. Heat energy
 - ☐ B. Sound energy
 - ☐ C. Light energy
 - ☐ D. Potential energy

Q.37 A shopkeeper marks a product 75% above cost price and offers two successive discounts of 30% and 40%. What is the profit or loss percentage?

- Ans**
- ☐ A. 22.6% profit
 - ☐ B. 20.9% profit
 - ☐ C. 15.7% profit
 - ☒ D. 26.5% loss

Q.38 Which of the following statements correctly describes average velocity and its SI unit?

- Ans**
- ☒ A. Average velocity is the total displacement divided by total time, and its unit is meter per second.
 - ☐ B. Average velocity is the total distance divided by total time, and its unit is kilometer per hour.
 - ☐ C. Average velocity is the total distance divided by total time, and its unit is meter per second.
 - ☐ D. Average velocity is the total displacement divided by total time, and its unit is kilometer per hour.

Q.39 A trader buys 187 pens at ₹23 each. During transportation, 7 pens get damaged and cannot be sold. He sells the remaining pens at ₹27 each. Find his profit percentage. (rounded off to one decimal place)

- Ans**
- ☐ A. 14.1%
 - ☐ B. 12.6%
 - ☒ C. 13.0%
 - ☐ D. 13.7%

Q.40 The average of 8 numbers is 45. If one number, 59, is removed, what will the new average be?

- Ans**
- ☐ A. 42.5
 - ☒ B. 43
 - ☐ C. 42
 - ☐ D. 41.5

Q.41 In third angle projection, where is the object placed relative to the plane of projection?

- Ans**
- ☐ A. The object is placed in the first quadrant
 - ☐ B. The object is placed in the second quadrant
 - ☐ C. The object is placed in the fourth quadrant
 - ☒ D. The object is placed in the third quadrant

Q.42 What is the best description of the purpose of multi-view drawing in engineering drawing?

- Ans**
- ☐ A. To show different colors of an object for better visual appearance
 - ☐ B. To present the object in a single three-dimensional visual form only
 - ☒ C. To represent different sides of an object clearly on a flat surface
 - ☐ D. To view an object from only one direction

Q.43 Which property of a fuse wire ensures it melts quickly when excess current flows?

- Ans**
- ☐ A. Thick wire
 - ☒ B. Low melting point
 - ☐ C. High melting point
 - ☐ D. High electrical resistance

Q.44 What is the typical temperature range covered by a laboratory thermometer used in school experiments?

- Ans**
- ☒ A. Minus ten to one hundred and ten degrees Celsius
 - ☐ B. Zero to two hundred degrees Celsius
 - ☐ C. Thirty five to forty two degrees Celsius
 - ☐ D. Minus fifty to fifty degrees Celsius

Q.45 What should come in place of the question mark (?) in the given series based on the English alphabetical order?

UMD ZQG EUJ JYM ?

- Ans**
- ☐ A. NBQ
 - ☐ B. PDP
 - ☐ C. NDO
 - ☒ D. OCP

Q.46 Which situation best describes an entanglement hazard in a mechanical workshop?

- Ans**
- ☐ A. Finger cut by a sharp edge
 - ☐ B. Hand pinched between gears
 - ☒ C. Loose clothing caught in a rotating shaft
 - ☐ D. Gloves worn near hot surfaces

Q.47 Which component makes up the largest proportion of Earth's atmosphere by volume?

- Ans**
- ☐ A. Argon
 - ☒ B. Nitrogen
 - ☐ C. Carbon dioxide
 - ☐ D. Oxygen

Q.48 Two students move identical boxes through a distance of 10 m. Student A applies a force of 50 N, while Student B applies a force of 100 N. What is the difference in the work done by the two students?

- Ans**
- ☐ A. 1000 J
 - ☐ B. 50 J
 - ☒ C. 500 J
 - ☐ D. 0 J

- Q.49** Which feature is a requirement of the BIS drawing standard in engineering drawings?
- Ans**
- ☒ A. Freehand sketches without scale
 - ☒ B. Use of colored pencils for clarity
 - ☒ C. Title block with specific information
 - ☒ D. Margin lines of random width

- Q.50** Refer to the following letter and symbol series and answer the question that follows.
Counting to be done from left to right.

(Left) Z @ B R J # D * Q A M S % P L V O U S N T W Z (Right)

How many such symbols are there, each of which is immediately preceded by a letter and also immediately followed by a letter?

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

- Q.51** Namia is facing the west. She turns left and walks 15 m. She turns left and walks 25 m. She again turns left and walks 40 m. She finally turns left and walks 40 m to reach home. In which direction is her home with respect to the starting point?

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

- Q.52** If a scooter travels at a constant speed of 25 km per hour, how far will it travel in 4 hours?

- Ans**
- ☒ A. 100 km
 - ☒ B. 120 km
 - ☒ C. 80 km
 - ☒ D. 75 km

- Q.53** What should come in place of the question mark (?) in the given series?

98, 104, 116, 134, 158, ?

- Ans**
- ☒ A. 186
 - ☒ B. 184
 - ☒ C. 188
 - ☒ D. 190

- Q.54** 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 X and Z when counted from the right of X. Only two people sit between Z and D. Only three people sit between X and B. A sits to the immediate left of C.

Who sits third to the left of Y?

- Ans**
- ☒ A. C
 - ☒ B. Z
 - ☒ C. A
 - ☒ D. X

Q.55 Solve the system of equations:
 $-3x + 2y - z = -1$, $6x - 6y + 7z = -7$, $3x - 4y + 4z = -6$

- Ans
- ☐ A. $x=1, y=2, z=2$
 - ☐ B. $x=2, y=1, z=-3$
 - ☒ C. $x=2, y=2, z=-1$
 - ☐ D. $x=-2, y=2, z=11$

Q.56 Refer to the given letter series and answer the question that follows. Counting to be done from left to right.

