RRB ALP CBT-II (Mechanic Diesel) Official Paper (Held On: 02 May, 2025 Shift 2) (Previous Year Paper)

RRB Assistant Loco Pilot (ALP) • 2025 • 175 questions • 150 minutes • Answer key

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PART A

Q1. A wire of a certain material having length L and cross-sectional area A has a resistance of 2 Ω. What will be the resistance of another wire of the same material having length 2L and cross-sectional area A/2?

(a) 2 Ω
(b) 1Ω
(c) 8Ω
(d) 4Ω

Q2. In this question, statement I and statement II are given. These statements may be independent causes, effects of independent causes, or a common cause. One of these statements may be an effect of the other. Read both statements carefully and choose the correct answer.

I. The water level of the local river has reached its lowest level so far this summer, disrupting water supply to nearby towns.

II. Several power plants in the region have reported reduced power generation due to insufficient water for cooling processes.

(a) Both I and II are independent causes.
(b) II is the cause and I is its possible effect.
(c) Both I and II are effects of independent causes.
(d) I is the cause and II is its possible effect.

Q3. Identify the correct pair of Personal Protective Equipment (PPE) categories based on the nature of the hazard.

(a) Non-respiratory: Safety goggles, Respiratory: Safety gloves
(b) Non-respiratory: Nose mask, Respiratory: Safety boots
(c) Non-respiratory: Safety helmet, Respiratory: Nose mask
(d) Non-respiratory: Ear plugs, Respiratory: Safety shoes

Q4. Kaushik starts from point A and walks 32 m towards East. He turns right, walks 16 m and then turns right again, walks 14 m, reaches point B and stops. Chitra starts walking from point 2 which is 60 m east of point A. She walks 18 m north, turns right, walks 19 m, turns right and walks 65 m, turns right and walks 61 m and stops at point Y. What is the shortest distance between point B and point Y? (All turns are 90 degree turns only.)

(a) 33 m
(b) 29 m
(c) 31 m
(d) 25 m

Q5. Which of the following features is not available in Google Docs?

(a) Comment on text
(b) Insert images
(c) Create tables
(d) Track changes

Q6. Which of the following is an example of preventive maintenance?

(a) Ignoring minor faults to save costs
(b) Using equipment until failure occurs
(c) Waiting for a machine to break down before repairing it
(d) Conducting regular lubrication and inspections

Q7. Three of the following four letter-cluster pairs are alike in a certain way based on the English alphabetical order and thus form a group. Which of the following letter-cluster pairs does not belong to that group?

(Note: The mismatched letter-cluster pair is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) WC-UL
(b) MS-KB
(c) DJ-BT
(d) TZ-RI

Q8. Which of the following processes is mainly responsible for the loss of heat from a hot vessel?

(a) Radiation
(b) Conduction
(c) Absorption
(d) Convection

Q9. If a force of 6 N is applied on a body, which is displaced 2m in the direction of force, then find the work done.

(a) 3 J
(b) 12 J
(c) 4 J
(d) 10 J

Q10. A class of 30 students took an exam, with the average score of 12 students being 68 and the average score of the rest being 70. What is the average score of the class?

(a) 67.2
(b) 69.2
(c) 70.2
(d) 68.2

Q11. Ohm's law for a given potential difference (V), current (I) and resistance (R) across a conductor is given as

(a) $I = VR$
(b) $V = I - R$
(c) $V = I + R$
(d) $V = IR$

Q12. How does the thermal pollution of water affect the water quality?

(a) Sediments get settled soon
(b) Alters the colour of water
(c) Increases pH of water
(d) Oxygen level in water gets reduced

Q13. What is the typical range of wind speed (in m/s) required for the efficient operation of most commercial wind turbines?

(a) 12 - 25 m/s
(b) 0 - 2 m/s
(c) 5 - 15 m/s
(d) 3 - 5 m/s

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Q14. If 46.4 : x :: x : 2.9, and x > 0, then find the value of x.

(a) 15.6
(b) 14.3
(c) 13.4
(d) 11.6

Q15. The areas of three adjacent faces of a solid cuboid are 190 cm^2, 285 cm^2, and 150 cm^2. Find the volume (in cm^3) of the cuboid.

(a) 2850
(b) 2716
(c) 2896
(d) 3076

Q16. A fruit vendor had some apples. He sold 40% of them and now has 840. How many apples did he originally have?

(a) 1400
(b) 1260
(c) 1800
(d) 2100

Q17. How many fundamental units are there in the SI system?

(a) 14
(b) 10
(c) 5
(d) 7

Q18. What is recommended to be done before replacing a fuse?

(a) Wear safety belt.
(b) Wear rubber gloves.
(c) to close the circuit.
(d) Standing on a stool.

Q19. In a certain code language,

'A × B' means 'A is the son 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'.

If 'M × N − P % S + T', then how is M related to T?

(a) wife's father's brother's son
(b) wife's father's brother
(c) wife's mother's brother's son
(d) wife's mother's brother

Q20. Cooking utensils have metal bodies and plastic handles because _____

(a) Both metal and plastic are good conductors of heat.
(b) Metal is a good conductor of heat and plastic is a heat insulator.
(c) Metal is a heat insulator and plastic is a good conductor of heat.
(d) Both metal and plastic are heat insulators.

Q21. The list price of an article is Rs. 5,100 and a discount of 32% is offered on the list price. What additional discount per cent on the already discounted price must be offered to a customer to bring the net selling price to Rs. 1,734?

(a) 49%
(b) 46%
(c) 50%
(d) 55%

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Q22. A bulb is connected to a 10 V battery for 20 seconds. If it draws a current of 2 A, calculate the heat energy generated by the bulb.

(a) 400 J
(b) 200 J
(c) 100 J
(d) 120 J

Q23. What is the primary purpose of information kiosks set up by the government?

