RRB ALP CBT-II (Electrician) 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. Which type of material is used to protect the transformer winding from the core?

(a) Mica
(b) Iron
(c) Steel
(d) Water

Q102. A capacitor with a capacitance of 10 μF is connected in series with a 1 MΩ resistor. How much time will it take for the capacitor to reach 90% of its final charge?

(a) 35.7 seconds
(b) 23.03 seconds
(c) 50.2 seconds
(d) 10.5 seconds

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Q103. The SCR (Silicon controlled rectifier) is also called a _____.

(a) diode
(b) transistor
(c) triac
(d) thyristor

Q104. Which of the following processes is used to manufacture thick film resistors?

(a) Spraying metal powder on a ceramic base
(b) Embedding metal wire in ceramic
(c) Coating a metal rod with ceramic
(d) Pasting metal compound and powdered glass on a ceramic base

Q105. Which of the following is an example of a p-type semiconductor?

(a) Silicon doped with arsenic
(b) Silicon doped with boron
(c) Germanium doped with phosphorus
(d) Silicon doped with phosphorus

Q106. In a balanced three-phase system, the phase angles between the line-to-line voltages are _____.

(a) 0°
(b) 120°
(c) 90°
(d) 60°

Q107. A resistor has these colour bands: Brown, Black, Red and Gold. What is its resistance value?

(a) 10,000 Ω (10 kΩ) ± 5%
(b) 10 Ω ± 5%
(c) 100 Ω ± 5%
(d) 1,000 Ω (1 kΩ) ± 5%

Q108. A 6-pole alternator is running and producing a frequency of 50 Hz. If the frequency is decreased to 20 Hz, how many poles will be required, if the alternator is to be run at the same speed?

(a) 4
(b) 8
(c) 2
(d) 6

Q109. 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 incorrect.
(b) Statement (I) is correct but Statement (II) is incorrect.
(c) Statement (I) is incorrect but Statement (II) is correct.
(d) Statement (I) and (II) both are correct.

Q110. In an unbalanced three-phase system, the neutral current will _____.

(a) be equal to the phasor sum of the unbalanced currents
(b) be equal to the ratio of phase voltage of any phase to the impedance of that phase
(c) always be zero
(d) be equal to the ratio of phasor sum of phase voltage of any two phases to the total impedance of both phases

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Q111. Which of the following is a key advantage of using Thyristors in power control applications?

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

Q112. What is the holding current in a DIAC?

(a) The current required to keep the DIAC in conduction once it starts
(b) The current required to break down the junction
(c) The current that flows when the device is turned off
(d) The current needed to trigger the device into conduction

Q113. 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) 5 J
(d) 10 J

Q114. Select the option that is correct regarding the following two statements labelled Assertion (A) and Reason (R).

Assertion: The line voltage in a star-connected system is √3 times the phase voltage.

Reasoning: In a star connection, the line voltage is the vector sum of the phase voltages, resulting in a √3 factor between them.

(a) Both Assertion and Reason are correct, but the Reason is not the correct explanation for the Assertion.
(b) Assertion is correct, but Reason is incorrect.
(c) Assertion is incorrect, but Reason is correct.
(d) Both Assertion and Reason are correct, and the Reason is the correct explanation for the Assertion.

Q115. What is the recommended action if a DC motor produces excessive sparking at the brushes?

(a) Reduce the motor speed
(b) Increase the supply voltage
(c) Replace worn-out brushes and clean the commutator
(d) Add resistance to the armature circuit

Q116. What is another name for CTS wiring?

(a) Cleat wiring
(b) Batten wiring
(c) Conduit wiring
(d) Casing and capping wiring

Q117. Which of the following uses of wire gauge is INCORRECT?

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

Q118. 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.

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

Q119. What determines the appropriate current rating of a fuse in a circuit?
(a) The voltage supplied to the circuit
(b) The number of electrical devices connected
(c) The length of the circuit wires
(d) The smallest cable rating in the circuit

Q120. A DC generator delivers a load current of 25 A at 200 V. If the generated EMF is 205 V, what is the armature resistance?
(a) 0.1 Ω
(b) 0.4 Ω
(c) 0.2 Ω
(d) 0.3 Ω

Q121. In which application is a Gate Turn-Off Thyristor (GTO) used?
(a) Audio amplifiers
(b) Power inverters and motor drives
(c) High-speed communication systems
(d) Low-power digital circuits

Q122. When drawing a curved line of a specific length in an engineering drawing, which tool is most appropriate for ensuring accuracy?
(a) Compass
(b) Protractor
(c) Straightedge
(d) French Curve

Q123. What is the primary purpose of implementing Lockout/Tagout (LOTO) procedures when working on a DC motor?
(a) To measure motor speed
(b) To improve motor cooling
(c) To increase motor efficiency
(d) To prevent accidental startup during maintenance

