

**Direction (Questions 1 to 3) :** Read the following passage carefully and answer the questions that follow :

**PASSAGE**

The last twenty years have witnessed an explosion of growth opportunities for women in industry, especially at the decision-making level. Today more and more young women have a chance to walk the competitive edge and prove that their abilities are at par with, if not better than, those of their male colleagues.

However, as they are beginning to storm the traditionally male bastions of management they are finding out that the roads to success are paved with difficulties. They discover very early in their career that the battle for supremacy in corporate organisations calls into play not only the forces of power, control and dominance, but issues of gender, attitude and acceptance of women.

1. The first sentence of the passage implies that job opportunities for women
  1. in industry have increased
  2. have increased
  3. in the corporate sector have increased
  4. at the managerial level have increased
2. According to the passage which of the following is the most appropriate fact about women in high positions ?
  1. They face no problems at all
  2. They face some problems
  3. They face problems due to issues related to roles of women in society
  4. They face problems related to power and control only
3. Which of the following phrases best reflects the meaning of 'male bastions' ?
  1. Management areas dominated by males
  2. Management abilities of males
  3. Management styles of males
  4. Careers for males

**Direction (Questions 4 to 5) :** In the following questions out of given alternatives, choose the one which best expresses the meaning of the given word

4. **INGENUOUS**

1. Cunning	2. Frank
3. Courteous	4. Clever
5. **ACCENTUATED**

1. Projected	2. Exhibited
3. Sharpened	4. Mitigated

**Direction (Questions 6 to 7) :** Each of the following questions consists of a sentence in which one word is written in bold. It is followed by some words. Select the word which is closest to the opposite in meaning to the word in bold

6. His **arrogant** behaviour made him successful in his trade
 

1. flattering	2. humble
3. polite	4. pleasant
7. His short but pointed speech was **applauded** by all sections of the audience
 

1. welcomed	2. misunderstood
3. praised	4. disapproved

**Direction (Questions 8 to 9) :** In the following questions pick out the most effective word from the given words to fill in the blank to make the sentence meaningfully complete

8. Some people \_\_\_\_\_ themselves into believing that they are indispensable to the organization they work for
 

1. denounce	2. force
3. denigrate	4. delude
9. Although he never learnt to read, his exceptional memory and enquiring mind eventually made him a very \_\_\_\_\_ man
 

1. dedicated	2. erudite
3. pragmatic	4. charismatic

**Direction (Questions 10 to 11) :** In the following questions an idiomatic expression has been given followed by some alternatives. Choose the one which best expresses the meaning of the given idiom

10. To be at loggerheads
  1. To have tough encounter
  2. To be at enmity or strife
  3. To face stiff opposition
  4. To tax one's mind and body
11. To wash one's dirty linen in public
  1. To criticise one's nature in public
  2. To quarrel in the open
  3. To do some ugly work in public
  4. To discuss dirty and scandalous matters of personal nature in the presence of strangers

**Direction (Questions 12 to 13) :** In the following questions find out which one of the words given below the sentence can most appropriately replace the group of words italicised in the sentence

12. The officer was *not willing to take a definite stand on the point*

1. vague	2. evasive
3. ambiguous	4. complex

13. The advertisement assured the public that the medicine would *give back to the users, their youthful vigour and appearance*

- |               |            |
|---------------|------------|
| 1. rejuvenate | 2. restore |
| 3. replenish  | 4. render  |

**Direction (Questions 14 to 15):** In the following questions you are provided with the first and last part of a sentence. The remaining sentence is broken into four parts labelled P, Q, R and S. You are required to arrange these parts so as to form a complete meaningful sentence and then choose the correct combination

14. 1. The social groups in power  
P. especially when these happen to depend upon the state  
Q. have always manipulated the education systems  
R. for their very existence,  
S. to strengthen and perpetuate  
6. their own privileged position.  
1. QPRS                      2. QRPS  
3. QSRP                      4. SPQR