(Left) B F O P P S Q A L M K A W X S N U Q J O M Y (Right)

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

- Ans
- ☐ A. 6
 - ☒ B. 5
 - ☐ C. 4
 - ☐ D. 7

Q.57 A sample of water is heated from 15 degrees Celsius to 35 degrees Celsius. What is the temperature change in Kelvin?

- Ans
- ☐ A. The temperature change is 50 K.
 - ☐ B. The temperature change is 15 K.
 - ☒ C. The temperature change is 20 K.
 - ☐ D. The temperature change is 30 K.

Q.58 The median of the following data is :
 25, 15, 23, 25, 17, 27, 20, 18, 24, 30, 19, 28, 35, 10, 31, 40

- Ans
- ☐ A. 25
 - ☒ B. 24.5
 - ☐ C. 20.5
 - ☐ D. 23.5

Q.59 A tangent PQ at a point P of a circle of radius 5 cm meets a line through the center O at a point Q such that OQ = 12 cm. What is the length of PQ?

- Ans
- ☐ A. $\sqrt{97}$ cm
 - ☐ B. $\sqrt{117}$ cm
 - ☒ C. $\sqrt{119}$ cm
 - ☐ D. $\sqrt{107}$ cm

Q.60 A conical tent has a base radius of 14 m and a height of 48 m. How many cubic meters of air can it hold? (Use $\pi = \frac{22}{7}$)

- Ans
- ☐ A. 8956
 - ☐ B. 9865
 - ☐ C. 9568
 - ☒ D. 9856

Q.61 An object has a mass of 10 kilograms. How does its weight on the Moon compare to its weight on Earth?

- Ans**
- ☒ A. The object weighs less on the Moon than on Earth
 - ☐ B. The object weighs the same on both the Moon and Earth
 - ☐ C. The object weighs more on the Moon than on Earth
 - ☐ D. The object weighs zero on the Moon

Q.62 A car of mass 1200 kg accelerates from rest to a speed of 20 m/s on a straight road. If the kinetic energy gained by the car is completely due to the work done by the engine, which of the following best represents the total kinetic energy acquired by the car at this speed?

- Ans**
- ☐ A. 12,000 joules
 - ☐ B. 480,000 joules
 - ☒ C. 240,000 joules
 - ☐ D. 24,000 joules

Q.63 Which is the most important safety check before operating any machine in a workshop?

- Ans**
- ☐ A. Wipe the machine with a dry cloth before use
 - ☐ B. Check if the machine is plugged in properly
 - ☐ C. Ensure the machine area is properly illuminated
 - ☒ D. Inspect the machine for loose or damaged parts

Q.64 When using a hand file during fitting operations, which action demonstrates adherence to tool safety protocols?

- Ans**
- ☐ A. Holding the file near its tang during filing work
 - ☐ B. Filing above shoulder height for better leverage
 - ☒ C. Fitting a proper handle securely to the tang
 - ☐ D. Applying excessive downward force when filing

Q.65 The simple interest earned on a certain sum of money for 3 years at 15% per annum is ₹2,700. Find the sum.

- Ans**
- ☐ A. ₹9,000
 - ☐ B. ₹5,000
 - ☐ C. ₹8,000
 - ☒ D. ₹6,000

Q.66 Select the pair which follows the same pattern as that followed by the two pairs given below. Both pairs follow the same pattern.

BIP : EMU
GNU : JRZ

- Ans**
- ☐ A. XDE : PON
 - ☒ B. FMT : IQY
 - ☐ C. VCD : GRD
 - ☐ D. CGW : NHT

Q.67 A car travels 60 km north in 2 hours, then 40 km south in the next 1 hour. What is the car's average velocity over the entire trip?

- Ans**
- ☐ A. 33.3 km/h north
 - ☐ B. 0 km/h
 - ☒ C. 6.7 km/h north
 - ☐ D. 20 km/h south

Q.68 A train X crosses a man who is sitting in another train Y, which is moving in the opposite direction, in 8 seconds. However, when both trains are moving in the same direction, train X takes 20 seconds to pass the same man. If the length of train X is 360 meters and the length of train Y (in which the man is sitting) is 240 meters, what is the speed of train Y?

- Ans**
- ☒ A. 45.8 km/h
 - ☒ B. 46.5 km/h
 - ☒ C. 48.6 km/h
 - ☒ D. 45.3 km/h

Q.69 Which of the following best describes a key environmental concern associated with improper disposal of e-waste?

- Ans**
- ☒ A. Release of toxic metals into soil and water
 - ☒ B. Release of greenhouse gases from decomposition
 - ☒ C. Increased recycling rates of precious metals
 - ☒ D. Enhanced biodegradation of plastics

Q.70 A boat sails 40 km downstream and then 40 km upstream in a river. The boat's speed in still water is 12 km/hr and the speed of the stream is 4 km/hr. How much time does the boat take to cover the entire distance (both upstream and downstream)?

- Ans**
- ☒ A. 10 hours
 - ☒ B. 6 hours
 - ☒ C. 7.5 hours
 - ☒ D. 8 hours

Q.71 An engineering student is tasked with creating a detailed side view of a complex machine part for an assembly drawing. Which approach will most accurately represent all features visible from the side while avoiding hidden overlaps or misinterpretations?

- Ans**
- ☒ A. Sketch the side view freely without using projections from the main view
 - ☒ B. Use only hidden lines for representing features on the far side in the view
 - ☒ C. Include all features even those not visible from the selected side view
 - ☒ D. Project all visible elements from the side and omit hidden features unless needed

Q.72 A pendulum takes 60 seconds to complete 24 oscillations. If its length is increased and it now takes 72 seconds for the same number of oscillations, what has happened to its time period?

