TPSC JE Gr-VA

Previous Year Paper
(Electrical)
08 Oct, 2023

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO.

TR/SET/ELECTRICAL/PRE/DEGREE/2023

Test Booklet Series

TEST BOOKLET

GENERAL STUDIES & ENGINEERING APTITUDE

A

_____
(Signature of the Candidate)

_____
(Invigilator's Signature)

Time Allowed : Two (2) hours

Maximum Marks : 100

INSTRUCTIONS

1. PLEASE CHECK THE TEST BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.

2. **ENCODE CLEARLY THE TEST BOOKLET SERIES A,B,C OR D AS THE CASE MAY BE IN THE APPROPRIATE PLACE IN THE ANSWER SHEET BY BLACK BALL POINT PEN ONLY.**

3. This Test Booklet contains 100 items (questions). Each question has four responses (answers). You will select the responses which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the most appropriate. In any case, choose ONLY ONE response for each item.

4. You have to mark all your responses ONLY on the separate Answer Sheet provided. See directions in the Answer Sheet.

5. All items carry equal marks.

6. Before you proceed to mark in the Answer Sheet the responses to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.

7. After you have completed filling in responses on the Answer Sheet and the Examination is completed, you should handover the Answer Sheet to the Invigilator only. You are permitted to take away the Test Booklet.

8. Sheets for rough work are appended on the Test Booklet at the end.

9. **Penalty for wrong answers :**

    (a) There will be four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-fourth** of the marks assigned to that question will be deducted as penalty.

    (b) If a candidate gives more than one answer, it will be treated as a **Wrong Answer** even if one of the given answers happens to be correct and there will be same penalty as above to that question.

    (c) If a question is left blank, i.e., no answer is given by the candidate, there will be **no penalty** for that question.

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Four options are given against each of the following questions. Select the correct option from the four options and encode it in the Answer Sheet by using **Black Ball Point Pen** only as per example given below :

Example : P : Aunt Polly wanted to trap Tom ——— damaging confessions.

    (A) into   **(B)** with   **(C)** by   **(D)** on

Example Q : Let's watch ——— movie ; I mean 'Pather Panchali'.

    (A) a   **(B)** an   **(C)** the   **(D)** no article is needed

PART – A

Direction for Question Nos. 1 to 4

Choose the most appropriate preposition/article to fill in the blanks.

1. Mosquitoes breed _____ stagnant water.

    (A) in   **(B)** on

    (C) into   **(D)** under

2. He has a shop in the market where he deals ____ wheat.

    (A) with   **(B)** in

    (C) at   **(D)** of

3. What did you do with ____ camera, I lent you ?

    (A) a   **(B)** an

    (C) the   **(D)** no article is needed

4. Bring me _____ umbrella that is lying on the bed.

(A) an

(B) the

(C) a

(D) No article is needed

Direction for Question Nos. 5 and 6

Choose from the given options / words most opposite in meaning to the underlined words in the following sentences :

5. He spares no pain to come out of this problem.

(A) Doubt

(B) Pleasure

(C) Anger

(D) Hesitation

6. He confessed that he had stolen the money.

(A) Denied

(B) Refused

(C) Opposed

(D) Reacted

Direction for Question Nos. 7 and 8

Choose the most appropriate Synonym for the underlined words in the sentences :

7. Oil is one of the principal sources of energy.

(A) most expensive

(B) most important

(C) most difficult

(D) most popular

8. The road will be closed until the blizzard ends.

(A) snowstorm

(B) hurricane

(C) tornado

(D) thunderstorm

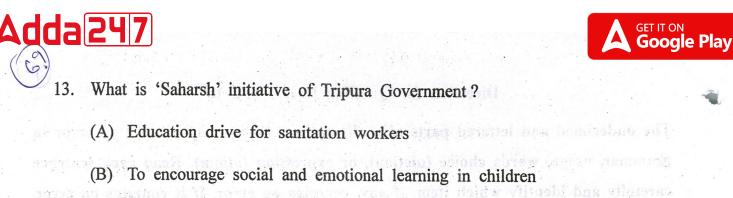**Direction for Question Nos. 9 and 10**

The underlined and lettered parts of each sentence below may contain an error in grammar, usage, words choice (diction), or expression (idiom). Read each sentence carefully and identify which item, if any, contains an error. If it contains no error, answer is D.