15. 1. There are people  
P. to be able to say  
Q. not because they enjoy the book,  
R. who read a book  
S. but because they want  
6. that they have read it  
1. PSQR                      2. RQSP  
3. RSPQ                      4. SQPR

16. Three numbers are in the ratio of 3 : 4 : 6 and their product is 1944. The largest of these numbers is  
1. 6                              2. 12  
3. 18                             4. 21

17. In a two-digit number, the sum of the digits is 15. If 9 is added to the number, the digits are reversed. The number is  
1. 96                             2. 87  
3. 78                             4. 69

18. The length of a train and that of a platform are equal. If with a speed of 90 km/hr, the train crosses the platform in one minute, then the length of the train (in metres) is  
1. 500                            2. 600  
3. 750                            4. 900

19.  $8^{2/3}$  is equal to  
1.  $5\frac{1}{2}$                             2.  $21\frac{1}{3}$   
3. 4                                4.  $3\frac{1}{3}$

20. If the area of a triangle is  $1176 \text{ cm}^2$  and base : corresponding altitude is 3 : 4, then the altitude of the triangle is

- |          |          |
|----------|----------|
| 1. 42 cm | 2. 52 cm |
| 3. 54 cm | 4. 56 cm |

21.  $1 + 1 \div \left\{ 1 + 1 \div \left( 1 + \frac{1}{3} \right) \right\}$  is equal to

- |                   |                   |
|-------------------|-------------------|
| 1. $1\frac{1}{3}$ | 2. $1\frac{4}{7}$ |
| 3. $1\frac{1}{8}$ | 4. $1\frac{2}{3}$ |

22. The age of Anu's father is four times his age. If 5 years ago, the father's age was seven times the age of his son at that time, what is Anu's father's present age ?

- |             |             |
|-------------|-------------|
| 1. 35 years | 2. 40 years |
| 3. 70 years | 4. 84 years |

23. Which of the following numbers should be added to 11158 to make it exactly divisible by 77 ?

- |      |      |
|------|------|
| 1. 9 | 2. 8 |
| 3. 7 | 4. 5 |

24. Profit after selling a commodity for Rs 425 is the same as the loss after selling it for Rs 355. What is the cost of the commodity ?

- |            |            |
|------------|------------|
| 1. Rs. 385 | 2. Rs. 390 |
| 3. Rs. 395 | 4. Rs. 400 |

25. A and B can do a job in 6 and 12 days respectively. They began the work together but A leaves after 3 days. Then the total number of days needed for the completion of the work is

- |      |      |
|------|------|
| 1. 4 | 2. 5 |
| 3. 6 | 4. 9 |

26.  $\frac{2}{3}$  is what percent of  $\frac{1}{3}$ ?

- |        |                    |
|--------|--------------------|
| 1. 50  | 2. $33\frac{1}{3}$ |
| 3. 150 | 4. 200             |

27. The sum of two numbers is 40 and their difference is 4. The ratio of the numbers is

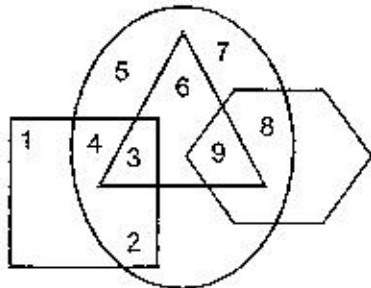
- |            |            |
|------------|------------|
| 1. 21 : 19 | 2. 22 : 9  |
| 3. 11 : 9  | 4. 11 : 18 |

28. The diameter of a toy wheel is 14 cm. What is the distance travelled by it in 15 revolutions ?

- |           |           |
|-----------|-----------|
| 1. 880 cm | 2. 660 cm |
| 3. 600 cm | 4. 560 cm |

29. The average of 9 numbers is 30. The average of first 5 numbers is 25 and that of the last 3 numbers is 35. What is the 6th number ?
1. 20
  2. 30
  3. 40
  4. 50
30. What is the difference of simple and compound interest on sum of Rs. 12500 for two years @ 4 percent per annum ?
1. Rs. 230
  2. Rs. 20
  3. Rs. 45
  4. Rs. 125
31. Kailash faces towards north. Turning to his right, he walks 25 metres. He then turns to his left and walks 30 metres. Next, he moves 25 metres to his right. He then turns to his right again and walks 55 metres. Finally, he turns to the right and moves 40 metres. In which direction is he now from his starting point ?
1. South-west
  2. South
  3. North-west
  4. South-east