- Ans**
- ☒ A. It has increased to 3.0 seconds
 - ☒ B. It remains at 2.5 seconds
 - ☒ C. It has decreased to 1.5 seconds
 - ☒ D. It has decreased to 2.0 seconds

Q.73 A laboratory record shows a distance of 0.004 kilometers between two points. How should this be written in SI units of length for a scientific report?

- Ans**
- ☒ A. 4 m
 - ☒ B. 400 cm
 - ☒ C. 4000 mm
 - ☒ D. 0.4 m

Q.74 A sum of ₹420 is divided among A, B, C, and D such that: $A : B = 4 : x$, $B : C = x : 7$, $C : D = 6 : (x - 3)$. If B and C together get ₹210, find the value of x.

- Ans**
- ☒ A. 39
 - ☒ B. 53
 - ☒ C. 27
 - ☒ D. 42

Q.75 A runner completes one lap of a 200 meter circular track in 50 seconds. What is the average speed of the runner?

- Ans**
- ✓ A. 4 meter per second
 - ✗ B. 3 meter per second
 - ✗ C. 4.5 meter per second
 - ✗ D. 3.5 meter per second

Q.76 The circumference of the base of a solid right circular cylinder is 88 cm and its height is 150 cm. What is the volume (in cm^3) of the cylinder?

$$\left(\text{Take } \pi = \frac{22}{7} \right)$$

- Ans**
- ✗ A. 92450
 - ✓ B. 92400
 - ✗ C. 92500
 - ✗ D. 92550

Q.77 Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

QOI 5, OMG 10, MKE 15, KIC 20, ?

- Ans**
- ✗ A. IHS 23
 - ✗ B. JHZ 24
 - ✗ C. HIZ 30
 - ✓ D. IGA 25

Q.78 In this question, 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.

Q. Among five people – A, B, C, D, and E – who is the tallest?

(I) A is taller than B. B is taller than C.

(II) D is taller than E.

- Ans**
- ✓ A. Both statements I and II together are NOT 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 (and not statement I alone or statement II alone) are 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.79 O, P, Q, U and V have different heights. Only three people have heights between V and Q. P is taller than U but shorter than O. V is taller than Q. How many people are shorter than P?

- Ans**
- ✗ A. Four
 - ✗ B. One
 - ✗ C. Three
 - ✓ D. Two

Q.80 If 'A' stands for '+', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', what will come in place of the question mark '?' in the following equation?

14 A 30 B 45 C 15 D 9 = ?

- Ans**
- ✗ A. 28
 - ✗ B. 25
 - ✓ C. 27
 - ✗ D. 29

Q.81 Find the LCM of 72, 78, and 90.

- Ans**
- ☒ A. 4680
 - ☐ B. 4280
 - ☐ C. 4120
 - ☐ D. 4250

Q.82 In this question, 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 the five poles—I, N, C, H, and L—each having a different height, which pole is the tallest?

(I) I is shorter than N but taller than C. C is taller than only one pole.

(II) H is taller than L.

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

Q.83 An engineer is tasked with creating a hollow cone for a machine part, where the wall thickness must be consistent and the slant height is critical for assembly. Which factor is most important to ensure the cone will fit correctly in the final design?

- Ans**
- ☒ A. Ensuring the slant height matches the assembly requirement
 - ☐ B. Prioritizing uniform wall thickness over all other features
 - ☐ C. Matching only the overall height of the cone
 - ☐ D. Focusing only on base diameter for precise fit

Q.84 A diamond ring costs ₹85,000. Its price is reduced first by 11% and then by 4% on the reduced price. Find the final price of the ring after both discounts.

- Ans**
- ☐ A. ₹74,624
 - ☒ B. ₹72,624
 - ☐ C. ₹72,604
 - ☐ D. ₹73,624

Q.85 A trader marks an article 25% above its cost price. He allows a discount of 10% on the marked price. After giving the discount, he makes a profit of ₹180 on the article. What is the cost price of the article?

- Ans**
- ☒ A. ₹1,440
 - ☐ B. ₹1,380
 - ☐ C. ₹1,260
 - ☐ D. ₹1,200

Q.86 What is the main purpose of ambient air quality standards?

- Ans**
- ☒ A. To set legally permissible limits for specific pollutants to protect public health.
 - ☐ B. To require all industries to reduce emissions by the exact same percentage.
 - ☐ C. To ensure air is routinely sampled to map historical pollution trends.
 - ☐ D. To focus exclusively on industrial operations while ignoring other sectors.

Q.87 Seven boxes, P, Q, S, T, U, V, and W, are kept one over the other, but not necessarily in the same order. Only three boxes are kept above S. Exactly one box is kept between T and S. Exactly three boxes are kept between T and U, and U is kept somewhere above S. V is kept immediately below U. W is kept at one of the places above P. Q is not kept immediately above or below T. Based on the given information, which box is kept at the lowermost position?

- Ans**
- ☒ A. Q
 - ☒ B. P
 - ☒ C. S
 - ☒ D. V

Q.88 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. DJ – GM
 - ☒ B. AF – DI
 - ☒ C. BG – EJ
 - ☒ D. CH – EK

Q.89 In how many years will a sum of ₹16,000 at 10% per annum compounded semi-annually become ₹18,522?

- Ans**
- ☒ A. 1.5 years
 - ☒ B. 2 years
 - ☒ C. 1 year
 - ☒ D. 2.5 years

Q.90 Below are given two sets of numbers. 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.)

