RRB ALP CBT-II (Electronic Mechanic) Official Paper (Held On: 06 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 can complete a work in 14 hours, while B can do the same work in 21 hours. A started working alone. After how many hours should B join A so that the total work is completed in 10 hours?

(a) 3
(b) 4.5
(c) 3.5
(d) 4

Q2. Why is regular maintenance of HVAC systems considered a medium ECO?

(a) It decreases the system's energy consumption.
(b) It prevents overheating of the system.
(c) It increases the cost of energy.
(d) It speeds up system breakdowns.

Q3. The speed of a train is 144 km/hr. The distance covered by the train in 12 seconds is:

(a) 480 m
(b) 103 m
(c) 518 m
(d) 78 m

Q4. In a certain code language, 'GOES' is coded as '8624' and 'SNYC' is coded as '3817'.
What is the code for 'S' in the given code language?

(a) 8
(b) 4
(c) 3
(d) 2

Q5. In a certain code language, 'BOAT' is coded as '8654' and 'AIDS' is coded as '3517'.
What is the code for 'A' in the given code language?

(a) 6
(b) 5
(c) 3
(d) 8

Q6. The weights (in kg) of 20 students of a class have been recorded as 35, 42, 56, 44, 55, 44, 36, 44, 49, 48, 55, 35, 44, 47, 49, 48, 56, 44, 37 and 35. The modal weight (in kg) of the class is:

(a) 47
(b) 37
(c) 44
(d) 45

Q7. Pipes A and B can fill a rectangular tank in 40 minutes and 120 minutes, respectively. Pipe C can empty the completely filled same tank in 240 minutes. If pipes A, B and C are opened at the same time, then how many minutes will it take to fill the tank?

(a) 342/8
(b) 342/7
(c) 322/7
(d) 343/7

Q8. Which of the following actions involves scientific work?

(a) Spending time conversing with friends
(b) Climbing up the stairs
(c) Watching a film
(d) Holding a large load on one's head while standing motionless

Q9. How is a voltmeter connected in a circuit to measure potential difference?

(a) In parallel across the points where potential difference is to be measured
(b) In series with the circuit
(c) Neither in series nor in parallel
(d) Directly to the power source only

Q10. Find the minimum value of $2x^2 - 5x - 3$ and also find x.

(a) • 6.125 and x = 1.25
(b) -6.125 and x = 0.25
(c) 6.125 and x = 1.25
(d) 6.125 and x = 1.2

Q11. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group? (Note: The odd one out is not based on the number of consonants/vowels or their position in the letter-cluster.)

(a) CGXF
(b) UYPW
(c) QULS
(d) JNEL

Q12. Which of the following letter-number clusters will replace the question mark (?) in the given series to make it logically complete?

AD8, FI16, KN24, ?

(a) OS32
(b) OR35
(c) PS35
(d) PS32

Q13. Select the pair which follows the same pattern as that followed by the two sets of pairs given below. Both pairs follow the same pattern.

ARF: YTH

WVJ: UXL

(a) MEL: HZN
(b) SZN: QBP
(c) QEB: NBD
(d) KXF: HZH

Q14. By how much is 60% of 50 greater than 4/5 of 35?

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

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(d) 1

Q15. Which of the following is NOT an SI unit?

(a) Hour
(b) Metre
(c) Mole
(d) Kilogram

Q16. The speed of a bus is 6 metres/second. The distance (in kilometres) travelled by the bus in 8 hours and 20 minutes is:

(a) 185
(b) 180
(c) 184
(d) 175

Q17. Three partners, A, B and C, shared the profit in a business in the proportion of 11: 13: 16. They invested their capitals for 7 months, 5 months and 12 months, respectively. What was the ratio of their capitals?

(a) 165 :273 :140
(b) 96: 135: 101
(c) 3:5:8
(d) 21:35:44

Q18. T-Square is used to _____in engineering drawings.

(a) support the drawing paper/tracing paper for making drawings
(b) draw curved lines on drawing sheets
(c) draw horizontal lines, parallel lines and to guide/hold the setsquares
(d) transfer dimensions and dividing lines into a number of equal parts

Q19. Which of the following features is unique to Telegram compared to WhatsApp and Facebook Messenger?

(a) Voice and video calling capabilities
(b) End-to-end encryption for all messages
(c) Ability to create channels for broadcasting messages to large audiences
(d) Integration with Facebook for seamless sharing

Q20. Calculate the resistance of the bulb filament if it draws 200 mA current from 220 V source.

(a) 0Ω
(b) 1100 Ω
(c) 220 Ω
(d) 44 Ω

Q21. Which of the following processes causes accumulation of heavy metals such as lead and mercury in soil?

(a) Ozone layer depletion
(b) Improper disposal of industrial wastes
(c) Water evaporation
(d) Natural soil formation

Q22. What should come in place of the question mark (?) in the given series?

WU5, SQ7, NL11, ?

(a) GE17
(b) HF13
(c) GE13
(d) HE15

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Q23. Which of the following statements is correct?

(a) All metals are poor conductors of heat.
(b) Plastic and wood allow heat to pass through them easily.
(c) Dry air is a good conductor of heat.
(d) Copper and aluminium are good conductors of heat

Q24. If 24 joules of work is done in moving a charge of 2 coulombs across two points, then what will be the correct voltage across these two points?

(a) 2 V
(b) 12 V
(c) 24 V
(d) 48 V

Q25. The two sides CB and BA of triangle ABC are produced to CE and BD, respectively, in such a way that angle DAC = 110° ; and angle ABE = 130°. Which of the following options is true?

(a) AC <AB < BC
(b) BC <AC <AB
(c) AB <AC <BC
(d) BC <AB < AC

Q26. The marked price of an item is Rs. 27,500. The shopkeeper gave two successive discounts: the first discount was 20%, and the second was 30% of the first discount rate. What is the selling price of the item (in rupees)?

(a) 1,26,080
(b) 20,860
(c) 20,086
(d) 20,680

Q27. Which of the following letter-clusters should replace # and % so that the pattern and relationship followed between the letter-cluster pair on the left side of:: is the same as that on the right side of ::?

#: KHM:: OLQ: %

(a) #LIN, % = NKO
(b) #LIN, % = NLP
(c) #LIN, %= NKP
(d) #LIM, % = NKP

Q28. Which of the following statements is INCORRECT?