**Direction (Questions 32 to 33) :** Study the figure given below carefully and answer the questions that follow :



32. Which number belongs to all the figures ?
1. 3
  2. 4
  3. 6
  4. None of these
33. What is the product of the numbers which belong to two figures only ?
1. 64
  2. 192
  3. 384
  4. None of these
34. Answer the given question based on the following English alphabet:
- A B C D E F G H I J K L M N O  
P Q R S T U V W X Y Z
- If the above alphabet is arranged in reverse order, which letter will be twelfth to the left of the sixteenth letter from your left ?
1. D
  2. V
  3. W
  4. X

35. In a class of 60, where girls are twice that of boys, Kamal ranked seventeenth from the top. If there are 9 girls ahead of Kamal, how many boys are after him in rank ?
1. 3
  2. 7
  3. 12
  4. 23

**Direction (Questions 36 to 37) :** Find the missing term in the following :

- 36.
- |           |           |            |
|-----------|-----------|------------|
| 64        | 125       | 216        |
| 1 (10) 27 | 8 (14) 64 | 27 (?) 125 |
| 8         | 27        | 64         |
1. 2
  2. 9
  3. 17
  4. 18
37. J2Z, K4X, I7V, ?, H16R, M22P
1. i11T
  2. L11S
  3. L12T
  4. L11T

**Direction (Questions 38 to 39) :** In the following questions below is given a statement followed by two assumptions numbered I and II. You have to consider the statement and the following assumptions and decide which of the assumptions is implicit in the statement. Give Answer (1) if only assumption I is implicit; (2) if only assumption II is implicit; (3) if either I or II is implicit; (4) if neither I nor II is implicit.

38. **Statement :** Detergents should be used to clean clothes.
- Assumptions :**
- i. Detergents form more lather.
  - ii. Detergents help to dislodge grease and dirt.
39. **Statement :** "Computer education should start at schools itself."
- Assumptions :**
- I. Learning computers is easy.
  - II. Computer education fetches jobs easily.

**Direction (Questions 40 to 41) :** In each of the following questions, there is some relationship between the two terms to the left of :: and the same relationship holds between the two terms to its right. Find out the missing term