10 - 100 - 50 - 25; 2 - 4 - 2 - 1

- Ans**
- ☒ A. 5 - 25 - 15 - 7
 - ☒ B. 4 - 16 - 8 - 4
 - ☒ C. 8 - 64 - 32 - 14
 - ☒ D. 12 - 144 - 62 - 31

Q.91 An engineer uses fault tree analysis to assess a machine-related injury in a factory. Which step should be taken first according to standard procedure?

- Ans**
- ☒ A. Define the top event representing the injury
 - ☒ B. Validate the analysis using workplace data
 - ☒ C. Establish preventive measures to control risks
 - ☒ D. List all possible causes of failures

Q.92 A father distributed two different amounts among his sons P, Q, R and S. First amount was distributed in the ratio 5 : 4 : 3 : 2 and the second amount was distributed in the ratio 6 : 7 : 8 : 9. If the second amount is thrice the first amount, then which son will get the maximum amount?

- Ans**
- ☒ A. P
 - ☒ B. S
 - ☒ C. Q
 - ☒ D. R

Q.93 Refer to the following letter series and answer the question that follows. Counting to be done from left to right only.

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

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

- Ans
- ☐ A. 1
 - ☐ B. 0
 - ☐ C. 2
 - ☒ D. 3

Q.94 A car travels on a highway, and its odometer records a reading of 180 km at 8:00 am and 240 km at 9:30 am. Based on this information, which statement best describes the car's average speed during this interval?

- Ans
- ☐ A. The car's average speed is 180 km per hour since that was the odometer reading at 8:00 am.
 - ☐ B. The car's average speed is 60 km per hour based only on the change in odometer readings.
 - ☒ C. The car's average speed is 40 km per hour as calculated from the odometer readings and time interval.
 - ☐ D. The car's average speed is 240 km per hour since that was the odometer reading at 9:30 am.

Q.95 Three pipes A, B and C can fill a tank in 12 hours, 18 hours and 24 hours, respectively. A leak at the bottom can empty the full tank in 36 hours. If all the pipes are opened together, in how many hours will the tank be filled? (Round off your answer to two decimal places.)

- Ans
- ☐ A. 3.33 hours
 - ☐ B. 9.45 hours
 - ☒ C. 6.55 hours
 - ☐ D. 5.56 hours

Q.96 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?

31 B 35 D 7 A 9 C 2 = ?

- Ans
- ☒ A. 44
 - ☐ B. 46
 - ☐ C. 48
 - ☐ D. 42

Q.97 A cyclist covers 120 meters in 16 seconds on a straight road, then immediately covers 180 meters in 24 seconds on a similar road segment. What is the average speed of the cyclist during the entire journey?

- Ans
- ☐ A. 6.5 meters per second
 - ☐ B. 7.0 meters per second
 - ☒ C. 7.5 meters per second
 - ☐ D. 8.0 meters per second

Q.98 In a certain code language, 'KING' is coded as '9713' and 'ITCH' is coded as '2945'. What is the code for 'I' in the given code language?

- Ans
- ☐ A. 4
 - ☐ B. 7
 - ☒ C. 9
 - ☐ D. 2

Q.99 Which of the following best defines 'work' in physics?

- Ans**
- ☐ A. Work is done whenever a force is applied, regardless of movement.
 - ☐ B. Work is done when energy is stored in an object.
 - ☐ C. Work is done if a force acts at any angle to the motion.
 - ☒ D. Work is done when a force moves an object in the direction of the force.

Q.100 Which statement best describes a 'point' in engineering drawing?

- Ans**
- ☒ A. A point indicates a precise location but has no size, length, or width.
 - ☐ B. A point is the intersection of two lines and always has measurable length.
 - ☐ C. A point represents a small area with both length and width.
 - ☐ D. A point is a short line segment used to mark measurements.

Section : **PART-B**

Q.1 Which of the following best describes the main advantage of using temporary clamps in CNC VMC work-holding?

- Ans**
- ☐ A. They provide the strongest possible holding force during machining
 - ☐ B. They eliminate the need for aligning the workpiece before machining
 - ☐ C. They are permanently attached to the machine table for stability
 - ☒ D. They allow quick setup changes and reusability for different jobs

Q.2 Which of the following best defines 'downtime' in manufacturing?

- Ans**
- ☐ A. A period during which operators take scheduled breaks
 - ☒ B. A period during which machines are not in production
 - ☐ C. A period during which routine maintenance is performed
 - ☐ D. A period during which machines achieve maximum output

Q.3 What is the defining characteristic of multi-point cutting tools?

- Ans**
- ☐ A. Used for end cutting action
 - ☐ B. Having single cutting edge
 - ☒ C. Having more than one cutting edge
 - ☐ D. Used for side cutting action

Q.4 Which statement about the distance from the center in a spiral compared to that in a helix is true?

- Ans**
- ☐ A. Helix's radius shrinks inward
 - ☒ B. Spiral's radius changes, helix's radius stays same
 - ☐ C. Both have constant radii
 - ☐ D. Both radii increase

Q.5 Dark lines are observed on the surface of a ground workpiece after finishing. What is the most likely cause of these burn marks during the grinding operation?

- Ans**
- ☒ A. Wheel is too hard for the material
 - ☐ B. Wheel speed is too slow
 - ☐ C. Sufficient coolant flow
 - ☐ D. Wheel is too soft for the material

Q.6 A file is not removing material efficiently. What is the likely cause?

- Ans**
- ☐ A. File is painted
 - ☐ B. File is too light weight
 - ☐ C. Handle is too long
 - ☒ D. Teeth are clogged with debris

Q.7 Which protective equipment is essential during a system failure response?