(a) In solids, heat transfer is typically carried out through conduction.
(b) Burning of feet on hot sand is an example of heat transfer by conduction.
(c) Conduction is the process of heat transfer that does not require any medium to transfer heat
(d) Conduction is the process of heat transfer from hotter body to colder body.

Q29. A man rides a bicycle from Point A to Point B in 10 minutes and comes back to Point A along the same path in 10 minutes. If the distance between Points A and B is 1 km, calculate his average velocity?

(a) 3.3 m/s
(b) 1.6 m/s
(c) 0 m/s
(d) 0.1 m/s

Q30. What is the dimensional equation of mass density (p)?

(a) [ML-3T2]
(b) [M0 L^3 T0]
(c) [ML-3T0]
(d) [M L-2 T0]

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Q31. What is the kinetic energy possessed by an object having mass 25 kg and moving with a uniform velocity of 2 m s^{-1}?

(a) 80 J
(b) 50 J
(c) 120 J
(d) 100 J

Q32. What is the value of 100 g in Sl units?

(a) 1 kg
(b) 0.1 kg
(c) 100 kg
(d) 10 kg

Q33. A mass m is moving with a velocity v and its kinetic energy is K. What will be the new kinetic energy if the velocity is doubled?

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

Q34. Which of the following is a main greenhouse gas that is responsible for global warming?

(a) Nitrogen
(b) Helium
(c) Carbon Dioxide
(d) Oxygen

Q35. Which of the following tools is commonly used to support the 'Standardize' step in the 5S methodology?

(a) Labels and signs
(b) Cleaning supplies
(c) Floor markings
(d) Job cycle charts

Q36. Based on the English alphabetical order, three of the following four letter-clusters are alike in a certain way and thus form a group. Which letter-cluster DOES NOT belong to that group?

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

(a) GMKT
(b) EKJR
(c) VBZI
(d) IOMV

Q37. What should come in place of the question mark (?) in the given alpha-numeric series?

Y13, F11, L9, Q7, U5, X3, ?

(a) 22
(b) A1
(c) Z1
(d) Y1

Q38. Given below are two sets of numbers. Both the sets are formed using the same mathematical equations or follow a common pattern. Which of the given options follows the same set of mathematical equations or patterns as the sets given in the question?

1333-1730-2199-2746-3377

218-345-514-731-1002

(a) 123 - 146 - 171 - 198 - 227
(b) 38 - 51 - 66 - 83 - 102
(c) 3-10-29-66-127
(d) 3 - 6 - 11 - 18 - 27

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Q39. Two sets of numbers are given below. In each set of numbers, certain mathematical operation(s) on the first number results in the second number. Similarly, certain mathematical operation(s) on the second number results in the third number and so on. Which of the given options follows the same set of operations as in the given sets?

(NOTE: Operations should be performed on the whole numbers, without breaking down the numbers into their constituent digits. E.g. 13-Operations on 13 such as adding/subtracting/multiplying to 13 can be performed. Breaking down 13 into 1 and 3 and then performing mathematical operations on 1 and 3 is not allowed.)

988-494-444-534; 894-447-397-487

(a) 138 - 69 - 14 - 98
(b) 226 - 113 - 144 - 268
(c) 586 - 293 - 244 - 328
(d) 682-341-291-381

Q40. What is the first step to take in case of a power failure in a workshop?

(a) Continue working as usual
(b) Check if emergency lighting and backup power are functional
(c) Panic and leave the premises immediately
(d) Ignore the situation and wait for power to return

Q41. Which of the following is an ethical concern related to Information Technology?

(a) Enhancement of communication channels
(b) Privacy violations and data breaches
(c) Reduction in administrative costs
(d) Increased accessibility to educational resources

Q42. Which term is used to describe the closeness of the measured value to the standard or true value?

(a) Mean
(b) Precision
(c) Approximate
(d) Accuracy

Q43. Which of the following is NOT correct about Joule's law of heating?

(a) Heat produced in a resistor is directly proportional to the square of the current for a given resistance.
(b) Heat produced in a resistor is directly proportional to the time for which the current flows through the resistor.
(c) Heat produced in a resistor is directly proportional to the resistance for a given current.
(d) Heat produced in a resistor is inversely proportional to the square of the current for a given resistance.

Q44. Which of the following terms is used to describe the pollutants that originate from identifiable sources, such as factories or vehicles?

(a) Non-point Source Pollution
(b) Random Pollution
(c) Point Source Pollution
(d) Radicle Pollution

Q45. How does installing energy-efficient windows in an old building affect energy consumption?

(a) It has no effect on fuel consumption.
(b) It causes indoor temperatures to rise.
(c) It reduces heating and cooling costs in the building.
(d) It increases the need for artificial lighting.

Q46. Which of the following is generally the temperature range in a laboratory thermometer?

(a) -10°C to 110°C
(b) -10°C to 150°C
(c) -100°C to 130°C
(d) 35°C to 42°C

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Q47. A refrigerator seller offers a discount of 10% on its listed price of Rs. 57,500 and still earns a profit of 15%. The cost price of the refrigerator is:

(a) Rs. 45,000
(b) Rs. 42,000
(c) Rs. 40,000
(d) Rs. 48,000

Q48. A person saves 50% of his income. If his expenditure is 440, then his income (in Rs.) is:

(a) 600
(b) 880
(c) 920
(d) 560

Q49. Which of the following is the correct statement of Ohm's Law?

(a) If the potential difference across the two ends of a conductor is 1 V and the current through it is 1A, then the resistance of the conductor is 20.
(b) The potential difference across the ends of a conductor is inversely proportional to the current flowing through it.
(c) The potential difference across the ends of a conductor is directly proportional to the current flowing through it.
(d) Current through a resistor is directly proportional to its resistance.

Q50. A shopkeeper sells sugar at 30 per kg, which he has bought at 24 per kg. Being dishonest, he also gives only y gm of sugar instead of 1000 gm that is mentioned on the weight. In this way, the shopkeeper manages to make an overall profit of 66 2/3 %. What is the value of y?

(a) 600
(b) 720
(c) 800
(d) 750

Q51. What is the SI unit for solid angle?