(a) To provide free food and beverages to citizens
(b) To offer citizens easy access to information and services such as bill payments, registrations and public information
(c) To allow citizens to participate in online gaming competitions
(d) To enable government employees to monitor social media activities of citizens

Q24. Which of the following statements are true regarding general safety in the workshop?

Statement 1: Use any available tool for the job, even if it is not the correct one.
Statement 2: Keep the tools in their proper place after use.
Statement 3: Clean the machine while it is still running.
Statement 4: Replace worn-out or damaged tools immediately.

(a) Statements 1 and 2 are true.
(b) Statements 3 and 4 are true.
(c) Statements 1 and 3 are true.
(d) Statements 2 and 4 are true.

Q25. What is the proper way to handle misunderstandings in online conversations?

(a) Publicly embarrassing the other person
(b) Block that person immediately
(c) Addressing misunderstandings politely and privately
(d) Ignoring the conversation

Q26. A man bought two varieties of apples at Rs. 4 per 5 apples and Rs. 4 per apple, respectively. If he bought an equal number of each variety of apples and then sold all the apples at Rs. 3 per apple, what would his profit percentage be?

(a) 2%
(b) 24%
(c) 25%
(d) 23%

Q27. Simplify the following expression: $(x - y - z)^2 - (x + y + z)^2$

(a) $-4x\ (y + z)$
(b) $-4z\ (x + y)$
(c) $-4y\ (x + z)$
(d) $-4\ (xy + yz + zx)$

Q28. What is the process of heat transfer in liquids?

(a) Just conduction
(b) Both conduction and radiation
(c) Convection
(d) Only radiation

Q29. In a rare coin collection, there was one gold coin for every five non-gold coins. Then, 18 more gold coins were added to the collection, after which the ratio of gold coins to nongold coins became 5 : 7. How many coins in all are now there in the collection?

(a) 55
(b) 45
(c) 75

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(d) 60

Q30. A car leaves New Delhi and goes to Agra. The distance between the two cities is 300 km. Then the car returns to New Delhi. What is the total distance and displacement covered by the car? (Assume the car returns to the same destination and the route taken for both journeys is the same.)

(a) The distance covered is 0 km and the displacement is 600 km.
(b) The distance covered is 0 km and the displacement is 0 km.
(c) The distance covered is 300 km and displacement is 0 km.
(d) The distance covered is 600 km and displacement is 0 km.

Q31. Samir can complete a task in 6 days, while Tanveer can do it in 8. If Amir joins them, the three can complete the entire task in 3 days. If the total payment for the work is Rs. 2,400, how much will Aamir receive for his contribution?

(a) Rs. 300
(b) Rs. 250
(c) Rs. 430
(d) Rs. 340

Q32. A person saves 10% of his monthly income. If his monthly income increases by 30%, he saves 20% more than before. The percentage increase in his expenditure (rounded to two decimal places) is

(a) 31.11%
(b) 24.89%
(c) 40.44%
(d) 37.33%

Q33. A, B, C, D, E, F and G are seated around a round table facing the center. G sits second to the left of E. B sits third to the right of A. C is the immediate neighbour of both E and B. D sits immediate left of G. How many people sit between E and F when counted from the right of E?

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

Q34. Refer to the following letter and symbol series and answer the question that follows. Counting to be done from left to right only.

(Left)^TJ#LROY#%SU$EKQ &*£B (Right)

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

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

Q35. In the following triplet, each group of letters is related to the next group following a certain logic. Select the option from the given options that follows the same logic.

GRAND-GRNAD-DNARG

(a) INDEX–DEXIN–XDEIN
(b) NIGHT–NGHIT–THGIN
(c) FRUIT–FRIUT–TIURF
(d) MINOR–MOINR–RNOIM

Q36. A train travels from A to B at a speed of 40 km/hr and returns from B to A via the same route at a speed of 10 km/hr. Find the average speed (in km/hr) of the train during the two-way journey.

(a) 15
(b) 14
(c) 19

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(d) 16

Q37. Find the largest four-digit number which, when divided by 21, 42, 147 and 105 leaves remainders 14, 35, 140 and 98 respectively.

(a) 8019
(b) 8813
(c) 8034
(d) 8816

Q38. Statement I and Statement II are given below. These statements may be independent causes, effects of independent causes, or common causes. One statement may be an effect of the other. Read both statements carefully and choose the correct answer.

Statement:

The traffic police have issued a traffic advisory regarding traffic diversions for the next two days due to the closure of Raj Bhavan Road.

The Municipal Corporation plans to repair potholes on Raj Bhavan Road tomorrow.

(a) II is the cause and I is its possible effect.
(b) Both I and II are effects of independent causes.
(c) Both I and II are independent causes.
(d) I is the cause and II is its possible effect.

Q39. The SI unit of luminous intensity is

(a) Watt
(b) Mol
(c) Meter
(d) Candela

Q40. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true even if it seems to be at variance from commonly known facts, decide which of the given conclusions logically follow(s) from the given statements.

Statements:

Some cats are rats. All bats are tables. All rats are bats.

Conclusions:

(I): Some cats are bats.

(II): All bats are rats.

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

Q41. What is the normal range of temperature for a healthy human body in Kelvin?

(a) (301.15-323.15) K
(b) (283.15-323.15) K
(c) (308.15-315.15) K
(d) (293.15-323.15) K

Q42. What should come in place of question mark (?) in the given series?

197 112 189 129 181 146 173 163?

(a) 165
(b) 153
(c) 156
(d) 144

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Q43. Study the following table and answer the given question.

	Number of mangoes sold on Monday	Number of mangoes sold on Tuesday	Wednesday
Shop X	58	19	25
Shop Y	42	34	30

If a mango was sold by shop Y for Rs. 80 on Tuesday, then how much amount did shop Y receive on Tuesday?

(a) Rs. 2,720
(b) Rs. 2,780
(c) Rs. 2,560
(d) Rs. 2,620

Q44. Which of the following options represents the equation of work done?