- Ans**
- ☐ A. Regular cotton gloves
 - ☐ B. Workshop caps
 - ☒ C. Insulated gloves
 - ☐ D. Aprons

Q.8 Which of the following statements best describes the vertical milling attachment?

- Ans**
- ☐ A. It offers automatic indexing operation
 - ☒ B. It converts horizontal to vertical spindle orientation
 - ☐ C. It provides rotary table movement
 - ☐ D. It enables gear cutting on horizontal machines

Q.9 Given the ratio 3:4::6:8, which operation verifies the proportion?

- Ans**
- ☒ A. $3 \times 8 = 6 \times 4$
 - ☐ B. $3 - 4 = 6 - 8$
 - ☐ C. $3 + 8 = 6 + 4$
 - ☐ D. $3/8 = 6/4$

Q.10 If you replaced a left-hand helix with a right-hand helix in a reversing motion device, what problem might occur?

- Ans**
- ☒ A. Thread may loosen
 - ☐ B. Thread binds more
 - ☐ C. Thread stays tight
 - ☐ D. Thread changes pitch

Q.11 What is the formula used to calculate the hourly depreciation of a machine?

- Ans**
- ☐ A. $(\text{Cost of Machine} + \text{Scrap Value}) \div \text{Total Machine Working Hours}$
 - ☐ B. $(\text{Cost of Machine} - \text{Replacement Cost}) \div \text{Total Machine Working Hours}$
 - ☐ C. $(\text{Cost of Machine} \div \text{Scrap Value}) \times \text{Total Machine Working Hours}$
 - ☒ D. $(\text{Cost of Machine} - \text{Scrap Value}) \div \text{Total Machine Working Hours}$

Q.12 In a three-wire method of thread measurement, wires are selected based on the thread pitch. What may result from using wires larger than the calculated size?

- Ans**
- ☐ A. The wires will provide a tighter fit and better results
 - ☒ B. The wires will not fit properly, leading to inaccurate measurement
 - ☐ C. The wires will measure the root diameter instead of the pitch diameter
 - ☐ D. The measurement will be more accurate due to increased contact area

Q.13 What is the primary purpose of entering workpiece offset data in the CNC VMC console during setup?

- Ans**
- ☐ A. To adjust the spindle speed for the operation of the machining process
 - ☐ B. To calibrate the coolant flow rate during machining process
 - ☐ C. To set the tool length value for the current tool for machining process
 - ☒ D. To define the position of the workpiece origin for machining process

Q.14 During the setup of a CNC lathe for a first part check, the machinist is instructed to use the single-block mode. What is the primary reason for activating single-block mode at this stage?

- Ans**
- ☐ A. To optimize spindle speed automatically
 - ☐ B. To monitor the machine motion for vibrations only
 - ☒ C. To verify each program block individually for errors
 - ☐ D. To check the coolant flow rate during operation

Q.15 Why is centre punching necessary on curved or cylindrical surfaces?

- Ans**
- ☒ A. Drill bit tends to slip more easily on curved surfaces
 - ☐ B. Curved surfaces always contain soft metal layers
 - ☐ C. Curved surfaces increase drilling speed automatically
 - ☐ D. Curved surfaces reduce hardness of metals

Q.16 In a cylindrical grinding operation, an operator needs to remove material from the entire surface of a short, stepped workpiece in a single pass. Which method should be selected for efficient operation?

- Ans**
- ☒ A. Plunge grinding with stationary table
 - ☐ B. Traverse grinding with reciprocating table
 - ☐ C. Creep feed grinding for cylindrical surfaces
 - ☐ D. Centerless grinding for long parts

Q.17 A CNC machine is programmed to move the tool from point X (10, 20) to point Y (50, 60) using linear interpolation. What will be the nature of the tool path between these two points ?

- Ans**
- ☒ A. The tool will move in a straight-line path connecting point X and point Y.
 - ☐ B. The tool will move in an arc trajectory from point X to point Y.
 - ☐ C. The tool will move step-by-step, first along the X-axis and then along the Y-axis.
 - ☐ D. The tool will follow a curved path between the two points.

Q.18 What is generally done after drawing the two strokes of an arrowhead?

- Ans**
- ☐ A. The enclosed space is shaded with random marks
 - ☐ B. The enclosed space is removed by erasing lines
 - ☐ C. The enclosed space is left completely empty
 - ☒ D. The enclosed space is neatly filled and darkened

Q.19 The pilot diameter in a piloted counterbore is designed to match which feature?

- Ans**
- ☐ A. The length of the counterbore
 - ☐ B. The diameter of the fastener head
 - ☐ C. The shank diameter
 - ☒ D. The diameter of the existing hole

Q.20 While setting up a CNC lathe for a new job, it is observed that the tool tip does not align with the programmed workpiece zero point after changing to a longer tool. Which parameter should be adjusted in the machine controller to ensure accurate machining dimensions?

- Ans**
- ☐ A. Feed rate adjustment
 - ☐ B. Spindle speed setting
 - ☒ C. Tool length offset value
 - ☐ D. Coolant flow rate

Q.21 If a drawing specifies a fillet weld with unequal leg lengths, what must the welder ensure during fabrication?

- Ans**
- ☒ A. Produce a finished fillet weld with both legs matching the specified lengths.
 - ☐ B. Substitute the specified fillet weld with a standard butt joint configuration.
 - ☐ C. Disregard the required leg measurements and focus entirely on the weld throat.
 - ☐ D. Fabricate the weld with equal leg dimensions regardless of drawing guidelines.

Q.22 A detailed drawing includes a note: M12 x 1.75. What does the 1.75 specify in screw thread representation?