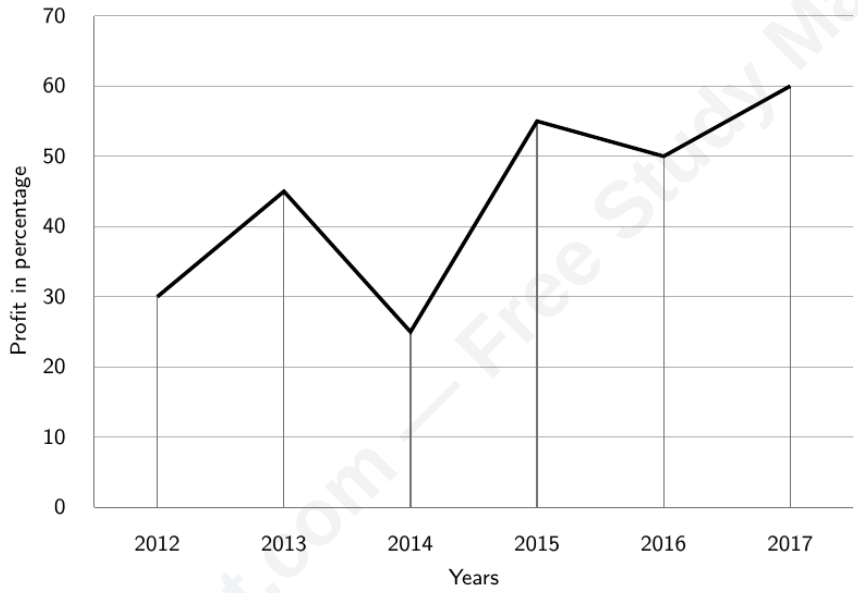
(a) Metre
(b) Candela
(c) Radian
(d) Steradian

Q52. Eight people are sitting in two parallel rows containing 4 people each in such a way that there is equal distance between adjacent persons. In row 1-A, B, C and D are seated and all of them are facing south. In row 2-P, Q, R and S are seated and all of them are facing north. Thus each person faces another person from the other row. No one sits to the left of B. R faces the person who sits second to the right of D. C faces the person who is the immediate neighbour of Q and R, B does not face S. Who amongst the following faces P?

(a) D
(b) A
(c) B
(d) C

Q53. Study the given graph and answer the question that follows.

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What is the average profit percentage of the given years?

(a) 44%
(b) 43.4%
(c) 44.1%
(d) 45%

Q54. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion(s) logically follow(s) from the statements.

Statements:

I. All books are pencils.

II. All pencils are cardboards.

III. All cardboards are notebooks.

Conclusions:

I. Some notebooks are pencils.

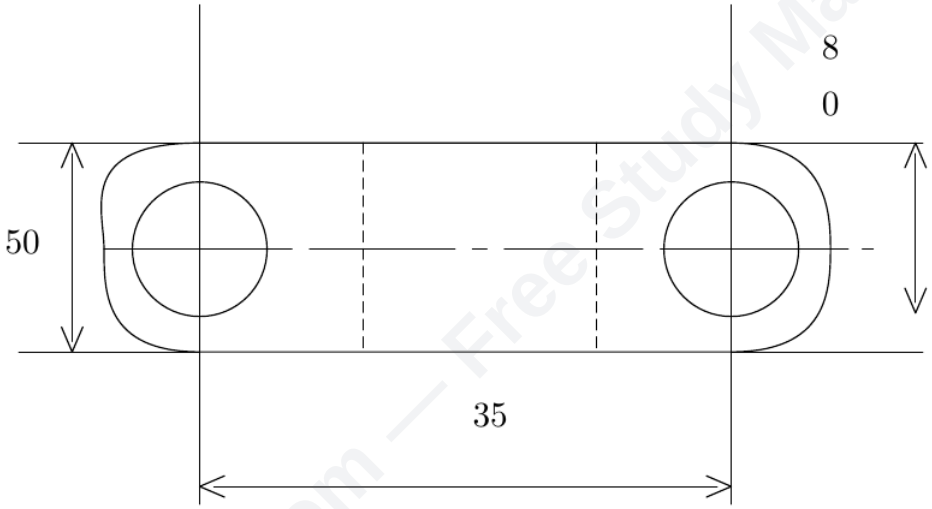
II. Some cardboards are books.

III. Some notebooks are books.

(a) Only conclusions I and II follow.
(b) All conclusions I, II and III follow
(c) Only conclusions I and III follow.
(d) Only conclusions II and III follow.

Q55. What type of view is represented of the given machine component?

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(a) Oblique view
(b) Orthographic view
(c) Perspective view
(d) Isometric view

Q56. In order to resolve disputes arising from cyber crime, such as tampering with computer source documents, hacking the computer system, using password of another person and publishing sensitive personal data of others without their consent, a forum has been established by the Central Government (India) in accordance with the provisions contained under Section 48(1) of the Information Technology Act, 2000. What is the name of that forum?
(a) Cyber Appellate Tribunal
(b) National Cybercrime Reporting Station
(c) Cybercrime Reporting Tribunal
(d) Internet Crime Complaint Center

Q57. When reporting a fire in an emergency, what is the most critical information to provide to emergency services?
(a) The weather conditions at the time of the fire
(b) How the fire started and if someone is injured or missing
(c) The likely cause of the fire and the building owner's name
(d) The colour of the smoke and the direction it is moving

Q58. Why does a combination of two thin blankets keep you warmer in the winter than a single thick blanket?
(a) Two thin blankets allow more heat to escape, keeping you warmer.
(b) Two blankets create an additional insulating layer of air, reducing heat loss
(c) Two thin blankets generate more heat than one thick blanket.
(d) Two thin blankets absorb more heat from the surroundings than one thick blanket.

Q59. What is necessary for a circuit to have electric current flowing through it?
(a) A closed conducting path with a voltage source
(b) Only wire
(c) Only switch
(d) Only bulb

Q60. Which of the following is NOT correct?
(a) An object moving with a constant velocity represents uniform motion.
(b) The motion of satellite around Earth in a circular orbit is uniform circular motion.
(c) A person jogging in the park is not an example of uniform circular motion.
(d) The distance-time graph of an object moving with uniform speed is not a straight line:

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Q61. Among three partners A, B and C in a business. The capital of B is equal to half the difference between thrice the capital of C and twice the capital of A. If at the end of the year, they received a profit of 25,415, what is the share of C (in)?