Q124. 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

Q125. Which of the following types of wooden mallets are used for hollowing panel beatings?
(a) End-faked mallets
(b) Side-faked mallets
(c) Standard wooden mallets
(d) Bossing mallets

Q126. What is the primary principle behind the generation of electrical energy in a piezoelectric device?
(a) Conversion of chemical energy into electrical energy
(b) Conversion of mechanical stress into electrical energy
(c) Conversion of thermal energy into electrical energy
(d) Conversion of light energy into electrical energy

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Q127. A shunt release in an MCCB is commonly used for:

(a) overcurrent protection
(b) voltage stabilisation
(c) remote tripping of the MCCB
(d) improving power factor

Q128. Which type of wiring is used only for temporary installations?

(a) Conduit wiring
(b) Cleat wiring
(c) Casing and capping wiring
(d) CTS wiring

Q129. Which of the following is a fundamental unit?

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

Q130. What happens to inductive reactance, when frequency increases?

(a) It remains the same.
(b) It increases.
(c) It becomes zero.
(d) It decreases.

Q131. What does inductance (L) oppose in a circuit?

(a) Change in voltage
(b) Change in frequency
(c) Change in current magnitude
(d) Change in resistance

Q132. If 'P' is the number of poles on a rotor of an alternator, how many cycles of EMF are completed in one revolution?

(a) P/2
(b) P
(c) P/4
(d) 2P

Q133. Which power loss is assessed by open-circuit test on transformer?

(a) Core loss
(b) Winding loss
(c) Friction loss
(d) Copper loss

Q134. If the load on a three-phase system is unbalanced, the power calculation becomes more complex because _____.

(a) the line current becomes zero
(b) the line and phase voltages become equal
(c) the current in each phase differs, and the total power must be calculated by adding individual phase powers
(d) the power factor becomes unity

Q135. What is the main difference between grounding and earthing in a three-phase system?

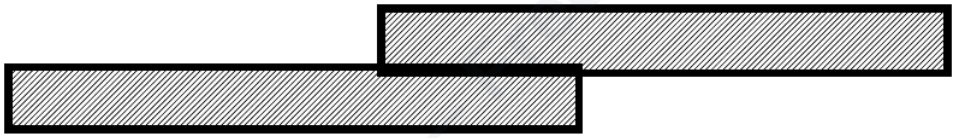
(a) Grounding and earthing are used interchangeably, with no major difference.
(b) Grounding provides a return path for current, while earthing provides a safe path for fault current.
(c) Grounding connects only the body of the electrical equipment to the earth, whereas earthing is associated with the neutral conductor.
(d) Grounding is used to protect electrical appliances from surge voltages, while earthing is used to prevent system overloads.

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Q136. In a single-phase transformer, which instrument is used to check continuity between the primary and secondary windings when they are not energised?

(a) Use an energy meter
(b) Use a multimeter set to current
(c) Use a multimeter set to voltage
(d) Use a multimeter set to ohms

Q137. Identify the type of brazed joint shown below.



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

Q138. In parallel grouping of capacitors, what happens to the total capacitance?

(a) It becomes zero.
(b) It increases.
(c) It decreases.
(d) It remains the same.

Q139. Which of the following types of wooden mallets are used for general purpose work such as flattening and bending?

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

Q140. Why is it important to follow proper disposal procedures for industrial waste?

(a) To comply with environmental regulations and reduce pollution
(b) To reduce the number of trash bins needed
(c) To save time and effort in sorting waste
(d) To allow waste to decompose anywhere

Q141. What is the significance of the term 'equipotential bonding' in the context of IEEE regulations for earthing?

(a) It refers to ensuring that all metallic parts of electrical systems are connected together to maintain the same electrical potential.
(b) It ensures that electrical systems operate at different voltage levels.
(c) It is a method to increase the resistance of the grounding system.
(d) It refers to the insulation of electrical cables.

Q142. The total power delivered by a balanced three-phase system is _____.

(a) the product of the phase voltage and current of any one phase
(b) the average of the powers in all three phases
(c) the sum of the individual powers of any two phases
(d) the sum of the individual powers in each phase

Q143. What should be the minimum thickness of the MS clips used for fixing PVC channels under steel joints?

(a) 2.2 mm
(b) 0.5 mm
(c) 1.2 mm
(d) 1.7 mm

Q144. What is waste?

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

Q145. Which type of DC generator has its field winding connected in parallel with the armature?

(a) Series DC generator
(b) Shunt DC generator
(c) Separately excited DC generator
(d) Compound DC generator

Q146. What will be the eddy current loss if the supply frequency of a transformer becomes double?