40. 25 : 37 :: 49 : ?
1. 41
  2. 56
  3. 60
  4. 65
41. FILM : ADGH :: MILK : ?
1. ADGF
  2. HDGE
  3. HDGF
  4. HEFG

# A

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42. Which of the following will be a number of the series 10, 17, 24, 31, 38, .....
1. 48
  2. 346
  3. 574
  4. 1003
43. Given that
- i. A is the mother of B;
  - ii. C is the son of A;
  - iii. D is the brother of E;
  - iv. E is the daughter of B
- The grandmother of D is
1. A
  2. B
  3. C
  4. E
- Direction (Questions 44 to 45) :** Read the following information to answer the given questions :
- Seven children A, B, C, D, E, F and G are standing in a line. G is to the right of D and to the left of B. A is on the right of C. A and D have one child between them. E and B have two children between them. D and F have two children between them.
44. Who is on the extreme right ?
1. B
  2. E
  3. F
  4. G
45. Who is exactly in the middle ?
1. A
  2. C
  3. D
  4. E
46. Adjournment Motions in Lok Sabha are moved with
1. the Speaker's consent
  2. the President's consent
  3. the Prime Minister's consent
  4. both 1 and 2
47. JEEVIKA, is the rural livelihoods project of which of the following State Governments ?
1. West Bengal
  2. Bihar
  3. Punjab
  4. Uttar Pradesh
48. Who abandoned the policy of wars after his conquest over Kalinga ?
1. Harsha
  2. Samudragupta
  3. Ashoka
  4. Chandragupta
49. Which part of the body does pneumonia affect ?
1. Brain
  2. Heart
  3. Kidneys
  4. Lungs
50. What is the name of the physicist who originated and developed quantum theory ?
1. Albert A. Michelson
  2. Max Planck
  3. Ernest O. Lawrence
  4. Heinrich Hertz
51. What is the title character's name in Shakespeare's 'The Merchant of Venice' ?
1. Antonio
  2. Balthasar
  3. Bassanio
  4. Shylock
52. Name the Indian badminton player who won the Indonesian Badminton Masters Grand Prix Gold on 14 September 2014
1. Saina Nehwal
  2. Firman Abdul Kholik
  3. Arvind Bhat
  4. HS Prannoy
53. International Day for the preservation of the ozone layer is observed on ?
1. 14 September
  2. 16 September
  3. 18 September
  4. 25 December
54. Where was the G-20 Labour and Employment Ministerial Level Meet held in 2014 ?
1. Geneva
  2. Melbourne
  3. Perth
  4. India
55. The 18<sup>th</sup> Asian Games in 2018 will be held in
1. Doha, Qatar
  2. Incheon, South Korea
  3. Jakarta, Indonesia
  4. Guangzhou, China
56. Which of the following was Satyajit Ray associated with ?
1. Commercial art
  2. Classical music
  3. Film Direction
  4. Classical dance
57. Amjad Ali Khan is associated with which of the following musical instruments ?
1. Sarod
  2. Veena
  3. Violin
  4. Sitar
58. Who is the winner of Nobel Peace Prize for the year 2014 ?
1. Barack Obama
  2. Kailash Satyarthi
  3. Liu Xiaobom
  4. Leymah Gbowee
59. Which of the following is a cultural organisation ?
1. UNESCO
  2. ILO
  3. WHO
  4. FAO
60. Which one of the following is **not** a Fundamental right guaranteed in the Constitution of India ?
1. Right to Equality
  2. Right to Freedom
  3. Right to Property
  4. Right against exploitation

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61. The breaking capacity of a circuit breaker in MVA can be derived using which one of the following formula ?
1.  $\sqrt{3} I.V \times 10 E - 6$  MVA
  2.  $\sqrt{3} I/V \times 10 E - 6$  MVA
  3.  $\sqrt{3} I.V \times 10 E$  6 MVA
  4.  $\sqrt{3} I/V \times 10 E$  6 MVA
62. As the load on the induction motor is increased
1. power factor goes on increasing upto 75% load and then decreases
  2. power factor goes on increasing even beyond rated load
  3. power factor goes on increasing upto rated load and then it starts decreasing
  4. power factor remains unchanged
63. Slip ring induction motor is preferred to squirrel cage induction motor when the main concern is
1. initial cost
  2. high starting torque
  3. power factor
  4. maintenance cost
64. In a synchronous machine if terminal voltage is lagging the excitation voltage, then
1. it may either be synchronous motor or generator
  2. it can only be synchronous generator
  3. it is definitely synchronous motor
  4. none of these
65. A synchronous motor is loaded at its rated value and working on the lagging power factor. Suddenly load is removed, then the power factor
1. remains lagging
  2. becomes unity
  3. becomes leading
  4. does not change
66. A long transmission line experiences Ferranti effect when the line is on
1. full load at unity power factor
  2. half-load at 0.8 p.f. lag
  3. light load
  4. all of these
67. The ratio of symmetrical breaking current to the rated normal current in an OCB is 45. The short time rating of this OCB will be
1. 3 sec.
  2. 5 sec.
  3. 0.5 sec.
  4. 1 sec.
68. The rotor of an induction motor can never run at synchronous speed because then the relative speed between the rotating flux and the rotor will be
1. maximum and hence the torque will be maximum
  2. maximum and hence the torque will be zero
  3. zero and hence the torque will be maximum
  4. zero and hence the torque will be zero
69. Two single phase transformers with equal turns have impedance of  $(0.5 + j 0.3)$  ohms and  $(0.6 + j 10)$  ohms with respect to the secondary. If they operate in parallel, how will they share a load of 100 kW at 0.8 p.f. lagging ?
1. 50 kW, 50 kW
  2. 62 kW, 38 kW
  3. 78.2 kW, 21.8 kW
  4. 85.5 kW, 14.5 kW
70. The losses on a transformer are
- A. copper losses
  - B. eddy current losses
  - C. hysteresis losses
- The constant power loss of a transformer loss is given by
1. A only
  2. A and B
  3. B and C
  4. A, B and C
71. Which of the following will improve the mutual coupling between primary and secondary circuits ?
1. Transformer oil of high breakdown voltage
  2. High reluctance magnetic core
  3. Winding material of high resistivity
  4. Low reluctance magnetic core
72. The secondary of a current transformer under operating conditions is short circuited to avoid
1. break in primary winding
  2. insulation breakdown
  3. core saturation and high voltage induction
  4. high voltage surge
73. Use of mechanical ash precipitator and electrostatic precipitator in a boiler helps to extract \_\_\_\_\_ of fly ash content in the flue gases
1. 75%
  2. 84%
  3. 92%
  4. 97%
74. Which of the following statements are true of a type 1 system having unity gain in the forward path and unity feedback ?
- A. Position error constant  $K_p$  is equal to infinity
  - B. Acceleration error constant  $K_a$  is equal to zero
  - C. Steady state error to unit step displacement input is equal to 1
- Choose the correct option :
1. A, B and C
  2. A and B
  3. B and C
  4. A and C
75. No load current of a transformer is 6A at 0.3 power factor when supplied at 440 V, 50 Hz. The number of turns on the primary is 250. What is the magnetizing component ?
1. 5.72A
  2. 6A
  3. 1.8A
  4. None of these