(a) 9,166
(b) 8,666
(c) 11,666
(d) 10,166

Q62. E, F, G, H, P, Q, and R, are sitting around a circular table facing the centre. F sits third to the left of H. Only two people sit between H and G when counted from the right of H. Q is an immediate neighbor of G. P is NOT an immediate neighbour of H. E is an Immediate neighbour of Q. Who sits second to the left of E?

(a) H
(b) R
(c) G
(d) P

Q63. The cost of painting a spherical ball at the rate of Rs. 2.50 per cm^2 is 13,860. What is the diameter of the ball? (Use $\pi = 22/7$)

(a) 40 cm
(b) 48 cm
(c) 21 cm
(d) 42 cm

Q64. In an electrical circuit, 'n' number of 10 Ohm resistors are connected in parallel. When one of the resistors is eliminated, the overall resistance of the circuit is _____.

(a) $1/(n^2)$
(b) Zero
(c) 1/n
(d) 1/(n-1)

Q65. What is the ratio of areas between two consecutive format sheet sizes created by halving the length or doubling the width?

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

Q66. If 'A' stands for '÷', 'B' stands for 'x', 'C' stands for '+' and 'D' stands for '-', then what will come in place of the question mark (?) in the following equation?

47 D 25 A 5C2B9=?

(a) 62
(b) 60
(c) 58
(d) 56

Q67. What is the primary purpose of netiquette in online communication?

(a) To ensure polite and respectful interactions
(b) To enhance internet connection speed
(c) To improve typing speed
(d) To increase the number of followers on social media

Q68. The thickness of a thread is measured by a student using a microscope of magnification 100. After making 30 observations, he finds the average width of the thread is 5.7 mm. What is the estimated thickness of the thread?

(a) 171 mm
(b) 0.057 mm

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(c) 0.57 mm
(d) 0.09 mm

Q69. The interest of $(10r)^2$ in r time at rate r/10 % is _____.
(a) (r^4)/10
(b) 10r^4
(c) (r^4)/20
(d) (r^4)/5

Q70. A force of 6 N is exerted on an object, resulting in its displacement of 2 m in the direction of the force. If the force is constant during the displacement, what is the work done in this case?
(a) 25 J
(b) 12 J
(c) 3 J
(d) 10 J

Q71. If 21.6: x:: x: 29.4, and x > 0 then find the value of x.
(a) 23.9
(b) 23.3
(c) 25.4
(d) 25.2

Q72. Which of the following statements is NOT true?
(a) Clinical thermometer should not be used to measure the temperature of boiling water.
(b) Clinical and laboratory thermometers are the same.
(c) The range of clinical thermometer is 35 to 42°C.
(d) Laboratory thermometer cannot be used to measure body temperature.

Q73. Which of the following options is NOT a necessary characteristic of a kite?
(a) At least one diagonal is bisected by the other diagonal.
(b) The diagonals are perpendicular to each other.
(c) The pairs of opposite angles are bisected by the corresponding diagonals.
(d) At least one pair of opposite angles is congruent.

Q74. A porter lifts a 10 kg luggage from the ground and places it on his head, 2.5 m above the ground. Calculate the work done by him on the luggage. (Take g = 10m s^(- 2))
(a) 200 J
(b) 100 J
(c) 250 J
(d) 250 N

Q75. What should come in place of the question mark (?) in the given series?
179 171 163? 147 139
(a) 155
(b) 157
(c) 151
(d) 153

Q76. If x + y + z = 0 then find the value of $(x^2)/2yz + (y^2)/2xz + (z^2)/2xy$
(a) 2/5
(b) 3/2
(c) 3/5
(d) 2/3

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Q77. In a certain code language, 'WIDE' is coded as '8694' and 'INKS' is coded as '3917', 7 What is the code for 'I' in the given code language?

(a) 8
(b) 3
(c) 7
(d) 9

Q78. A shopkeeper allows a discount of 18% on the marked price of an article and sells it for 2,870. Find the marked price of the article.

(a) Rs. 3,200
(b) Rs. 3,350
(c) Rs. 3,460
(d) Rs. 3,500

Q79. Which is the least number that must be subtracted from 5563 to make it exactly divisible by 18?

(a) 5
(b) 7
(c) 3
(d) 1

Q80. Study the given table carefully and answer the question that follows.

	Number of students who	
Appeared for the exam	Passed the exam	
Class IX	104	89
Class X	63	47

What was the total number of students who failed the exam from classes IX and X?

(a) 21
(b) 31
(c) 28
(d) 33

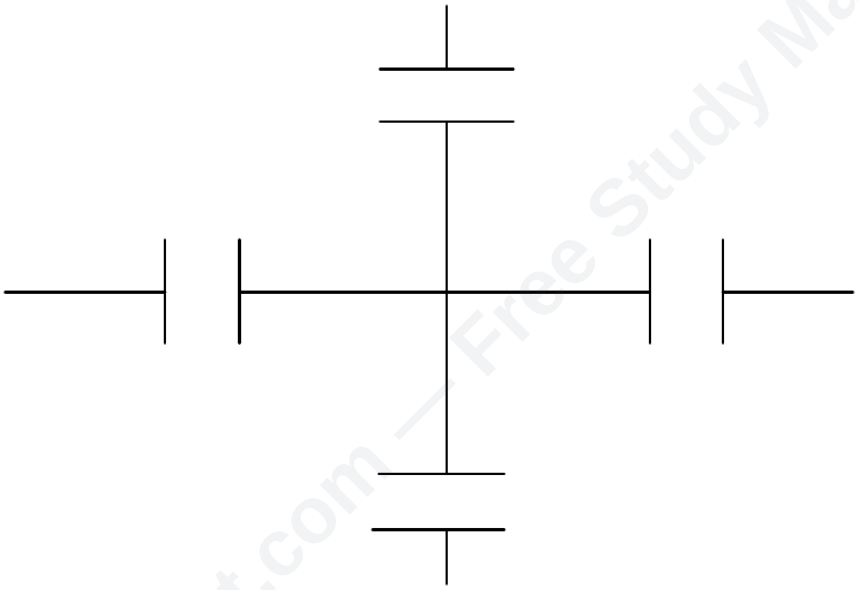
Q81. Based on the English alphabetical order, three of the following four letter-cluster pairs are alike in a certain way and thus form a group. Which letter-cluster pair DOES NOT belong to that group?