9. I hope   you'll come   in Spain   soon   No error
       A   B   C   D

(A) I hope   (B) in

(C) soon   (D) No error

10. I shall buy one of the radios   that is on sale.   No error
        A   B   C   D

(A) I shall   (B) one of

(C) that is   (D) No error

11. 'Sethusamudram Project' will connect the Palk strait with

(A) Gulf of Khambat   (B) Gulf of Kutch

(C) Gulf of Mannar   (D) None of these

12. What is 'Angel Tax'?

(A) Tax on sales   (B) Tax on individual income

(C) Tax on Capital Gains   (D) Tax on start ups

13. What is 'Saharsh' initiative of Tripura Government ?

(A) Education drive for sanitation workers

(B) To encourage social and emotional learning in children

(C) Financial help for poor

(D) Drive against child marriages

14. Which institution is a watchdog for money laundering and terror financing and issues 'Grey List' :

(A) WHO   (B) IMF

(C) FATF   (D) WTO

15. Which institution has commissioned India's first green hydrogen blending project ?

(A) ONGC   (B) GAIL

(C) NTPC   (D) IOL

16. Which State of India has become country's Fully Digital Banking State according to SLBC ?
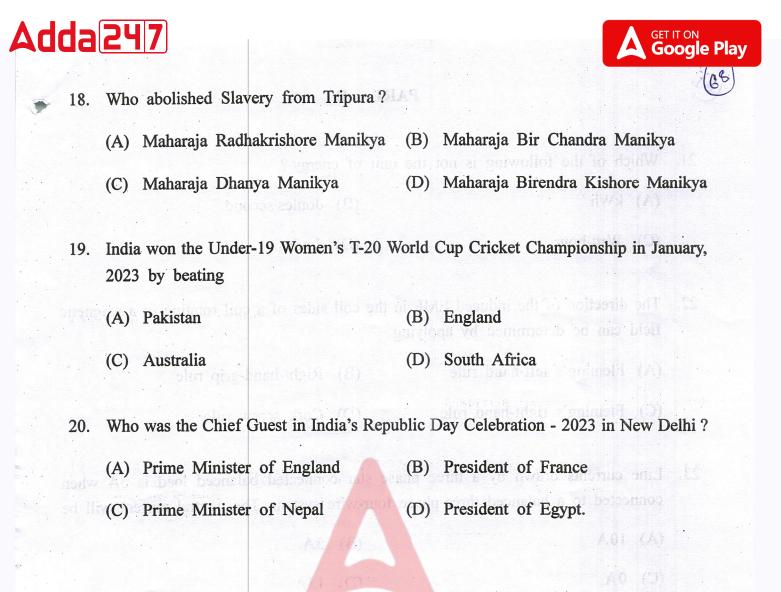
(A) Kerala   (B) Assam