76. Given the transfer function  $G(s) = \frac{121}{s^2 + 13.2s + 121}$  of a system. It has which of the following characteristics ?
1. Over damped and settling time 1.1 sec
  2. Under damped and settling time 0.6 sec
  3. Critically damped and settling time 0.8 sec
  4. Under damped and settling time 0.707 sec
77. If ramp input is supplied to a type 2 system, the steady state error is
1. positive infinity
  2. negative constant
  3. zero
  4. positive constant
78. The response of a second order to a step input is obtained as  $c(t) = 1.66 e^{-6t} \sin(6t + 37^\circ)$ . The damping ratio is
1. 0.4
  2. 0.5
  3. 0.8
  4. 1.0
79. The unit step response of a second order linear system with zero initial states is given by  $c(t) = 1 - 1.25e^{-6t} \sin(8t + \tan^{-1} 1.333)$ ,  $t > 0$ . The damping ratio and the undamped natural frequency of oscillation of the system are respectively
1. 0.6 and 10 rad/sec
  2. 0.6 and 12.5 rad/sec
  3. 0.8 and 10 rad/sec
  4. 0.8 and 12.5 rad/sec
80. If a second order system has poles at  $-1 + j$  and  $-1 - j$ , then step response of the system will exhibit a peak value at
1. 4.5 sec
  2. 3.5 sec
  3. 3.14 sec
  4. 1.0 sec
81. Distribution transformers are usually designed to have maximum efficiency near
1. full load
  2. 75% full load
  3. 50% full load
  4. no load
82. To avoid breakdown of transformers under surges any one of the following except one may be adopted
1. use of surge absorbers
  2. use of surge diverters
  3. use of metal shields
  4. reinforcement of end turn insulation
83. A linear second order system with the transfer function  $G(s) = \frac{49}{s^2 + 16s + 49}$  is subjected to a step input. The response of the system will exhibit a peak overshoot of
1. 16%
  2. 9%
  3. 2%
  4. 0
84. If the characteristic equation of a system, is  $s^3 + 14s^2 + 56s + k = 0$ , then it will be stable only if
1.  $0 < k < 784$
  2.  $1 < k < 64$
  3.  $10 > k < 660$
  4.  $4 < k < 784$
85. Bundling of conductors becomes necessary at and above the transmission voltage of
1. 132 kV
  2. 220 kV
  3. 400 kV
  4. 66 kV
86. Which of the following are the minimum specified dimensions of the earthing plate ?
1. 90 cm x 90 cm x 12.5 mm
  2. 90 cm x 90 cm x 6.36 mm
  3. 60 cm x 60 cm x 12.5 mm
  4. 60 cm x 60 cm x 6.36 mm
87. An induction motor, in general, is analogous to
1. an auto-transformer
  2. a two-winding transformer with its secondary open-circuited
  3. a two-winding transformer with its secondary short-circuited
  4. a three-winding transformer
88. In geo-thermal power generator, the water taken from deep well pump can be used for power generation by feeding it to turbine
1. directly since it has sufficient temperature
  2. after super heating in boiler
  3. after sending to condenser pre heater
  4. after sending to liquid heating first
89. Bio mass fuels used in India have very big share in the total fuel used in the country. What is the share of biomass as compared to total fuel used in the country ?
1. One-half
  2. One-third
  3. One-fourth
  4. One-tenth
90. For a slip-ring induction motor, if the rotor resistance is increased, then the
1. starting torque and efficiency increases
  2. starting torque and efficiency decreases
  3. starting torque decreases but efficiency increases
  4. starting torque increases but efficiency decreases
91. In power station practice "spinning reserve" is
1. reserve generating capacity that is in operation but not in service
  2. reserve generating capacity that is connected to bus and ready to take load
  3. reserve generating capacity that is available for service but not in operation
  4. capacity of the part of the plant that remains under maintenance