(a) No change
(b) Double
(c) Half
(d) Four times

Q147. Which of the following methods is used to reduce earth resistance in an earthing system?

(a) Reducing the distance between the earth and the neutral
(b) Using insulated grounding cables
(c) Using larger conductors for grounding
(d) Increasing the depth of the ground electrode

Q148. Which of the following is true for an alternator?

(a) Alternator is a synchronous motor.
(b) Alternator is a DC machine.
(c) Alternator is an AC induction generator.
(d) Alternator is a synchronous generator.

Q149. In a Power MOSFET, the gate-to-source voltage (V_(gs)) controls the _____.

(a) drain current
(b) gate current
(c) breakdown voltage
(d) source current

Q150. Salient pole type alternator has a _____ diameter and a _____ axial length for low speed of operation.

(a) short, short
(b) large, large
(c) large, short
(d) short, large

Q151. If 'P' is the number of poles on a rotor of an alternator, 'n' is the number of revolutions made per second by the rotor, then the frequency will be:

(a) f=(p*n)/120
(b) f=p/2n
(c) f=120P*n
(d) f=P*n

Q152. Pencils are rated in engineering drawings based on the _____.

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

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Q153. Which of the following parts of a hammer-head is used for shaping and forming work like riveting and bending?

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

Q154. The EMF per turn of a single phase 10 kVA, 2200/220 V, 50 Hz transformer is 10 V. Calculate the number of primary and secondary turns, respectively.

(a) 10 and 110
(b) 220 and 22
(c) 22 and 220
(d) 110 and 10

Q155. 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) Solid punch
(d) Centre punch

Q156. What does an optical pyrometer measure?

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

Q157. Select the correct statement regarding grounding and earthing in electrical system.

(a) Grounding is used to protect humans from electric shocks, while earthing is used to reduce power consumption.
(b) Grounding involves connecting the earth to a system's neutral or other conductors, while earthing connects the system's frame or body to the earth.
(c) The grounding and earthing are related to single phase system.
(d) Grounding and earthing are the same process with no distinction.

Q158. Which of the following is the key difference between a fuse and a circuit breaker?

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

Q159. Which type of semiconductor material is typically used to construct a DIAC?

(a) Silicon
(b) Gallium Arsenide
(c) Aluminium
(d) Copper

Q160. 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 - P, D - Q

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

Q161. When did India implement the Hazardous Wastes (Management and Handling) Rules to regulate the disposal and handling of hazardous waste?
(a) 1989
(b) 2000
(c) 1987
(d) 1982

Q162. What is the maximum allowable distance of the screw from the end point of a joint during installation of PVC channel?
(a) 5 cm
(b) 10 cm
(c) 20 cm
(d) 15 cm

Q163. Which of the following instruments is used to measure the resistance of an earthing electrode?
(a) Power analyser
(b) Tachometer
(c) Clamp meter
(d) Earth resistance tester

Q164. 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 length per degree Celsius
(b) The material expands by 2 × 10^(-5) times its original area per degree Celsius
(c) The material always increases by 2 × 10^(-5) kg when temperature is increased by 1°C
(d) The material expands by 2 × 10^(-5) times its original volume per degree Celsius

Q165. In engineering drawing, what is defined as the path of a moving point with no thickness?
(a) Curve
(b) Line
(c) Angle
(d) Point

Q166. Which of the following IEEE standards focuses on the grounding of electrical systems and equipment?
(a) IEEE 519
(b) IEEE 80
(c) IEEE 1547
(d) IEEE 1100

Q167. Which of the following maintenance practices helps prevent overheating in a DC motor?
(a) Increasing armature resistance
(b) Disconnecting the load frequently
(c) Regular lubrication of bearings
(d) Reducing field current

Q168. What is the chemical effect that occurs in a battery during the charging process of a Lead Acid battery?
(a) Lead reacts with sulphur to form lead sulphate
(b) Sulphuric acid dissociates into hydrogen and sulphate ions
(c) Water dissociation into hydrogen and oxygen
(d) Lead sulphate decomposes into lead and sulphuric acid

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Q169. What is the most likely cause if a DC motor runs in the wrong direction?

(a) Worn-out brushes
(b) Incorrect field or armature wiring connections
(c) Faulty bearings
(d) High armature resistance

Q170. 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.

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

Q171. In engineering drawing (lettering and numbering), a single stroke means that the _____.

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

Q172. Which of the following losses remains variable during normal operation of transformer?

(a) Stray loss
(b) Hysteresis loss
(c) Copper loss
(d) Eddy current loss

Q173. Which of the following punch marks is used for the correct location and seating of the divider point?

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

Q174. What is the blade length of the T1 'T' square, as per IS:1360-1989?

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

Q175. If a machine has an efficiency of 80%, it means:

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

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
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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