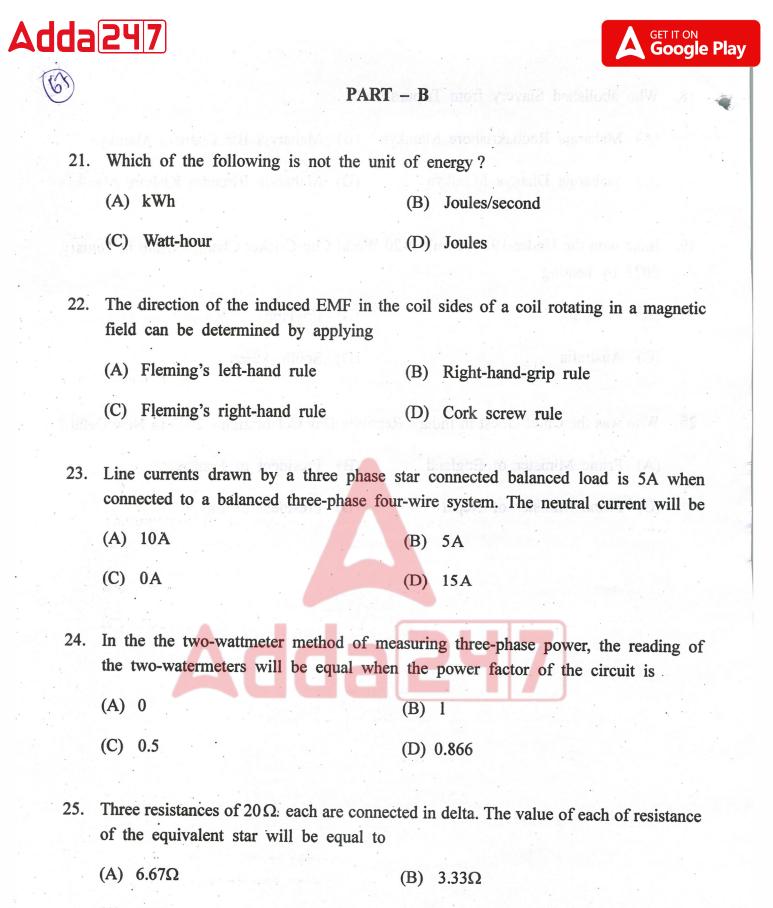(C) Uttar Pradesh   (D) Punjab

17. The Tripura Merger Agreement was signed in New Delhi on

(A) 15th October, 1949   (B) 15th August, 1947

(C) 9th September, 1949   (D) 26th November, 1949

18. Who abolished Slavery from Tripura ?

(A) Maharaja Radhakrishore Manikya   (B) Maharaja Bir Chandra Manikya

(C) Maharaja Dhanya Manikya   (D) Maharaja Birendra Kishore Manikya

19. India won the Under-19 Women's T-20 World Cup Cricket Championship in January, 2023 by beating

(A) Pakistan   (B) England

(C) Australia   (D) South Africa

20. Who was the Chief Guest in India's Republic Day Celebration - 2023 in New Delhi ?

(A) Prime Minister of England   (B) President of France

(C) Prime Minister of Nepal   (D) President of Egypt.

PART – B

21. Which of the following is not the unit of energy ?

   (A) kWh   (B) Joules/second

   (C) Watt-hour   (D) Joules

22. The direction of the induced EMF in the coil sides of a coil rotating in a magnetic field can be determined by applying

   (A) Fleming's left-hand rule   (B) Right-hand-grip rule

   (C) Fleming's right-hand rule   (D) Cork screw rule

23. Line currents drawn by a three phase star connected balanced load is 5A when connected to a balanced three-phase four-wire system. The neutral current will be

   (A) 10A   (B) 5A

   (C) 0A   (D) 15A

24. In the the two-wattmeter method of measuring three-phase power, the reading of the two-watermeters will be equal when the power factor of the circuit is

   (A) 0   (B) 1

   (C) 0.5   (D) 0.866

25. Three resistances of $20\,\Omega$ each are connected in delta. The value of each of resistance of the equivalent star will be equal to

   (A) $6.67\,\Omega$ (B) $3.33\,\Omega$

   (C) $20\,\Omega$ (D) $10\,\Omega$.