92. The double-cage rotors are used to
1. improve efficiency
  2. increase pull-out torque
  3. increase starting torque
  4. reduce rotor core losses
93. For starting squirrel cage induction motors, reactors are preferred over resistors because
1. reactors increase the starting torque
  2. reactors improve the starting power factor
  3. reactors incur less power loss and effectively reduce the applied voltage to the motor
  4. of none of these
94. Which variety of coal has lowest calorific value ?
1. Steam coal
  2. Bituminous coal
  3. Lignite
  4. Anthracite
95. Ball mills are used in power plants using
1. multi stage expansion
  2. water softening
  3. fly ash removal from flue gases
  4. pulverized fuel firing
96. Topping turbines are
1. high pressure non condensing units installed in existing plants to exhaust into existing low pressure turbines
  2. those which divert major parts of the throttle steam at intermediate stages of the turbine for process unit
  3. those that introduce and remove steam into the turbine after the throttle
  4. all of these
97. In an interconnected system consisting of a nuclear power plant station, steam station and diesel generation station, which plant can be used as base load plant ?
1. Steam station
  2. Diesel generation plant
  3. Nuclear power station
  4. Any of these
98. During load shedding
1. system voltage is reduced
  2. system frequency is reduced
  3. some loads are switched off
  4. system power factor is changed
99. The function of steel wire in ACSR conductor is to
1. take care of surges
  2. prevent corona
  3. reduce inductance and hence improve power factor
  4. provide additional mechanical strength
100. Steepness of the traveling wave is attenuated by
1. resistance of the line
  2. inductance of the line
  3. capacitance of the line
  4. all of these
101. A 300 m long, 2 wire distributor is fed from both ends and is uniformly loaded at the rate of 2 A per m. Assuming the resistance of each conductor to be  $0.15 \Omega$  per km, what is the voltage at both ends for a minimum voltage of 230 V at consumer's point (middle of the line) ?
1. 240.5 V
  2. 215.5 V
  3. 228.65 V
  4. 236.75 V
102. Which of the following statements about  $SF_6$  gas is incorrect ?
1. It is non toxic gas
  2. It is non inflammable gas
  3. It has density five times that of air at  $20^\circ C$
  4. It has dark yellow colour
103. Surge impedance of the overhead transmission line is of the order of
1. 20 to 30 ohms
  2. 300 to 500 ohms
  3. 3000 to 5000 ohms
  4. 30 k-ohm to 300 k-ohm
104. Smooth speed control of induction motors can be obtained by
1. variation of rotor resistance
  2. variation of supply frequency
  3. rotor slip power control
  4. both variation of supply frequency and rotor slip power control
105. The rotor of a hysteresis motor
1. is made of chrome steel
  2. has high retentivity
  3. has high hysteresis loss
  4. should have all of these
106. A semi conductor read only memory basically is a
1. sequential circuit with flip flop
  2. sequential circuit with flip flop and gate
  3. set of flip flop memory elements
  4. combinational logic circuit
107. Semi conductor A has a higher band gap than semi conductor B. If both A and B have the same dimension, the same number of electrons at a given temperature and the same electron and hole mobilities, then
1. A has the same number of holes as B
  2. A has a larger number of holes than B
  3. A has less number of holes than B
  4. any of the above statements could be true