- Ans**
- ☐ A. The major diameter of the screw thread
 - ☒ B. The pitch of the thread in millimeters
 - ☐ C. The total length of the threaded portion
 - ☐ D. The thread angle measured in degrees

Q.23 Which condition would most likely cause uneven lubrication in a splash lubrication system?

- Ans**
- ☐ A. Using clean oil in the reservoir for lubrication system
 - ☒ B. Improper alignment of the ring oiler with the oil level
 - ☐ C. Maintaining proper oil viscosity for smooth circulation
 - ☐ D. Maintaining correct shaft rotation for oil distribution

Q.24 A workshop facing repeated incidents of misplaced hazardous materials should prioritize which advanced housekeeping measure?

- Ans**
- ☐ A. Posting warning notices around designated hazardous storage
 - ☐ B. Switching to sealed material containers with safety labeling
 - ☒ C. Establishing color-coded storage with end-of-shift inspections
 - ☐ D. Providing handling instruction programs for workshop employees

Q.25 Which measuring method is used to examine the concentric alignment of a chuck mounted on a back plate?

- Ans**
- ☐ A. Using feeler guage
 - ☒ B. Using Dial indicator
 - ☐ C. Visual inspection by the eyes
 - ☐ D. Using calipers

Q.26 Which of the following tasks is NOT suitable for a bench-type drilling machine?

- Ans**
- ☐ A. Making holes in thin plastic sheets
 - ☒ B. Drilling large diameter holes in heavy beams
 - ☐ C. Performing counter-sinking operations on light workpieces
 - ☐ D. Drilling small holes in sheet metals

Q.27 While preparing a hardened plain carbon steel die, a machinist must ensure uniform grain structure and relieve internal stresses before hardening. Which sequence of heat treatments should be followed to achieve this?

- Ans**
- ☐ A. Direct quenching without prior normalization
 - ☒ B. Normalizing followed by quenching
 - ☐ C. Spheroidizing followed by tempering
 - ☐ D. Annealing followed by quenching

Q.28 Which of the following best describes the main difference between annealing and normalizing in heat treatment?

- Ans**
- ☐ A. Annealing hardens mild steel, while normalizing softens stain-less steel
 - ☒ B. Annealing cools metal slowly in furnace, while normalizing cools metal in air
 - ☐ C. Annealing uses water quenching, while normalizing uses oil quenching
 - ☐ D. Annealing is used after welding, while normalizing is used before welding

Q.29 Which of the following tool angles affects chip flow during turning operations?

- Ans**
- ☐ A. Clearance angle
 - ☐ B. Relief angle
 - ☐ C. Point angle
 - ☒ D. Rake angle

Q.30 Which operation most benefits from using a V-block with a clamp?

- Ans**
- ☐ A. Filing flat surfaces
 - ☐ B. Grinding a rectangular plate
 - ☒ C. Drilling a hole through a round bar
 - ☐ D. Measuring internal diameter

Q.31 A precise gear tooth profile is to be cut on a milling machine. Which milling attachment should be selected to accurately divide the workpiece for this operation?

- Ans**
- ☐ A. Vertical milling attachment
 - ☒ B. Dividing head attachment
 - ☐ C. Slotting attachment
 - ☐ D. Rotary table attachment

Q.32 What is the main reason for wearing gloves when giving first aid for bleeding?

- Ans**
- ☐ A. To help stop the bleeding
 - ☐ B. To keep hands free from dirt
 - ☒ C. To protect against infection
 - ☐ D. To make hands feel comfortable

Q.33 While calculating plate cam motion, which parameter is essential for determining the displacement of the follower at any given cam rotation angle?

- Ans**
- ☒ A. The distance from the camshaft center to the cam profile at a specific angle
 - ☐ B. The hardness of the tip of the follower used in the cam mechanism
 - ☐ C. The material used to manufacture the plate cam
 - ☐ D. The spindle rotation on which the cam is attached

Q.34 What is the primary function of feedback devices in CNC machines?

- Ans**
- ☐ A. To lubricate moving machine parts at friction points
 - ☐ B. To store CNC programs as a memory in tape
 - ☒ C. To monitor and report actual position to the control unit
 - ☐ D. To supply power to the servo motors for optimum speed

Q.35 As the angle increases beyond 45 degrees, what happens to the tangent value?

- Ans**
- ☐ A. Tangent value becomes zero
 - ☐ B. Tangent value remains constant
 - ☒ C. Tangent value increases above 1
 - ☐ D. Tangent value decreases below 1

Q.36 During installation of a new spindle head on a vertical milling machine, what is the most critical step to ensure reliable operation and long-term accuracy?

- Ans**
- ☒ A. Tightening all spindle head mounting bolts uniformly
 - ☒ B. Aligning the spindle head precisely with the vertical machine axis
 - ☒ C. Adjusting the table longitudinal stops for travel limits
 - ☒ D. Lubricating the spindle quill and machine parts after installation

Q.37 When comparing piloted counterbore and countersink tools, which statement is correct?

- Ans**
- ☒ A. Piloted counterbores create conical holes, while countersinks create flat-bottomed holes.
 - ☒ B. Piloted counterbores create flat-bottomed holes, while countersinks create conical holes.
 - ☒ C. Both piloted counterbores and countersinks create only tapered holes.
 - ☒ D. Both piloted counterbores and countersinks create only through-holes.

Q.38 What is one limitation of using the tailstock offset method for taper turning in terms of workpiece setup?

- Ans**
- ☒ A. It requires use of rapid feed during the turning operation process
 - ☒ B. It requires the workpiece to be held strictly between centers
 - ☒ C. It requires use of a special chuck for mounting workpiece
 - ☒ D. It requires swiveling of the compound rest during setup work

Q.39 Why are V-blocks often used in pairs when supporting long cylindrical workpieces?