(a) Work done = Force / Displacement
(b) Work done = Force × Displacement
(c) Work done = Force + Displacement
(d) Work done = Force – Displacement

Q45. In which chemical process the R group of alcohol is replaced by R' group of ester to make biodiesel from vegetable oils?

(a) Fermentation
(b) Polymerisation
(c) Distillation
(d) Transesterification

Q46. The resistance of a wire is affected by which of the following factors?

(a) Length and cross-sectional area of the wire only
(b) Length, cross-sectional area and material of the wire
(c) Wire material only
(d) Wire length only

Q47. In triangle PQR, angle Q=90°. If tan R=1/2, then find the value of (sec P(3cos R-sin P))/(4csc R(4sin R-cos P)).

(a) 1/3
(b) 8/7
(c) -8/7
(d) -1/3

Q48. Which of the following letter-number cluster will come in place of the question mark (?) in the given series?
6S, 24T, 12V, 48Y, 24C, ?

(a) 60H
(b) 96I
(c) 96H
(d) 96G

Q49. A cylindrical tank of diameter 14 m contains water up to the depth of 6 m. What is the total area of wetted surface? Use($\pi = 22/7$).

(a) 414 m^2
(b) 418 m^2
(c) 416 m^2
(d) 412 m^2

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Q50. In a project involving the design of a pipeline for a building, which technical drawings would need to be referenced together?

(a) Mechanical and Electrical
(b) Civil and Electronics
(c) Mechanical and Civil
(d) Electrical and Electronics

Q51. How many folds is/are required to fold an A2 size drawing sheet (420 mm × 594 mm), according to BIS SP: 46-2003?

(a) 1 fold
(b) 2 folds
(c) 4 folds
(d) 3 folds

Q52. Which of the following is not a heat insulator?

(a) Rubber
(b) Silver
(c) Plastic
(d) Wool

Q53. There are four partners in a business, A, B, C, and D. A's investment is two-thirds of D's. B and C invest equal amounts, and C's investment is half of D's. If they earn Rs. 137.6 lakh at the end of one year, find the total share (in lakhs) of A and B.

(a) 62.2
(b) 63.2
(c) 59.2
(d) 60.2

Q54. If the arithmetic mean of A and B is 70 and that of B and C is 110, then what will be the value of C-A?

(a) 80
(b) 90
(c) 60
(d) 70

Q55. In a certain code language, 'GIFT' is coded as '8264' and 'FEAR' is coded as '3527'. What is the code for 'F' in the given code language?

(a) 3
(b) 2
(c) 5
(d) 6

Q56. In the following number-pairs, the second number is obtained by performing certain mathematical operations on the first number. What number should replace X and Y so that the pattern followed by the two numbers on the left side of :: sign is the same as the pattern followed by the two numbers on the right side of :: sign?

(Note: Operations must be performed on whole numbers, without breaking the number into its component digits. Take 13 for example. Operations such as addition/subtraction/multiplication by 13 can be performed on 13. Breaking 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

X : 179 :: 22 : Y

(a) X = 16, Y = 222
(b) X = 15, Y = 223
(c) X = 16, Y = 219
(d) X = 18, Y = 219

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Q57. A, B, C, D, E, and F live on six different floors of the same building. The ground floor is numbered 1, the floor immediately above it is numbered 2, and so on until the topmost floor is numbered 6. F lives on an even-numbered floor, but not on floor number 6. The sum of the floors on which D and F live is 9. The sum of the floors on which F and B live is 5. E lives on the floor immediately below C. How many people live between D and E?

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

Q58. Which of the following correctly identifies the main components of a standard email structure?

(a) Subject Line, Recipient Address, Message Body and Signature
(b) Recipient Address, CC, BCC and Attachment
(c) Header, Body, Footer and Encryption Key
(d) Username, Password, Message Body and Signature

Q59. Automobile A travels a distance in 2 hours at a speed of 42 km/hr. Automobile B travels twice the distance traveled by A in 5 hours. Find the speed (in km/hr) of Automobile B.

(a) 31.2
(b) 34.2
(c) 36.3
(d) 33.6

Q60. Find the smallest number which when divided by 5, 6 and 7 leaves remainders 4, 5 and 6.

(a) 208
(b) 207
(c) 209
(d) 210

Q61. 5 men or 9 women can do a piece of work in 9 days. 5 men work for 7 days and then leave. Find the number of women needed to complete the remaining work in 9 days.

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

Q62. Which of the following statements is correct?

(a) The resistance increases as the length of the conductor increases.
(b) The resistance decreases as the length of the conductor increases.
(c) The resistance increases as the thickness of the conductor increases.
(d) The resistance remains unchanged on increasing the length of the conductor.

Q63. The length of a rectangular sheet is 15.2 cm ± 0.1 cm and the width is 9.11 cm ± 0.1 * cm / 1, then what is the error in estimating the area of the rectangular sheet?

(a) 0.3 cm^2
(b) 13 cm^2
(c) 5 cm^2
(d) 2 cm^2

Q64. What is the most effective way to avoid mechanical hazards when operating large and dangerous machinery?

(a) Appropriate training and experience
(b) Regular machine maintenance only
(c) Employee-only physical fitness training
(d) Redesigning the machine to eliminate hazards

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Q65. If the ball is thrown upwards, then the work done by the force of gravity on the ball is:

(a) Negative
(b) Independent of the displacement of the ball
(c) Positive
(d) Zero

Q66. Rita invests a certain sum of money at a certain rate of simple interest per annum, and the interest she receives is equal to one-fourth of the invested amount. If the time period of investment (in years) is equal to the rate of interest per annum, then for how many years did Rita invest the money?

(a) 4
(b) 6
(c) 5
(d) 7

Q67. Which of the following fundamental quantities are used to express any mechanical quantity?