26. Two equal resistances when connected in parallel across a 10V battery draw a total current of 10A. When one of the resistances is disconnected, the current drawn becomes 5A. The resistances are of values

(A) 10Ω and 10Ω   (B) 1Ω and 1Ω

(C) 2Ω and 2Ω   (D) 5Ω and 5Ω

27. The extension of range of an ammeter and a voltmeter can be made respectively by

(A) using multiplier and shunt

(B) using shunt and multiplier

(C) using series capacitor and a series inductor

(D) reducing the spring tension of the deflecting system

28. Linear variable differential transformer is a

(A) temperature-sensitive transducer   (B) pressure transducer

(C) displacement transducer   (D) vibration measuring transducer

29. A magnetic circuit is said to be saturated when an increase in the field intensity results in

(A) decrease in flux density

(B) proportional increase in flux density

(C) very marginal increase in flux density

(D) sudden increase in flux density

30. Material used for making a permanent magnet should have

(A) large hysteresis loop area   (B) small hysteresis loop area

(C) low coercieve force   (D) low saturation flux density

31. The coefficient of coupling of two coils of 16 mH and 25 mH is 0.5. The mutual inductance between them is

(A) 10 mH
(B) 5 mH

(C) 25 mH
(D) 16 mH

32. Self-inductance of an air-core coil can be increased by introducing

(A) a copper rod inside the core
(B) a wooden rod inside the core

(C) an iron rod inside the core
(D) None of these

33. The value of emf induced in circuit having an inductance of 700 µH if the current flowing through it varies at a rate of 5,000 A/s

(A) 3.5V
(B) 35V

(C) 25 mH
(D) 16 mH

34. A transformer has 300 primary turns and 900 secondary turns. The primary winding is connected across a 230 V, 50 Hz supply. The induced EMF in the secondary will be

(A) 690 V, 50 Hz
(B) 690 V, 100 Hz

(C) 690 V, 150 Hz
(D) 115 V, 50 Hz.

35. When the primary and secondary windings of a transformer are perfectly magnetically coupled ?

(A) The leakage reactance will be high and voltage regulation will be high (i.e., poor)

(B) The leakage reactance will be low and voltage regulation will be low (i.e., good)

(C) The leakage reactance will be low and voltage regulation will be high (i.e., poor)

(D) The leakage reactance will be high and voltage regulation will be low (i.e., good)

(64)

36. Which of the following losses in a transformer vary with load?

(A) Hysteresis loss

(B) Eddy current loss

(C) Copper losses in the windings

(D) Iron loss

37. In a capacitor start induction motor, the capacitor is connected

(A) in series with the main winding

(B) in series with the auxiliary winding

(C) across the supply terminals

(D) in parallel with the auxiliary winding

38. Which type of wiring is suitable for multi-story buildings?

(A) tree system

(B) ring main system

(C) distribution board system

(D) Ring main and distribution main system

39. A single phase transformer rated for 400/100 V, 1 kVA 50 Hz has load resistance of 100 ohm. The load resistance as viewed from primary side i.e. 400 V side is

(A) 100 ohm

(B) 25 ohm

(C) 400 ohm

(D) 1600 ohm

40. A D.C. shunt motor is driving a mechanical load at rated voltage and rated excitation. If the load torque is doubled, the speed of the motor

(A) increases slightly

(B) decreases slightly

(C) becomes half

(D) becomes double

41. The reactance offered by a capacitor to alternating current of frequency 50 Hz is 20Ω. If frequency is increased to 100 Hz, reactance becomes

(A) 2.5Ω

(B) 5Ω

(C) 10Ω

(D) 15Ω

42. The phase difference between voltage and current wave through a circuit element is given as 30°. The essential condition is that