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

(a) QL-NT
(b) BW-YE
(c) KF-HM
(d) DY-AG

Q82. Identify the orthographic symbol of a pipe fitting shown in the figure.

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(a) Tee
(b) Cross
(c) Union
(d) Bend

Q83. Read the given statement and conclusions carefully. Assume that the information given in the statement is true, even if it appears to be at variance with commonly known facts, and decide which of the given conclusion(s) logically follow(s) from the statement.

Statement:

Over the past year, respiratory illnesses have increased significantly in city W. According to a public health study, this increase is linked to the increase in the number of cars, which raises air pollution levels on the roads.

Conclusions:

I. Increased vehicular traffic contributes to higher levels of air pollution.

II. Improving public transportation will reduce respiratory illnesses in city W.

(a) Both conclusions I and II follow.
(b) Neither conclusion I nor II follows.
(c) Only conclusion II follows.
(d) Only conclusion 1 follows.

Q84. An object's potential energy is equal to _____.

(a) Change in velocity
(b) Change in acceleration
(c) Transfer of energy
(d) Loss of energy

Q85. Which of the following is the primary reason for adopting scientifically designed methods for safely disposing of toxic waste from automobiles?

(a) To improve vehicle lifespan by minimising mechanical wear
(b) To increase vehicle performance by optimising engine efficiency
(c) To reduce fuel consumption and improve overall efficiency
(d) To protect human health from harmful fumes and dust in the air

Q86. Given below are two sets of numbers. Both the sets are formed using the same mathematical equations or follow a common pattern. Which of the given options follows the same set of mathematical equations or patterns as the sets given in the question?

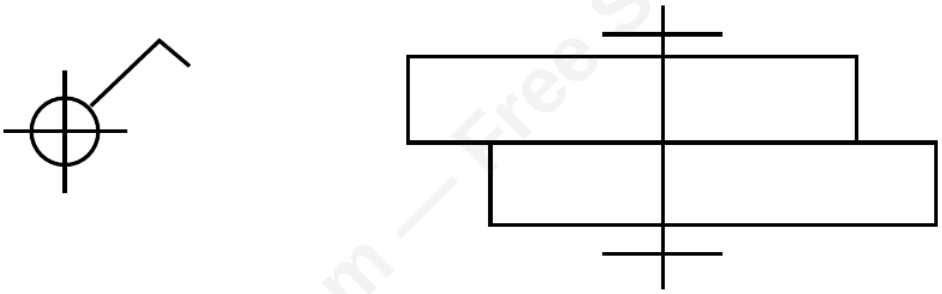
4-9-25-64-169; 16-49-121-324-841

(a) 64 - 100 - 144 - 196 - 256

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(b) 16 - 36 - 64 - 100 - 144
(c) 4 - 16 - 36 - 64 - 100
(d) 64-225-529-1444-3721

Q87. Examine the symbolic representation of the hole and rivet provided below. According to BIS SP 46-2003, what does this symbol represent?



(a) Drilled in the workshop
(b) Fitted in the workshop
(c) Drilled and fitted on-site
(d) Drilled on-site

Q88. The ABC Association meeting will be held on the 2nd Sunday of next month. The registration fee is Rs. 50 per person. Participants will be provided meals at an additional cost of Rs. 24. If the number of people who paid for meals is 100 more than those who did not pay for meals, and the total amount collected from registrations and meals is Rs. 69,400, then how many people registered and how many meals should be prepared?
(a) 1100 and 1100
(b) 1100 and 600
(c) 1100 and 50
(d) 500 and 600

Q89. What should come in place of the question mark (?) in the given series?
62 73 87 104 124 ?
(a) 142
(b) 147
(c) 134
(d) 153

Q90. What should come in place of the question mark (?) in the given alpha-numeric series?
Q16, O14, M12, K10, I8, ?
(a) G4
(b) H6
(c) G6
(d) J6

Q91. Which element is used in thermometers?
(a) Bromine
(b) Mercury
(c) Gallium
(d) Lead

Q92. Two trains are running in opposite directions at the same speed. The length of each train is 175 m. If they cross each other in 7 s, the speed of each train is:
(a) 75 km/hr
(b) 90 km/hr
(c) 85 km/hr
(d) 80 km/hr

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Q93. If the length, the breadth, and the height of a cuboid are 5 m, 2 m, and 50 cm, respectively, then find its volume.

(a) 500 m^3
(b) 20 m^3
(c) 50m^3
(d) 5 m^3

Q94. If an electric load draws a current of 2 A for 1 second, then calculate the number of electrons (with charge 1.6 × 10^(-19) °c) passing through the load.

(a) 1.25x10^(20)
(b) 0.25 x 1019
(c) 0.25 x 1020
(d) 1.25 x1019

Q95. An electric heater of resistance 50 uses a current of 3 A. Determine the heat generated in 20 seconds.

(a) 5000 J
(b) 1000 J
(c) 9000 J
(d) 60 J

Q96. Which of the following keyboard shortcuts on a Windows 10 home screen opens the item's properties?

(a) Insert + Alt
(b) F2 + Alt
(c) Tab + Del
(d) Alt + Enter

Q97. Which of the following is NOT a good heat conductor?

(a) Fur
(b) Copper
(c) Iron
(d) Aluminum

Q98. A, B, C, D, E, and F live on six different floors of the same building. The lowest floor of the building is numbered 1, the floor above it is numbered 2, and the top floor is numbered 6. E lives on an even-numbered floor but not on floor 4. The sum of the floor numbers where E and B live is 9. Only three people live between A and C. The sum of the floor numbers where F and C live is 3. What is the sum of the floor numbers where B and F live?

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

Q99. Under which Section of the Factories Act, of 1948, is the employment of women and children near cotton openers prohibited?

(a) Section 25
(b) Section 21
(c) Section 27
(d) Section 29

Q100. Four chairs and a table set up cost 22,000. Determine the table's cost, if it is Rs. 2,000 more expensive than the chair.

(a) Rs. 6,000
(b) Rs. 5,000
(c) Rs. 4,000
(d) Rs. 6,500

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PART B

Q101. Which of the following statements about title block is/are true?

Statement 1: The title block is situated in the bottom right-hand corner of the drawing sheet.

Statement 2: The contents of the title block are standardised and cannot be modified to suit individual company needs.