# A

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108. A 100 V voltmeter has an accuracy of 5% on full scale. The percentage error while measuring 50 V will be
1. 2.5%
  2. 5%
  3. 7.5%
  4. 10%
109. In a piezo-electric crystal oscillator, the oscillation or tuning frequency is linearly proportional to the
1. mass of crystal
  2. square root of the mass of crystal
  3. square of the mass of crystal
  4. inverse of the square root of the mass of crystal
110. Some electrons are injected into the interior of a conductor surrounded by an insulator. The injected electrons will
1. distribute themselves uniformly
  2. distribute themselves randomly
  3. be confined at the point of injection
  4. travel to the surface of the conductor
111. Consider the following statements :  
In the case of diamagnetic materials, the magnetic susceptibility is
- A. positive
  - B. negative
  - C. independent of temperature
  - D. inversely proportional to temperature
- Of these statements,
1. A and C are correct
  2. B and C are correct
  3. A and D are correct
  4. B and D are correct
112. In certain temperature range the electrical conductivity of a semi conductor increases with increase in temperature. This is because
1. both carrier concentration and mobility of carriers increase with increasing temperature
  2. both carrier concentration and mobility of carriers decrease with increasing temperature
  3. the carrier concentration increases substantially but the mobility of carrier decreases with increasing temperature
  4. the carrier concentration remains constant but the mobility of carrier increases with increasing temperature
113. Visible spectrum to human eye falls in the range of
1. 360 nm to 780 nm
  2. 380 nm to 760 nm
  3. 320 nm to 700 nm
  4. 280 nm to 680 nm
114. A satellite carrying antenna system, transmitter, receiver and power supplying system is known as
1. geo stationary satellite
  2. orbital satellite
  3. active satellite
  4. passive satellite
115. For dc motors a dual converter used for the speed control of dc motors will have two bridges, they are
1. two rectifiers
  2. two inverters
  3. one rectifier and one inverter
  4. none of these
116. Which of the following is UHF ?
1. 40 GHz
  2. 400 MHz
  3. 440 kHz
  4. 40 kHz
117. In two wattmeter method of measurement of power, if power factor is 0.5 then one of the watt meters will read
1. zero
  2.  $W/2$
  3.  $W/\sqrt{2}$
  4.  $W/\sqrt{3}$
118. The smallest change in sound intensity that can be detected is
1. 1 dB
  2. 3 dB
  3. 10 dB
  4. 20 dB
119. Colour rendering index of a sodium vapour lamp is
1. excellent
  2. good
  3. poor
  4. indeterminate
120. A single instruction to clear the lower 4 bits of the accumulator in 8085 assembly language is
1. XRI OFH
  2. ANI FOH
  3. XRI FOH
  4. ANI OFH
121. Turn-on time of an SCR in series with RL circuit can be reduced by
1. increasing circuit resistance R
  2. decreasing R
  3. increasing circuit inductance L
  4. decreasing L
122. Underground cables are laid at sufficient depth
1. to avoid being unearthed easily due to removal of soil
  2. to minimize temperature stresses
  3. to minimize the effect of shocks and vibrations due to passing vehicles etc.
  4. for all the above reasons
123. The average on state current for an SCR is 20 A for a resistance load. If an inductance of 5 mH is included in the load, then average on state current would be
1. more than 20 A
  2. less than 20 A
  3. 15 A
  4. 20 A