(A) both waves must have same frequency

(B) both waves must have identical peak values

(C) both waves must have zero value at the same time

(D) None of these

43. In a series resonant circuit, the impedance of the circuit is

(A) minimum

(B) maximum

(C) zero

(D) None of these

44. The time constant of the capacitance circuit is defined as the time during which voltage

(A) falls to 36.8% of its final steady value

(B) rises to 38.6% of its final steady value

(C) rises to 63.2% of its final steady value

(D) None of these

45. In the R-L-C Containing R = 4.5W, L = 0.06 H, C = 0.6mF the power factor will be

(A) zero

(B) lagging

(C) leading

(D) unity

46. In D.C. machines fractional pitch winding is used

    (A) to improve cooling   (B) to reduce copper losses

    (C) to increase the generated e.m.f.   (D) to reduce the sparking

47. What will happen in case 220 V D.C. series motor is connected to 220 V A.C. supply ?

    (A) The armature winding of motor will burn

    (B) The motor will vibrate violently

    (C) The motor will run with less efficiency and more sparking

    (D) The motor will not run

48. An SCR is considered to be a semi-controlled device because

    (A) it can be turned OFF but not ON with a gate pulse.

    (B) it conducts only during one half cycle of an alternating current wave.

    (C) it can be turned ON but not OFF with a gate pulse.

    (D) it can be turned ON only during one half cycle of an AC

49. A step up chopper has input voltage 110 V and output voltage 150V. The value of duty cycle is

    (A) 0.32   (B) 0.67

    (C) 0.45   (D) 0.27

50. Which following is a two-terminal three-layer device ?

    (A) BJT   (B) Power diode

    (C) MOSFET   (D) None of these

51. The material used for fuse must have

  (A) low-melting point and low-specific resistance.

  (B) low-melting point and high-specific resistance

  (C) high-melting point and low-specific resistance

  (D) low-melting point with any specific resistance

52. If torque to weight ratio of an instrument is low, it can be concluded that

  (A) the meter will have uniform scale

  (B) the meter will have non-uniform scale

  (C) the sensitivity of the meter will be high

  (D) the sensitivity of the meter will be low

53. Transmission efficiency of a transmission line increases with the

  (A) decrease in power factor and voltage

  (B) increase in power factor and voltage

  (C) increase in power factor but decreases in voltage

  (D) increase in voltage but decreases in power factor

54. A transformer has at full load iron loss of 900 W and copper loss of 1600 W. At what per cent of the load the transformer will have maximum efficiency ?

  (A) 100%   (B) 90%

  (C) 75%   (D) 50%

55. A transformer has full load copper loss of 800W and core loss of 600W. Total loss at no load will be approximately

  (A) 1400 W   (B) 1000 W

  (C) 1100W   (D) 600 W

56. Dielectric materials are essentially

(A) insulating material

(B) conducting material

(C) semiconductor material

(D) ferroelectric material

57. For maximum power transfer, the internal resistance of the source should be

(A) equal to the load resistance

(B) less than the load resistance

(C) more than the load resistance

(D) None of these

58. The Superposition theorem is applicable to

(A) linear, non-linear and time-variant responses

(B) linear and non-linear responses

(C) only linear responses

(D) None of these

59. In a pure inductive circuit, if the supply frequency is reduced to 1/5 of the previous value, the current will be

(A) 5 times of its previous value

(B) 1/5 of its previous value

(C) the same

(D) None of these

60. In a series RLC circuit, the value of resistance, inductive reactance, and capacitive reactance are respectively 4Ω 5Ω and 2Ω. The impedance of the circuit will be

(A) 11Ω

(B) 7Ω

(C) 5Ω

(D) Zero

61. A filament bulb of 40W, 110 V is connected in series with resistance R. If the supply voltage is 230V, the value of resistance R would be

(A) 1340Ω

(B) 130Ω

(C) 240Ω

(D) 330Ω

62. A 5 amp current flows in a circuit for 5 minutes. The amount of charge transferred to the circuit will be

(A) 25C

(B) 1C

(C) 150C

(D) 1500C

63. For reactive load, the power factor is equal to

(A) 0

(B) 1

(C) 2

(D) 3

64. Name of the Acid used in lead acid cells is

(A) Sulphuric Acid

(B) Nitric Acid

(C) Hydrochloric Acid

(D) Phosphoric Acid

65. An inductive circuit has a resistance of 2.0Ω in series with an inductance of 0.015 H. Find power factor when connected across 200 V, 50 Hz supply mains ____.