(a) Both statements are true
(b) Statement 1 is false, but statement 2 is true
(c) Both statements are false
(d) Statement 1 is true, but statement 2 is false

Q102. When creating 10 mm single-stroke capital letters in vertical style, what does the 10 mm distance between horizontal parallel lines represent?

(a) Letter height
(b) Interline spacing
(c) Letter width
(d) Stroke thickness

Q103. In a series circuit, three resistors of 10 ohms, 20 ohms, and R ohms are connected in series with a 12 V battery. What is the value of resistance R if current flowing in the circuit is 0.2 A?

(a) 30 ohms
(b) 40 ohms
(c) 10 ohms
(d) 20 ohms

Q104. Which of the following is a common calibration method for electrical measuring instruments?

(a) Approximation method
(b) Guesswork method
(c) Null method
(d) Estimation method

Q105. Why is an electrodynamometer-type power factor meter preferred in AC circuits?

(a) It does not require voltage connections.
(b) It can measure both single-phase and three-phase power factors
(c) It can measure DC power factor accurately.
(d) It has a faster response time.

Q106. How does the 8051's internal RAM organisation affect the efficiency of interrupt service routines (ISRs) that require saving and restoring register values?

(a) The bit-addressable area allows for fast saving and restoring of individual flags. improving ISR efficiency.
(b) The multiple register banks allow for switching to a different bank, reducing the need to push and pop registers, thus increasing efficiency.
(c) The general-purpose RAM area allows for large amounts of data to be pushed onto the stack, making ISRs more versatile.
(d) The lack of hardware stack pointer in the internal RAM limits the efficiency of ISRs.

Q107. Which of the following is the main property of the OR gate?

(a) It produces a high output when at least one input is high.
(b) It produces a low output only when all inputs are high.
(c) It produces a high output only when all inputs are low.
(d) It produces a low output when at least one input is low.

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Q108. Match the following types of lines with their correct descriptions according to their orientation and characteristics.

Description	Type of Line
A. A line that is neither parallel to a horizontal plane nor perpendicular to it.	1. Horizontal Line
B. A line that is perpendicular to horizontal lines.	2. Vertical Line
C. A line that changes its direction continuously.	3. Inclined Line
D. A line that is parallel to a horizontal plane.	4. Curved Line

(a) A-3. B-2, C-4, D-1
(b) A-2, B-3, C-4, D-1
(c) A-1, B-2, C-3, D-4
(d) A-2, B-1, C-4, D-3

Q109. What is the minimum age for employment in factories or mines or other hazardous employment, according to Article 24 of the Indian Constitution?

(a) 12 years
(b) 14 years
(c) 18 years
(d) 16 years

Q110. What is the primary function of a NOT gate in a digital circuit?

(a) To invert the input signal
(b) To delay the input signal
(c) To combine multiple input signals
(d) To amplify the input signal

Q111. A 100-mm prick punch with a 7-mm diameter body could have a 2.5-mm diameter point ground to an angle of _____

(a) 12^o
(b) 90^o
(c) 30^o
(d) 45^o

Q112. What happens when both the Set (S) and Reset (R) inputs of an RS Flip-Flop are 0?

(a) The flip-flop is in an invalid state.
(b) The output remains unchanged.
(c) The output is set to 1.
(d) The output is reset to 0.

Q113. What is the advantage of using a differential amplifier in a voltage amplifier circuit?

(a) It increases the common-mode rejection ratio (CMRR) of the amplifier.
(b) It increases the noise sensitivity of the amplifier.
(c) It increases the gain of the amplifier.
(d) It decreases the power consumption of the amplifier.

Q114. Which of the following is the primary reason why copper is widely used as a conductor in electrical wiring?

(a) Copper is abundant and inexpensive.
(b) Copper has high resistance to electricity.
(c) Copper has low resistance and high conductivity.
(d) Copper has a low melting point.

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Q115. How can stability be improved in a practical differentiator circuit using an op-amp?

(a) By adding a resistor in series with the capacitor of the input path
(b) By increasing the gain of the op-amp
(c) By decreasing the input voltage
(d) By removing the capacitor

Q116. Which of the following materials can be detected by an inductive proximity switch?

(a) Wood
(b) Glass
(c) Stainless steel
(d) Paper

Q117. Which of the following statements is INCORRECT about End standard?

(a) It is used to measure the distance between two engraved lines.
(b) It is slower but more accurate.
(c) It measures the distance between two parallel flat surfaces
(d) Faces are subject to wear.

Q118. Which of the following information is necessary to construct a rectangle?

(a) Only the length of one side
(b) Length of two adjacent sides
(c) Only the length of the diagonal
(d) Length of one side and the area of the rectangle

Q119. What are the two main outputs of a half adder?

(a) Sum and Difference
(b) Sum and Carry
(c) Sum and Quotient
(d) Carry and Borrow

Q120. Which of the following is the correct implementation of the Boolean equation F = (AB) + (CD) using only AND and OR gates?

(a) One AND gate and two OR gates
(b) One AND gate followed by one OR gate
(c) Two OR gates followed by one AND gate
(d) Two AND gates followed by one OR gate

Q121. A voltmeter with a resistance of 10,000 ohms is connected across a circuit that has a voltage of 50 V. What is the current flowing through the voltmeter?

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

Q122. What is the typical temperature range of a mercury-based clinical thermometer?

(a) 0°C to 100°C
(b) -10°C to 110°C
(c) 35°C to 42°C
(d) 4.0°C to 50°C

Q123. The input stage of an operational amplifier is typically a/an:

(a) oscillator
(b) voltage regulator
(c) buffer circuit
(d) differential amplifier

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Q124. An AND gate is used in a digital circuit to enable a certain function. Under what condition will the function be enabled?

(a) When any one of the inputs is low
(b) When all the inputs are high
(c) When any one of the inputs is high
(d) When all the inputs are low

Q125. Who may come out When passing stationary vehicles, keep a watch on _____suddenly from the front of the stationary vehicle. While overtaking, it should be done on the ___ side. Always keep a good _____and others. between your vehicle

(a) vehicles: right; gap
(b) pedestrians; right; distance
(c) cyclists; left; interval
(d) drivers; left; space

Q126. For your safety at work, which of the following should be ensured?

1. All the required protective clothing and equipment are used.
2. Training and instruction necessary for performing tasks safely have been received.