(a) Length, mass and time
(b) Mass, time and force
(c) Length, time and energy
(d) Length, mass and speed

Q68. A product with an MRP of Rs. 1,590 is sold by a wholesaler for Rs. 835. Find the percentage discount offered (rounded off to the nearest integer).

(a) 46%
(b) 47%
(c) 45%
(d) 49%

Q69. Find the value of 32 - 4 [4 + 5 (4 - 4 (6 - 2) + 4) - 18] ÷ 6.

(a) 60
(b) 56
(c) 68
(d) 58

Q70. The value of 60% of 45 is how much more than 4/5 of 25?

(a) 1
(b) 5
(c) 4
(d) 7

Q71. What is the first step in providing first aid for a minor burn?

(a) Cover the burned area with a thick cloth
(b) Pour cold water on the burned area
(c) Burst any blisters that form
(d) Apply butter to the burned area

Q72. The resistivity of a conductor depends on _____.

(a) Cross-sectional area
(b) Matter
(c) Length of conductor
(d) Potential difference across the ends of the conductor

Q73. Which ICT (Information and Communication Technology) service is commonly used for activities like railway reservation in e-governance?

(a) Online payment gateway
(b) Social media platform

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(c) Email Services
(d) Web portal

Q74. Find the energy of a 5 kg object at a height of 8 m above the ground. Let the value of 'g' be 9.8 m s^2.
(a) 392 J
(b) 784 J
(c) 300 J
(d) 400 J

Q75. Three of the following four letter-clusters are alike in a certain way based on the English alphabetical order and hence form a group. Which letter-cluster does not belong to that group? (Note: The odd letter-cluster is not based on the number of consonants/vowels or their position.)
(a) NQIL
(b) BEWZ
(c) RUNP
(d) WZRU

Q76. Which of the following statements is correct?
(a) Laboratory thermometers are used to measure the temperature of the human body.
(b) There is no method to convert temperature from one heat scale to another.
(c) The normal human body temperature is 45°C.
(d) The normal human body temperature is 98.6°F.

Q77. An 8 Ω resistor generates 200 J of heat per second. Find the potential difference across the resistor.
(a) 10 V
(b) 30 V
(c) 40 V
(d) 20 V

Q78. Which of the following is commonly used for the treatment of drinking water?
(a) Acid neutralization
(b) Chlorination
(c) Incineration
(d) Oil Filtration

Q79. In the following series, only one letter-cluster is wrong. Choose the wrong letter-cluster.
INK KPJ MRI OTH QWG SXF
(a) MRI
(b) QWG
(c) SXF
(d) OTH

Q80. If '+' and '-' are interchanged and '×' and '÷' are interchanged, then what will come in place of question mark (?) in the following equation?
9 ÷ 5 + 70 × 7 − 11 = ?
(a) 46
(b) 47
(c) 44
(d) 45

Q81. Neha swims in a pool that is 50 metres long. She covers 100 metres in 1 minute by swimming from one end of the pool to the other and back along the same straight path. Find her average velocity (in m/s).
(a) 3.2 m/s
(b) 1.7 m/s
(c) 2.5 m/s

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(d) 0 m/s

Q82. Which of the following letter-clusters should be replaced by # and % so that the pattern and relation followed between the letter-cluster pair on the left side of :: sign is the same as the pattern and relation followed between the letter-cluster pair on the right side of :: sign?

: EAG :: IEK : %

(a) = FBH, % = HDI
(b) = FBH, % = HDJ
(c) = FBG, % = HDJ
(d) = FBH, % = HEJ

Q83. Which of the following statements are true regarding electrical safety practices?

1. It is safe to plug multi-outlet bars into other multi-outlet bars as long as the total load does not exceed the rated capacity of the outlet.

2. Electrical appliances should not be used near damp surfaces or when your hands are wet, and electrical cords should be protected by not placing them under rugs or mats.

(a) Neither statement 1 nor statement 2 is true.
(b) Only statement 2 is true.
(c) Both statement 1 and statement 2 are true.
(d) Only statement 1 is true.

Q84. The resistance of a uniform metallic conductor depends on its:

(a) length only
(b) length, area of cross-section, and nature of its material
(c) melting point only
(d) area of cross-section only

Q85. The sum of _____ is mechanical energy.

(a) Potential energy and kinetic energy
(b) Electrical energy and light energy
(c) Thermal energy and chemical energy
(d) Chemical energy and electrical energy

Q86. Refer to the following letter and symbol series and answer the question that follows.

Counting to be done from left to right only.

(Left) ^TJ#LROY#E%SU$KQ&*£B (Right)

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

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

Q87. Select the option that is true regarding the following two statements labelled Assertion (A) and Reason (R).

Assertion (A): It is safe to work under a suspended load if you are in a hurry.

Reason (R): Never exceed the safe working load (SWL) of the equipment you are using.

(a) Both (A) and (R) are true, and (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
(c) Assertion (A) is false, but Reason (R) is true
(d) Assertion (A) is true, but Reason (R) is false.

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Q88. What is a rheostat used for in an electrical circuit?

(a) To change the resistance in a circuit
(b) To measure current only
(c) To measure voltage only
(d) To measure both current and voltage

Q89. A, B, C, D, E, F, and G are seated around a round table facing the center. Only two people sit between G and C, when counted from the left of C. F sits third to the left of E. B sits to the immediate right of E. B sits second to the left of G. D is an immediate neighbor of F. How many people sit between A and C, when counted from the right of C?

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

Q90. In a certain code language, 'while you wait' is coded as 'ns bg sp' and 'why 1 wait now' is coded as 'kc rw bg'. How will 'wait' be coded in the given language?

(a) ns
(b) kc
(c) bg
(d) sp

Q91. The dimension of surface tension is _____.

(a) $ML^2T^{(-2)}$
(b) ML^0T ^(-2)
(c) MLT ^(-2)
(d) ML^0T

Q92. Find the kinetic energy of a body of mass 10 kg moving with a uniform velocity of 5ms^(-1).