# A

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124. Which type of wattmeter **cannot** be used for both ac and dc ?
1. Dynamometer type
  2. Electrostatic type
  3. Induction type
  4. None of these
125. In a UJT, maximum value of charging resistance is associated with
1. peak point
  2. valley point
  3. any point between peak and valley points
  4. after the valley point
126. When a UJT is used for triggering an SCR, the wave shape of the voltage obtained from UJT circuit is
1. sine wave
  2. saw-tooth wave
  3. trapezoidal wave
  4. square wave
127. A metal oxide varistor (MOV) is used for protecting
1. gate circuit against over currents
  2. gate circuit against over voltages
  3. anode circuit against over currents
  4. anode circuit against over voltages
128. For a pulse transformer, the metal used for its core and the possible turn-ratio from primary to secondary are, respectively
1. ferrite; 20 : 1
  2. laminated iron; 1 : 1
  3. ferrite; 1 : 1
  4. powdered iron; 1 : 1
129. In single pulse modulation of PWM inverters, third harmonic can be eliminated if pulse width is equal to
1.  $30^\circ$
  2.  $60^\circ$
  3.  $120^\circ$
  4.  $150^\circ$
130. A single phase half wave controlled rectifier has  $400 \sin 314t$  as the input voltage and R as the load. For a firing angle of  $60^\circ$  for the SCR, the output voltage is
1.  $400 / \pi$
  2.  $300 / \pi$
  3.  $250 / \pi$
  4.  $200 / \pi$
131. For a synchronous phase modifier the load angle is
1.  $30^\circ$
  2.  $0^\circ$
  3.  $45^\circ$
  4. none of these
132. Two voltmeters A and B having resistances  $5000 \Omega$  and  $10000 \Omega$  respectively, are connected in series across a 240 V supply. The voltage across two voltmeters will be
1.  $V_A = 240 \text{ V}; V_B = 240 \text{ V}$
  2.  $V_A = 120 \text{ V}; V_B = 120 \text{ V}$
  3.  $V_A = 60 \text{ V}; V_B = 180 \text{ V}$
  4.  $V_A = 180 \text{ V}; V_B = 60 \text{ V}$
133. Which of the following circuit breakers will produce least arc energy ?
1. Minimum oil circuit breaker
  2. Air blast circuit breaker
  3. Plain oil circuit breaker
  4. All will produce the same energy
134. In a single-phase semi converter with resistive load and for a firing angle  $\alpha$ , each SCR and freewheeling diode conduct, respectively, are for
1.  $\alpha, 0^\circ$
  2.  $\pi - \alpha, \alpha$
  3.  $\alpha, \alpha + \pi$
  4.  $\pi - \alpha, 0^\circ$
135. Differential relays are used to protect the equipment against
1. internal faults
  2. reverse current
  3. over current
  4. none of these
136. The number of electrons passed in 1 minute and 20 sec. through cross section of a conductor is  $5 \times 10^{16}$ . The current flowing through wire is
1. 1 mA
  2. 0.1 mA
  3. 0.01 mA
  4. 10 mA
137. An incandescent lamp taking 3.5 A at 100 V emits 6000 lumens. What is its efficacy in lumens per watt?
1. 60
  2. 17.1
  3. 171
  4. 600
138. Which of the following bridges can be used for the measurement of dielectric loss of a capacitor ?
1. Schering
  2. Heaviside Campbell equal ratio voltage
  3. Owen
  4. None of these
139. A lamp has an intensity of 1000 candela in every direction below the horizontal and zero above the horizontal. The total radiation sent vertically downwards is
1. 314 lumens
  2. 31.4 lumens
  3. 3140 lumens
  4. 31400 lumens
140. The resonant frequency for parallel circuit containing 8 H inductance and a 20 micro F capacitor will be
1. 12.6 Hz
  2. 126 Hz
  3. 1.26 kHz
  4. none of these