- Ans**
- ☒ A. To measure thickness of the workpiece
 - ☒ B. To provide balanced support and alignment
 - ☒ C. To increase cutting speed
 - ☒ D. To reduce the cost of fixtures

Q.40 Which application is most suitable for a triangular file?

- Ans**
- ☒ A. Sharpening saw teeth
 - ☒ B. Polishing flat surfaces
 - ☒ C. Boring holes
 - ☒ D. Cutting threads

Q.41 Before starting the grinding operation, an operator inspects the wheel for safe operation. Which check is most critical to prevent wheel burst accidents?

- Ans**
- ☒ A. Ensure the wheel dresser remains sharp and properly cleaned
 - ☒ B. Check the coolant system carefully for leaks around the machine area
 - ☒ C. Conduct a ring test to check for cracks before mounting the wheel
 - ☒ D. Verify the tailstock pressure is set to manufacturer recommendations

Q.42 If the spindle speed is doubled but the wheel diameter remains the same, what happens to the cutting speed in grinding?

- Ans**
- ☒ A. The cutting speed will be reduced to half
 - ☒ B. The cutting speed will remain the same
 - ☒ C. The cutting speed will become four times
 - ☒ D. The cutting speed will also be double

Q.43 A machinist attempts to adjust the vertical height of a table by using saddle in a milling machine. What mistake is being made?

- Ans**
- ☒ A. Saddle does not provide vertical movement
 - ☒ B. Saddle does not support worktable
 - ☒ C. Saddle is fixed to column
 - ☒ D. Saddle controls spindle speed

Q.44 During CNC lathe setup, the spindle speed override is set to 50%. What advantage does this provide to the operator?

- Ans**
- ☒ A. It sets the feed rate for roughing operation
 - ☒ B. It allows safer observation during trial cutting
 - ☒ C. It automatically finishes the part up to final length
 - ☒ D. It selects the correct tool set for the job

Q.45 In marking operations, a V-block is mainly used to:

- Ans**
- ☒ A. Measure diameter directly
 - ☒ B. Mark centres of round bars
 - ☒ C. Measure surface roughness
 - ☒ D. Support square plates

Q.46 Which of the following is a direct benefit of using absolute programming in CNC VMC operations?

- Ans**
- ☒ A. Faster spindle speed
 - ☒ B. Shorter programs
 - ☒ C. Less setup time
 - ☒ D. Easier error detection

Q.47 Why is interchangeability important in mass production according to Bureau of Indian Standards (BIS) guidelines?

- Ans**
- ☒ A. It guarantees zero defects in every manufactured part
 - ☒ B. It allows replacement of parts without custom adjustments
 - ☒ C. It ensures all parts are made with zero tolerances
 - ☒ D. It ensures all parts are made from identical materials

Q.48 Which standard recommends the use of single-stroke lettering in engineering drawings?

- Ans**
- ☒ A. IS : 1234-1999
 - ☒ B. IS : 9609-2001
 - ☒ C. BS : 8888-2010
 - ☒ D. ISO : 9001-2000

Q.49 A machine has an original cost of 100,000, scrap value of 10,000, and total working hours of 10,000. What is its hourly depreciation?

- Ans**
- ☒ A. 10
 - ☒ B. 12
 - ☒ C. 11
 - ☒ D. 9

Q.50 In piloted counterbore nomenclature, what does the term 'body' refer to?

- Ans**
- ☒ A. The cutting portion that enlarges the hole
 - ☒ B. The cylindrical guide at the tip
 - ☒ C. The threaded part for attachment
 - ☒ D. The handle

Q.51 Which characteristic is NOT commonly linked with ceramic cutting tool materials?

- Ans**
- ☒ A. High toughness
 - ☒ B. Heat resistance
 - ☒ C. High hardness
 - ☒ D. Wear resistance

Q.52 A machinist needs to slot multiple identical parts quickly. Which machine vice feature best supports efficient, repeatable clamping?

- Ans**
- ☐ A. Fixed jaw only vice
 - ☐ B. Manual alignment indicator
 - ☐ C. Single position locking system
 - ☒ D. Quick-release jaw mechanism

Q.53 When using MPG mode on a CNC lathe, what does rotating the handwheel achieve?

- Ans**
- ☐ A. Increases spindle speed proportionally to rotation
 - ☐ B. Selects between different part programs loaded
 - ☒ C. Moves the selected machine axis in small increments
 - ☐ D. Changes tool length offset values in the system

Q.54 What is the main function of an indexing plate in a dividing head setup?

- Ans**
- ☐ A. To clamp the workpiece
 - ☐ B. To control spindle speed
 - ☒ C. To assist in precise divisions
 - ☐ D. To hold the workpiece

Q.55 If both left-hand and right-hand angles are required to be cut on a plate in a single setup, which tool and approach is most suitable?

- Ans**
- ☒ A. Using a double angle milling cutter in a single pass
 - ☐ B. Using a single angle milling cutter with two setups
 - ☐ C. Using a side and face cutter for each angle separately
 - ☐ D. Using an end mill with repeated passes for each side

Q.56 Which file is best suited for filing internal corners?

- Ans**
- ☒ A. Triangular file
 - ☐ B. Round file
 - ☐ C. Flat file
 - ☐ D. Square file

Q.57 In a ram type slotter, what is the main function of the column?

- Ans**
- ☒ A. To support the ram and table
 - ☐ B. To provide reciprocating motion
 - ☐ C. To cut the slot
 - ☐ D. To rotate the tool

Q.58 A force of 10 newtons moves an object 2 metres. How much work is done?