(a) 120 J
(b) 125 J
(c) 50 J
(d) 25 J

Q93. I, J, K, L, U, V and W each have their exam on a different day of the week, starting from Monday and ending on Sunday of the same week. Only two people have their exam before V. Only one person has an exam after L. Only three people have an exam between V and I. Only one person has an exam between J and K. W has an exam just before J. Who among the following has an exam on Friday?

(a) W
(b) U
(c) I
(d) V

Q94. What should come in place of question mark (?) in the given series?

67 106 88 127 109 148?

(a) 130
(b) 126
(c) 117
(d) 108

Q95. Which of the following materials serves as a heat insulator?

(a) Aluminium
(b) Silver
(c) Plastic
(d) Copper

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Q96. Which of the following units is used to measure only basic physical quantities?

(a) Derived unit
(b) Basic unit
(c) Neither basic nor derived units
(d) Both basic and derived units

Q97. Which of the following terms describes the process of the gradual increase in the average temperature of the Earth's atmosphere, due to the greenhouse effect caused by increased levels of carbon dioxide, CFCs and other pollutants?

(a) Acid rain
(b) Global warming
(c) Ozone depletion
(d) Deforestation

Q98. Two sets of numbers are given below. In each set, performing certain mathematical operations on the first number gives the second number. Similarly, by performing certain mathematical operations on the second number, the third number is obtained and so on. Which of the given options follows the same set of operations as the given sets?

(Note: Operations must be performed on whole numbers, without breaking the number into its component digits. Take 13 for example. Operations such as addition/subtraction/multiplication by 13 can be performed on 13. Breaking 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

68-136-121-363;

29-58-43-129

(a) 35 – 70 – 55 – 165
(b) 42 – 84 – 74 – 222
(c) 13 – 26 – 46 – 138
(d) 73 – 146 – 114 – 228

Q99. The measures of two supplementary angles are in the ratio 3 : 7. Find the measure of the greater of the two angles.

(a) 180°
(b) 54°
(c) 144°
(d) 126°

Q100. The sum of the ages of a grandfather, his son, and his grandson is 128 years. The grandfather is twice as old as his son, and the son is five times his grandson. Find the grandson's age (in years).

(a) 9
(b) 8
(c) 6
(d) 7

PART B

Q101. If a machine has an efficiency of 80%, it means:

(a) the machine has a velocity ratio and mechanical advantage both equal to 80
(b) the machine loses 20% of the input
(c) the machine does not have any loss in input energy
(d) the machine produces more output than input

Q102. When did India implement the Hazardous Wastes (Management and Handling) Rules to regulate the disposal and handling of hazardous waste?

(a) 1989
(b) 1987
(c) 1982
(d) 2000

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Q103. What is the function of cooling fins in a tubular-type radiator core?

(a) To support tubes
(b) To strengthen structure
(c) To circulate water
(d) To absorb and radiate heart

Q104. What is the primary principle behind the generation of electrical energy in a piezoelectric device?

(a) Conversion of mechanical stress into electrical energy
(b) Conversion of light energy into electrical energy
(c) Conversion of chemical energy into electrical energy
(d) Conversion of thermal energy into electrical energy

Q105. Which of the following punch marks is used for the correct location and seating of the divider point?

(a) Centre punch marks of 60°
(b) Prick punch marks of 30°
(c) Prick punch marks of 120°
(d) Centre punch marks of 30°

Q106. What is the accuracy level of a vernier caliper that can be read?

(a) 0.02 mm
(b) 0.01 mm
(c) 0.1 mm
(d) 0.2 mm

Q107. Which of the following emission control devices is a charcoal filled device?

(a) EGR valve
(b) EVAP canister
(c) Oxygen sensor
(d) Catalytic converter

Q108. Match the correct length and breadth of the Trimmed sizes of sheets.

Designation	Trimmed size
A. A0	P. 297 × 420
B. A1	Q. 420× 594
C. A2	R. 594 × 841
D. A3	S. 841 × 1189

(a) A - S, B - R, C - Q, D - P
(b) A - R, B - S, C - Q, D - P
(c) A - S, B - R, C - P, D - Q
(d) A - P, B - R, C - Q, D - S

Q109. When drawing a curved line of a specific length in an engineering drawing, which tool is most appropriate for ensuring accuracy?

(a) Protractor
(b) Straightedge
(c) French Curve
(d) Compass

Q110. Which of the following statements is correct about a protractor?

Statements:

1. A protractor can be used to measure angles from both sides.
2. A protractor is typically made of a rigid metal material.

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(a) Neither statement is true
(b) Only statement 1 is true
(c) Only statement 2 is true
(d) Both statements are true

Q111. A cylinder head gasket is incorporated between which of the following two parts of the engine?
(a) Puppet valve and cylinder block
(b) Cylinder block and cylinder head
(c) Piston ring and cylinder head
(d) Cylinder head and water jacket

Q112. What does SCR stand for in the diesel exhaust treatment?
(a) Solid Catalytic Reduction
(b) Selective Catalytic Reduction
(c) Standard Catalytic Reaction
(d) Selective Carbon Reduction

Q113. Which component assists the pneumatic governor of FIP in diesel engines?
(a) Intercooler
(b) Turbocharger
(c) Exhauster
(d) Fuel injector

Q114. The basic function of the connecting rod is to convert:
(a) the linear motion of the crankshaft into rotary motion of piston
(b) the reciprocating motion of piston to the rotary motion of the crankshaft
(c) the reciprocating motion of piston head to the rotary motion of the camshaft
(d) the curvilinear motion of piston to the linear motion of the camshaft

Q115. Which of the following parts of a dial bore gauge is used to hold all the components together and contains a mechanism for transmitting the plunger motion to the dial?
(a) Anvil
(b) Extension rings
(c) Stem
(d) Sliding plunger

Q116. What is the function of non-return valve (NRV) in a hydraulic system?
(a) To increase system temperature
(b) To control the viscosity of the fluid
(c) To control the pressure in both directions
(d) To allow flow in one direction

Q117. As per the SAE viscosity rating, which of the following numbers reflects thicker oil that better resists viscosity breakdown in the summer season?
(a) 40W to 50W
(b) 100W to 160W
(c) −6W to −70W
(d) 0W to 5W

Q118. Which of the following is an example of a p-type semiconductor?
(a) Germanium doped with phosphorus
(b) Silicon doped with arsenic
(c) Silicon doped with boron
(d) Silicon doped with phosphorus

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Q119. Which of the following parts of an engine adjusts the opening times of the valves to suit all operating conditions and ensures ideal charge cycles within a wide range of engine speeds and loads?