(a) Both statements 1 and 2
(b) Neither statement 1 nor 2
(c) Only statement 1
(d) Only statement 2

Q127. What is the significance of the cut-off region in the output characteristic of a transistor?

(a) It indicates the region where the transistor is fully turned on.
(b) It indicates the maximum collector current.
(c) It indicates the minimum collector-emitter voltage.
(d) It indicates the region where the transistor is fully turned off.

Q128. How can a NOT gate be implemented using a 2-input NOR gate?

(a) It is not possible to create a NOT gate using a NOR gate.
(b) By connecting two NOR gates in parallel
(c) By connecting both inputs of the NOR gate to the same input signal
(d) By connecting two NOR gates in series

Q129. What does 'Light On' operation mean in a photoelectric switch?

(a) The photoelectric switch remains off regardless of light interruption.
(b) The photoelectric switch is energised when the beam of light reaches the receiver.
(c) The photoelectric switch is always on, even when an object is detected.
(d) The photoelectric switch is energised when the beam of light is interrupted.

Q130. Which of the following 'V' blocks will have one 'V' groove and two grooves (slots) on either side for clamping in two positions?

(a) Single level double groove V block
(b) Single level single groove 'V' block
(c) Matched pair 'V' block
(d) Double level single groove 'V' block

Q131. If a potential transformer has a turns ratio of 100: 1 and the primary voltage is 11 kV, what will be the secondary voltage?

(a) 1 V
(b) 110 V
(c) 1,100 V
(d) 11 V

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Q132. Which logic gate configuration can be used to implement the Boolean function F = [A.(B+C)] ?

(a) One AND gate, followed by a NOT gate and one OR gate
(b) One AND gate, followed by a NOT gate
(c) NOT gate, followed by one AND gate and one OR gate
(d) One OR gate, followed by one AND gate and one NOT gate

Q133. Which of the following colours is commonly used for caution signs?

(a) Blue
(b) Red
(c) Yellow
(d) Green

Q134. Which of the following calipers are used for marking lines, parallel to inside and outside edges and for locating the centre of round bars?

(a) Leg and point calipers
(b) Spring joint calipers
(c) Firm joint calipers
(d) Simple calipers

Q135. Which type of semiconductor has an excess of holes?

(a) p-type semiconductor
(b) Pure conductor
(c) Intrinsic semiconductor
(d) n-type semiconductor

Q136. In a logic circuit, two inputs A and B are applied to an AND gate, and the output of the AND gate is connected to the input of a NOT gate. If the inputs A and B are both at logic 0, what will be the output of the entire circuit?

(a) 1
(b) 0
(c) Undefined
(d) 2

Q137. Where should the probes be connected when measuring voltage in a circuit?

(a) Across the fuse only
(b) In series with the circuit
(c) In parallel with the circuit
(d) Across the circuit breaker only

Q138. Which of the following metals has the lowest melting point?

(a) Gold
(b) Lead
(c) Mercury
(d) Iron

Q139. The SI unit of temperature is/are _____

(a) kelvin
(b) both kelvin and celsius
(c) fahrenheit
(d) celsius

Q140. Which of the following types of errors can be minimised by proper instrument calibration?

(a) Random error
(b) Systematic error
(c) Observational error
(d) Gross error

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Q141. Which of the following statements is NOT correct for using scribers?

(a) While scribing lines, the scriber is used like a pencil.
(b) Do not put the scriber in your pocket
(c) Place a cork on the point when in use to prevent accidents.
(d) Scriber points are very sharp, so they are to be handled very carefully.

Q142. What is the effect of increasing the base current on the collector current in a transistor amplifier?

(a) The collector current becomes zero.
(b) The collector current remains constant.
(c) The collector current increases.
(d) The collector current decreases.

Q143. Select the correct statement regarding an antenna application.

(a) It is impossible to cover the VHF and UHF bands with the one antenna.
(b) It is possible to cover the VHF and UHF bands with the one antenna.
(c) A Yagi-Uda antenna does not contain a reflector and dipole as its component.
(d) A biconical antenna is not used for UHF signal.

Q144. If the length of a resistor is doubled, what happens to its resistance, assuming all other factors remain constant?

(a) The resistance is doubled
(b) The resistance is halved.
(c) The resistance quadruples.
(d) The resistance remains the same.

Q145. In the 8051 microcontroller, what is the memory address range reserved for Special Function Registers (SFRs)?

(a) 20h to 2Fh
(b) 80h to FFh
(c) 0000h to FFFFh
(d) 00h to 7Fh

Q146. Which type of line is used to represent hidden edges or surfaces in a technical drawing, as per BIS SP 46-2003?

(a) Dashed thin line
(b) Continuous thick line
(c) Continuous thin line
(d) Chain thin line

Q147. A basic inverting integrator using OP-AMP is unstable at low frequencies. What modification is commonly made to stabilise it?

(a) Add a resistor in series with the capacitor in the feedback path
(b) Use a low-power op-amp
(c) Increase the op-amp gain
(d) Add a resistor in parallel with the capacitor in the feedback path

Q148. For an 'N' bit uniform quantizer, the number of quantization levels is given by:

(a) 2^N
(b) N/2
(c) 2+N
(d) 2N

Q149. Which of the following types of chisels is used for separating metals after chain drilling?

(a) Flat chisel
(b) Cross-cut chisel
(c) Diamond point chisel
(d) Web chisel

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Q150. What is the SI unit of 'volume'?

(a) Millilitres
(b) Cubic centimetre
(c) Litres
(d) Cubic metre

Q151. Who is authorised to conduct road tests on workshop vehicles?

(a) Only trained and certified personnel
(b) The company accountant
(c) Any employee
(d) Visitors to the workshop

Q152. Which of the following is true about Port 0 in the 8051 microcontrollers?

(a) Port 0 can be used for both input and output operations, but requires external pull-
(b) Port 0 cannot be used for output operations.
(c) Port 0 is exclusively used for input only.
(d) Port 0 pins are not programmable.

Q153. In a PCM pulse code modulator, if the output of the encoder is 1 Byte sequence, then determine the number of bits of the encoder and number of quantization levels required by the quantizer.

(a) 8 and 64, respectively
(b) 16 and 128, respectively
(c) 16 and 64, respectively
(d) 8 and 256, respectively

Q154. What is the purpose of negative feedback in a voltage amplifier?