- Ans**
- ☐ A. 8 joules
 - ☐ B. 12 joules
 - ☐ C. 5 joules
 - ☒ D. 20 joules

Q.59 During a CNC lathe roughing operation, excessive tool wear and uneven stock removal are observed. Which adjustment will help to improve machining consistency and tool life?

- Ans**
- ☐ A. Changing tool nose radius for a sharper edge
 - ☐ B. Applying coolant flow during operation
 - ☐ C. Increasing spindle speed during cutting
 - ☒ D. Adjusting feed and depth during cutting

Q.60 What is the main purpose of heat treatment in metals?

- Ans**
- ☐ A. To reduce the cost of metal
 - ☒ B. To improve mechanical properties
 - ☐ C. To change color of the metal
 - ☐ D. To add weight to the metal

Q.61 What is the primary factor in selecting nose radius for a single-point tool?

- Ans**
- ☐ A. Cutting speed needed
 - ☒ B. Desired surface finish
 - ☐ C. Tool material used
 - ☐ D. Chip flow direction

Q.62 A machinist needs to cut a rectangular pocket using CNC VMC. Which sequence best ensures accurate straight edges using linear interpolation?

- Ans**
- ☒ A. Program each side of the rectangle using G01 with defined start and end coordinates.
 - ☐ B. Apply G02 to create all sides of rectangle as arcs with one radius value and fixed center.
 - ☐ C. Use G03 to create all edges of rectangle as curved segments continuously with different radii.
 - ☐ D. Use G00 to move rapidly around the rectangular pocket without programming coordinates.

Q.63 A steel plate is 20 mm thick and 45 mm wide. What is the length of the diagonal across the plate?

- Ans**
- ☐ A. 45.00 mm
 - ☐ B. 47.20 mm
 - ☐ C. 51.00 mm
 - ☒ D. 49.24 mm

Q.64 In unidirectional dimensioning, how are dimensions placed on the drawing sheet?

- Ans**
- ☐ A. Dimensions are placed so they can be read from multiple edges.
 - ☒ B. Dimensions are placed so they can be read from the bottom edge.
 - ☐ C. Dimensions are placed so they can be read from random directions.
 - ☐ D. Dimensions are placed so they can be read from diagonal angles.

Q.65 If a worker cannot find a tool quickly, which principle of Five S is likely not being followed?

- Ans**
- ☐ A. Shine
 - ☐ B. Standardize
 - ☒ C. Set in order
 - ☐ D. Sort

Q.66 A machinist needs to calculate the displacement of the follower at 90° cam rotation in a plate cam with uniform velocity motion and a maximum lift of 20 mm over 180°. What will be the follower displacement at 90°?

- Ans**
- ☐ A. 20 mm
 - ☐ B. 15 mm
 - ☐ C. 5 mm
 - ☒ D. 10 mm

Q.67 Which machining problem can be minimized by correctly grinding a lathe cutting tool?

- Ans**
- ☐ A. Overheating of the lathe machine
 - ☒ B. Premature tool wear
 - ☐ C. Rusting of the tool
 - ☐ D. Vibration of lathe

Q.68 What is the main purpose of a color code in the context of lubrication management?

- Ans**
- ☒ A. To measure lubricant viscosity and performance characteristics
 - ☒ B. To identify lubricants and match them with application points
 - ☒ C. To combine different lubricants for improved machine operation
 - ☒ D. To classify equipment according to maintenance schedules

Q.69 Why is depreciation included in the machine hour rate calculation?

- Ans**
- ☒ A. It times repairs accurately
 - ☒ B. It pays operator wages
 - ☒ C. It spreads asset cost over use
 - ☒ D. It covers power expenses

Q.70 A CNC turning operation is set to cut an external metric thread on a steel workpiece. If the thread pitch and minor diameter are already specified, which parameter must be accurately programmed in the tool path to ensure the correct thread profile and depth?

- Ans**
- ☒ A. Tool nose radius compensation
 - ☒ B. Coolant flow rate adjustment
 - ☒ C. Thread depth per pass value
 - ☒ D. Spindle RPM setting

Q.71 When should an operator use the Emergency Stop button on the CNC VMC panel during machining?

- Ans**
- ☒ A. If the program requires routine process adjustment
 - ☒ B. If the program requires routine setup adjustment
 - ☒ C. If there is a risk of injury or machine damage
 - ☒ D. If the program needs editing or recalibration

Q.72 A CNC machinist completes a first part check and notes the outer diameter is correct, but the length is slightly off. What does this suggest about tool offset correction?

- Ans**
- ☒ A. The X-axis tool offset needs to be decreased
 - ☒ B. Modify the program header for new coordinates
 - ☒ C. The Z-axis tool offset needs adjustment, not the X-axis
 - ☒ D. Increase the spindle speed for better accuracy

Q.73 A measuring instrument must be selected for verifying the small diameter (d) of a finely finished Morse taper. Which option provides the most accurate and reliable measurement for this application?

- Ans**
- ☒ A. A steel rule marked in millimeters
 - ☒ B. A vernier caliper with standard jaws
 - ☒ C. A thread gauge for comparing different profiles
 - ☒ D. A micrometer calibrated for small diameters

Q.74 A machinist is grinding a 200 mm long shaft with a feed of 2 mm per revolution at a speed of 40 revolutions per minute. What is the machining time required for one pass?

- Ans**
- ☒ A. 1.0 minute
 - ☒ B. 2.5 minutes
 - ☒ C. 3.5 minutes
 - ☒ D. 4.0 minutes

Q.75 Which of the following is the primary function of lubricants in grinding operations?

- Ans**
- ☐ A. To increase rotational speed of grinding wheel
 - ☒ B. To reduce friction between tool and workpiece
 - ☐ C. To remove metallic chips from the work area
 - ☐ D. To supply the extra coolant to the workpiece