(a) Crank
(b) Camshaft
(c) Rocker arm
(d) Crankshaft

Q120. _____ is a type of spring that is often used as part of the vehicle clutch assembly, and its main function is to engage and disengage the pressure plate and the driven plate (clutch disk).

(a) Diaphragm spring
(b) Spiral spring
(c) Laminated spring
(d) Leaf spring

Q121. Which of the following is a correct function of the indirect injection combustion chamber?

(a) It accommodates the port (Inlet and Outlet) for In & Out of air
(b) It houses and guides the crankshaft.
(c) It does not have properties to withstand temperature variations.
(d) There is a confined space in it, in which the air and fuel mixtures are burned.

Q122. What does an optical pyrometer measure?

(a) The pressure of gases
(b) The temperature of the surface
(c) The volume of liquids
(d) The relative density of liquids

Q123. In which part of the IC engine does a piston move during operation?

(a) Cylinder head
(b) Crankcase
(c) Sump
(d) Cylinder liner

Q124. A torsion bar is a steel bar operated by:

(a) both tensile and compressive stresses
(b) both compressive stress and twisting stress
(c) both shear strain and longitudinal strain
(d) both twisting and shear stresses

Q125. What component blows air across the intercooler fins?

(a) Exhaust fan
(b) Engine cooling fan
(c) Turbocharger
(d) Air filter

Q126. Which of the following is true for a given fixed compression ratio?

(a) Dual cycle is the most efficient.
(b) Otto cycle is the most efficient.
(c) Diesel cycle is the most efficient.
(d) Both Otto and Diesel cycles are equally efficient.

Q127. A device operates at 240 V and consumes 480 W of power. What is the current flowing through the device?

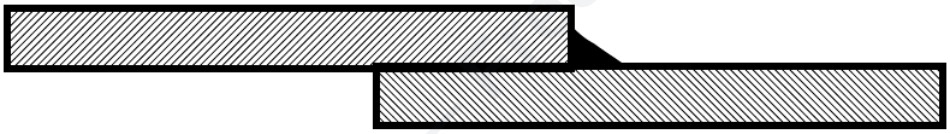
(a) 1 A
(b) 2.5 A
(c) 2 A
(d) 1.5 A

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Q128. Final drive is the last stage of power transmission from the propeller shaft to rear axles and then to the wheels. To which of the following angles does it turn the propeller shaft motion?

(a) Equal and opposite angle to drive the rear axle
(b) 45 degree angle to drive the rear axle
(c) −45 degree to drive the front axle
(d) Right angle to drive the rear axle

Q129. Identify the type of brazed joint shown below.



(a) Butted Flange
(b) Strapped Lap
(c) Simple Lap
(d) Joggle Lap

Q130. Which of the following is a fundamental unit?

(a) newton
(b) watt
(c) pascal
(d) metre

Q131. Which of the following types of valves is NOT used in the four stroke engine?

(a) Rotary valves
(b) Poppet valves
(c) Reed valves
(d) Butterfly valves

Q132. Why are fins provided over the cylinder in air-cooled engines?

(a) To increase cooling surface
(b) To provide structural support
(c) To reduce engine noise
(d) For direct air flow

Q133. What is the primary purpose of applying brakes in a vehicle?

(a) To stop or slow down the vehicle
(b) To improve fuel efficiency
(c) To increase the speed of the vehicle
(d) To open the fuel tank

Q134. What type of bearing is fitted into the connecting rod, allowing the gudgeon pin to provide bearing for the oscillating small end of the connecting rod?

(a) Journal bearing
(b) Needle bearing
(c) Tapper roller bearing
(d) Ball bearing

Q135. As the piston moves up to create a compression force, which of the following parts movements leads to inlet valve closure in engine?

(a) Helical spring movement
(b) Crankshaft movement
(c) Camshaft movement
(d) Connecting rod movement

Q136. A type of chamber in which the combustion space is essentially a single cavity with little restriction on one part of the chamber to the other, and hence with no large difference in pressure between parts of the chamber during the combustion process is known as:

(a) air-cell combustion chamber
(b) open combustion chamber
(c) pre-combustion chamber
(d) shallow depth combustion chamber

Q137. Which of the following types of wooden mallets are used for general purpose work such as flattening and bending?

(a) End-faked mallets
(b) Bossing mallets
(c) Standard wooden mallets
(d) Side-faked mallets

Q138. The exhaust gases in a two stroke engine are driven out by:

(a) fresh charge of fuel entering the cylinder nearly at the end of the compression stroke
(b) fresh air entering the casing nearly at the end of the suction stroke
(c) left out charge of fuel from exhaust entering the cylinder nearly at the end of the working stroke
(d) fresh charge of fuel entering the cylinder nearly at the end of the working stroke

Q139. Which of the following statements is/are correct?

Statement I - The annealing process uses heat to reduce the hardness and increase the ductility and toughness of various steels, cast iron, and alloys.

Statement II - Quenching is a rapid cooling process that alters specific properties of materials by manipulating the cooling rate.