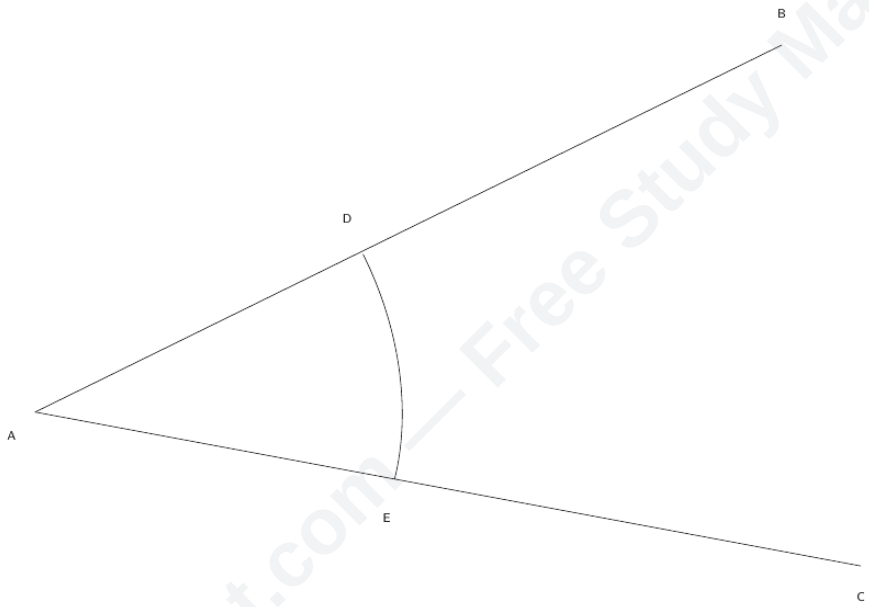
(a) To decrease the gain of the amplifier
(b) To increase the noise sensitivity of the amplifier
(c) To decrease the bandwidth of the amplifier
(d) To increase the gain of the amplifier

Q155. What is the correct way to connect a multimeter when measuring current in a circuit?

(a) In parallel with the circuit
(b) Across the power supply terminals
(c) In series with the circuit
(d) Across a resistor

Q156. In the process of bisecting angle BAC in the given figure, why do we draw arcs from points D and E?

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(a) To intersect above A
(b) To mark equal lengths
(c) To find midpoint AB
(d) To intersect line AC

Q157. Which of the following terms in the 5S concept refers to making a habit of maintaining the established procedures?
(a) Sustain
(b) Sort
(c) Shine
(d) Set

Q158. What is a DC LVDT?
(a) DC LVDT does not exist.
(b) It operates on AC power supply and has an AC output
(c) It operates on DC power supply and has an AC output
(d) It operates on DC power supply and has a DC output

Q159. Which of the following Boolean expressions represents the behaviour of a 3-input AND gate?
(a) (AB) + C
(b) A*B*C
(c) (A+B) C
(d) A+B+C

Q160. What happens when both the J and K inputs of a JK Flip-Flop are HIGH (1)?
(a) The output remains the same.
(b) The output is reset to 0.
(c) The output is set to 1.
(d) The output toggles.

Q161. Why should the highest voltage range be selected first when measuring an unknown voltage?
(a) To improve the response time of the display
(b) To protect the multimeter from damage
(c) To increase the measurement accuracy
(d) To save the battery power

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Q162. Convert 8.5% into a decimal.

(a) 0.85
(b) 85
(c) 0.085
(d) 8.5

Q163. What is the purpose of using a transistor in a relay driver circuit?

(a) To filter out noise
(b) To provide high input impedance in ON state
(c) To switch on the relay coil
(d) To amplify the input signal

Q164. What is the advantage of using a transistor as a switch in a digital circuit?

(a) High voltage gain
(b) High switching speed
(c) Low sensitivity
(d) High current gain

Q165. What precaution should be taken when measuring resistance in a circuit with 5 capacitors?

(a) Discharge the capacitors before testing.
(b) Measure resistance in AC mode.
(c) Use the highest resistance range.
(d) Reverse the test leads multiple times.

Q166. Which SFR in the 8051 is used to control the serial communication mode and baud rate?

(a) TMOD
(b) SMOD
(c) TCON
(d) SCON

Q167. Which of the following configurations is commonly used in Darlington amplifier circuits due to its high current gain and low input impedance?

(a) Common Emitter (CE)
(b) Common Collector (CC)
(c) Common Base (CB)
(d) Common Emitter with a Common Base stage (CE-CB)

Q168. Find the lateral surface area of a cube with side length 5 cm.

(a) 100 cm^3
(b) 125 cm^3
(c) 200 cm^3
(d) 150 cm^3

Q169. What happens to the conductivity of a semiconductor when it is heated?

(a) Conductivity remains constant
(b) Conductivity decreases
(c) Conductivity becomes zero
(d) Conductivity increases

Q170. What does 'traceability' in calibration mean?

(a) The instrument's accuracy depends on user experience
(b) The ability to track past measurements
(c) The calibration process is linked to an internationally recognised standard
(d) The ability to repeat measurements consistently

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Q171. The wave set of hacksaw teeth set has a pitch of _____

(a) 2.0 mm
(b) 1.0 mm
(c) 0.8 mm
(d) 0.5 mm

Q172. The generation of an electrostatic field is a characteristic of which type of sensor?

(a) Ultrasonic sensor
(b) Capacitive proximity sensor
(c) Inductive proximity sensor
(d) Optical sensor

Q173. A voltage amplifier has a gain of 20 and an input resistance of 1 ko. If the input signal is 0.1 V, what is the output voltage and the current drawn from the input signal source?

(a) Output voltage = 2 V, Input current = 0.1 mA
(b) Output voltage = 2 V, Input current = 3 mA
(c) Output voltage = 2 V, Input current = 1 mA
(d) Output voltage = 5 V. Input current = 0.1 mA

Q174. What is the primary disadvantage of using a digital frequency counter in high-frequency measurements?

(a) Increased power consumption
(b) Limited resolution at very high frequencies due to counting limitations
(c) High sensitivity to temperature variations
(d) Inability to measure AC voltages

Q175. "How many comparators are present in the internal block diagram of IC 555?

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

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

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171	**a**	**172**	**a**	**173**	**a**	**174**	**a**	**175**	**a**

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