(a) Statement (I) and (II) both are correct.
(b) Statement (I) is incorrect but Statement (II) is correct.
(c) Statement (I) is correct but Statement (II) is incorrect.
(d) Statement (I) and (II) both are incorrect.

Q140. Which of the following statements is correct about a diesel cycle and its air standard efficiency with respect to the compression ratio?

(a) The air standard efficiency of a diesel cycle increases with the increase in the compression ratio.
(b) The air standard efficiency decreases with the increase in the compression ratio.
(c) The maximum compression ratio for the diesel engine is limited by detonation.
(d) For a given compression ratio, Otto cycle is the least efficient while the diesel cycle is the most efficient.

Q141. Which of the following methods is implemented for locking a semi floating type piston pin?

(a) Gluing
(b) Screw
(c) Welding
(d) Riveting

Q142. Why do diesel engines generally produce more noise, vibration, and harshness (NVH) compared to petrol engines?

(a) Due to lower combustion temperaturev
(b) Due to simpler combustion method
(c) Due to less efficient fuel usage
(d) Due to rapid combustion pressure and high pressure

Q143. Which of the following types of shafts allows easy implementation of a 4 valve per cylinder configuration?

(a) Crankshaft of multicylinder engine setup
(b) Single overhead cam setup
(c) Dual overhead cam setup
(d) Cam and follower rocker arm setup

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Q144. In engineering drawing (lettering and numbering), a single stroke means that the _____.

(a) thickness of the line of the letter or number is obtained in three strokes of the pencil
(b) thickness of the line of the letter or number is obtained in one stroke of the pencil
(c) thickness of the line of the letter or number is obtained in two strokes of the pencil
(d) thickness of the line of the letter or number is obtained in no strokes of the pencil

Q145. Which of the following is a cause of high oil consumption in the engine cylinder?

(a) Blocked oil strainer
(b) Oil reaching to combustion
(c) High oil level in the sump
(d) Worn out oil pump gear

Q146. Which of the following uses of wire gauge is INCORRECT?

(a) It does not help determine how much current a wire can carry.
(b) It is used in electrical installations, welding and other applications.
(c) Using the wrong wire gauge can damage appliances and electronic devices.
(d) It measures the diameter of a wire.

Q147. The distance a cam lobe rises away from the base circle of the camshaft is known as:

(a) rocker arm lift
(b) lobe lift
(c) mushroom valve lift
(d) gross lift

Q148. What is the chemical effect that occurs in a battery during the charging process of a Lead Acid battery?

(a) Water dissociation into hydrogen and oxygen
(b) Lead sulphate decomposes into lead and sulphuric acid
(c) Sulphuric acid dissociates into hydrogen and sulphate ions
(d) Lead reacts with sulphur to form lead sulphate

Q149. A constant mesh gearbox usually comes with how many manual transmission configurations?

(a) It comes with a 6-speed 1-reverse manual transmission configuration.
(b) It comes with a 3-speed 1-reverse manual transmission configuration.
(c) It comes with a 5-speed 1-reverse manual transmission configuration.
(d) It comes with a 4-speed 1-reverse manual transmission configuration.

Q150. What conditions lead to the formation of oxides of nitrogen during combustion in the exhaust gases of an IC engine?

(a) High temperature and low pressure
(b) Low temperature and low pressure
(c) Low temperature and high pressure
(d) High temperature and high pressure

Q151. Which of the following types of engines has irregular operation that occurs because the amount of fresh mixture entering the cylinder is not enough to clear all the exhaust gases and a part of it remains in the cylinder to contaminate the charge?

(a) Two-stroke diesel engine
(b) Two-stroke petrol engine
(c) Four-stroke diesel cycle
(d) Four-stroke petrol engine

Q152. Which of the following is a key advantage of using Thyristors in power control applications?

(a) High efficiency and low power loss
(b) Low voltage handling capabilities
(c) High frequency switching

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(d) Small size and low cost

Q153. Why are metal dispersants or detergents used as additives in lubrication oil?

(a) These are used to control viscosity index and wax formation throughout the system at high temperature
(b) These are used to control deposit formation throughout the system
(c) These are used to control the formation of sedimentation of particles throughout the system
(d) These are used to control bubbles formation and mist throughout the system

Q154. Which of the following statements is NOT correct about the steering system in vehicles?

(a) It should minimise the turning effort applied on the steering wheel by the driver by use of overdamped damper
(b) It should multiply the turning effort applied on the steering wheel by the driver.
(c) It should not transmit the shocks of the road surface encountered by wheels to the driver hands.
(d) The function of the steering system is to convert the rotary movement of the steering wheel into the angular turn of the front wheels

Q155. How does the EGR valve help control NOx formation and engine knock?

(a) By limiting the exhaust flow
(b) By adding exhaust gas to the intake mixture
(c) By raising the intake air temperature
(d) By improving the fuel injection timing

Q156. What should be done if the starter motor pinion gear teeth are worn out?

(a) Repair the pinion.
(b) Tighten the starter motor mounting.
(c) Clean the plunger contact point
(d) Replace the pinion.

Q157. In engineering drawing, what is defined as the path of a moving point with no thickness?

(a) Point
(b) Line
(c) Curve
(d) Angle

Q158. Which of the following types of wooden mallets are used for hollowing panel beatings?

(a) Bossing mallets
(b) End-faked mallets
(c) Standard wooden mallets
(d) Side-faked mallets

Q159. What is waste?

(a) Unwanted or unusable materials
(b) Natural resources for living organisms
(c) Useful materials for industries
(d) Valuable substances for agriculture

Q160. Pencils are rated in engineering drawings based on the _____.

(a) hardness or softness of the lead
(b) colour of the lead
(c) shape of the lead
(d) durability of the lead

Q161. Why is it important to follow proper disposal procedures for industrial waste?

(a) To prevent waste from being scattered anywhere
(b) To save time and cost in waste classification
(c) To reduce the number of necessary waste bins
(d) To comply with environmental regulations and to reduce pollution

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Q162. How is the alternating current (AC) converted to direct current (DC) in an alternator?

(a) Using a transformer
(b) Using a capacitor
(c) Using silicon diodes
(d) Using an inverter

Q163. What is the blade length of the T1 'T' square, as per IS:1360-1989?

(a) 700 mm
(b) 500 mm
(c) 1500 mm
(d) 1000 mm

Q164. Which of the following is NOT a correct statement about the torsion spring?

(a) This spring provides very neat and compact design.
(b) It takes the driving or braking torque, and additional link mechanisms are not required for this purpose.
(c) It is lighter than leaf spring system.
(d) This spring needs less space.

Q165. What happens when the brake pedal is pressed in a pedal-assisted type brake?

(a) The power cylinder is activated.
(b) The engine shuts down.
(c) The accelerator is engaged.
(d) The clutch is released.

Q166. Which of the following is the key difference between a fuse and a circuit breaker?

(a) A fuse is used for high-voltage circuits, while a circuit breaker is used for low-voltage circuits.
(b) A fuse is a one-time-use device, while a circuit breaker can be reset and reused.
(c) A fuse can be reset after tripping, while a circuit breaker must be replaced.
(d) A fuse is a mechanical device, while a circuit breaker is an electronic device

Q167. What force (effort) will be required to push a load, initially at rest, of mass 500 g, so that at a distance of 20 m, its final velocity is 20 m/sec [Assume that there is no friction and ‘g’ = 10 m/s^2].

(a) 10 N
(b) 5 N
(c) 10 J
(d) 5 J

Q168. What is the role of baffles in the fuel tank?

(a) To store more fuel
(b) To minimise fuel slushing
(c) To filter impurities
(d) To indicate fuel level

Q169. _____ brakes are a type of brake in which the fluid from the master cylinder is forced into a caliper where it presses against a piston. The piston in turn squeezes two brake pads against the disc (rotor), which is attached to wheel, forcing it to slow down or stop.

(a) Electrical
(b) Vacuum
(c) Drum
(d) Disk

Q170. If the coefficient of linear expansion of a material is 2 × 10-5 °C-1, what does it mean?

(a) The material expands by 2 × 10-5 times its original volume per degree Celsius
(b) The material expands by 2 × 10-5 times its original length per degree Celsius
(c) The material always increases by 2 × 10-5 kg when temperature is increased by 1°C

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(d) The material expands by 2 × 10-5 times its original area per degree Celsius

Q171. Which of the following statements correctly describes the placement and purpose of orientation marks on a drawing sheet?

1. Orientation marks are placed at two opposite corners of the drawing sheet to indicate the correct orientation on the drawing board.

2. Orientation marks consist of arrow heads placed across the frame, with one at the shorter side and one at the longer side, coinciding with the centering marks.

3. One of the orientation marks always points towards the draughtsman, indicating the direction in which the drawing sheet should be placed.

4. Orientation marks are used to mark the midpoint of each side of the drawing sheet for accurate centering.

(a) 1 and 4 only
(b) 2 and 3 only
(c) 1, 2, and 4 only
(d) 1, 2, and 3 only

Q172. What do the SAE viscosity rating numbers denote, such as 0W or 5W?

(a) Denotes thicker oil that better resists viscosity breakdown when hot
(b) Easier oil flow for cold starting
(c) Denotes thicker oil that better resists viscosity breakdown when cold
(d) High viscosity oil and difficult flow for cold starting

Q173. Which of the following punches is used to make deeper witness marks on scribed lines and make it easier for the drill to start correctly?

(a) Pin punch
(b) Prick punch
(c) Centre punch
(d) Solid punch

Q174. What component in an adjustable flow control (throttle) valve controls the flow?

(a) Ball poppet
(b) Check valve
(c) Needle-shaped plunger
(d) Spring-loaded piston

Q175. Which of the following parts of a hammer-head is used for shaping and forming work like riveting and bending?

(a) Eyehole
(b) Cheek
(c) Pein
(d) Face

ANSWER KEY

1	a	2	a	3	a	4	a	5	a	6	a	7	a	8	a	9	a	10	a
11	a	12	a	13	a	14	a	15	a	16	a	17	a	18	a	19	a	20	a
21	a	22	a	23	a	24	a	25	a	26	a	27	a	28	a	29	a	30	a
31	a	32	a	33	a	34	a	35	a	36	a	37	a	38	a	39	a	40	a
41	a	42	a	43	a	44	a	45	a	46	a	47	a	48	a	49	a	50	a
51	a	52	a	53	a	54	a	55	a	56	a	57	a	58	a	59	a	60	a
61	a	62	a	63	a	64	a	65	a	66	a	67	a	68	a	69	a	70	a
71	a	72	a	73	a	74	a	75	a	76	a	77	a	78	a	79	a	80	a
81	a	82	a	83	a	84	a	85	a	86	a	87	a	88	a	89	a	90	a

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91	a	92	a	93	a	94	a	95	a	96	a	97	a	98	a	99	a	100	a
101	a	102	a	103	a	104	a	105	a	106	a	107	a	108	a	109	a	110	a
111	a	112	a	113	a	114	a	115	a	116	a	117	a	118	a	119	a	120	a
121	a	122	a	123	a	124	a	125	a	126	a	127	a	128	a	129	a	130	a
131	a	132	a	133	a	134	a	135	a	136	a	137	a	138	a	139	a	140	a
141	a	142	a	143	a	144	a	145	a	146	a	147	a	148	a	149	a	150	a
151	a	152	a	153	a	154	a	155	a	156	a	157	a	158	a	159	a	160	a
161	a	162	a	163	a	164	a	165	a	166	a	167	a	168	a	169	a	170	a
171	a	172	a	173	a	174	a	175	a										

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