(A) 0.39 lag

(B) 0.39 lead

(C) 0.76 lag

(D) 0.76 lead

66. Find the diameter of copper wire in mm, if the resistance of 1.5 km wire is 7.2Ω (Specific Resistance of copper is 1.7×10^{-6} Ohm/cm³)

(A) 0.11 cm

(B) 0.31 cm

(C) 0.21 cm

(D) 0.41 cm

67. Which of the following theorem is used to solve a circuit having various parallel voltage sources ?

(A) Kelvin law

(B) Norton theorem

(C) Superposition theorem

(D) Millman's theorem

68. Which of the Mowing devices is not a thyristor ?

(A) DIAC

(B) UJT

(C) SCS

(D) None of these

69. A shunt reactor at 100 MV Ar is operated at 98% of its rated voltage and at 96% of its rated frequency. The reactive power absorbed by the reactor is

(A) 98 MV Ar

(B) 104.02 MV Ar

(C) 96.04 MV Ar

(D) 100.04 MV Ar

70. The material used for making arcing contacts in a circuit breaker is

(A) copper tungsten alloy

(B) porcelain

(C) electrolytic copper

(D) None of these

71. Fault diverters are basically

(A) fuses

(B) relays

(C) fast switches

(D) circuit breakers

72. Give the Specific Gravity and Voltage of Fully charged cells

(A) 1220 and 2.2

(B) 1200 and 2.2

(C) 1220 and 2.1

(D) 1200 and 2.1

73. IGBT module is used as a/an

(A) Low frequency switching device

(B) Illuminating device

(C) Amplifier

(D) High frequency switching device

74. Instrument connected in the circuit with the ammeter (in panel) to facilitate the measurement of current is

   (A) Current transformer

   (B) Potential transformer

   (C) Excitation transformer

   (D) None of these

75. The kVAr rating required for improving the power factor of a load operating at 500 kW and 0.85 power factor to 0.95 is

   (A) 500 kVAr

   (B) 145 kVAr

   (C) 50 kVAr

   (D) 100 kVAr

76. Maxwell is the unit of which one of the following ?

   (A) magnetic flux

   (B) permeability

   (C) magnetic susceptibility

   (D) intensity magnetisation

77. The MOSFET stands for

   (A) Metal oxidized selenium FET

   (B) Metal oxide surface FET

   (C) Metal oxide semiconductor FET

   (D) Metal of surface FET

78. If brushes of a D.C. generator are moved in order to bring these brushes in magnetic neutral axis, there will be

   (A) demagnetization only

   (B) cross-magnetization as well as magnetization

   (C) cross-magnetisation as well as demagnetising

   (D) cross-magnetization only

56

79. Armature reaction of an unsaturated D.C. machine is

(A) cross magnetising

(B) demagnetizing

(C) magnetizing

(D) None of these

80. Equalizer rings are required in case armature is

(A) wave wound

(B) lap wound

(C) delta wound

(D) duplex wound

81. The ripple factor of a power supply is

(A) diode rating

(B) voltage regulation

(C) power output

(D) None of these

82. When the temperature of the semi-conductor is increased, the conductivity will

(A) decrease

(B) increase

(C) same every time

(D) All of these

83. Which of the following logic gates are known as universal gates ?

(A) NOR. NAND, XNOR

(B) XOR, NOR, NAND

(C) NOT, AND, OR

(D) NOR, NAND

84. An avalanche breakdown in a Zener diode is

(A) voltage multiplication

(B) electric current multiplication

(C) electrons are decelerated

(D) rise in voltage

85. In the block diagram given below," G2=10/s+l, Gl=10/s, H2=l, and Hl = s+3. The overall transfer function here would be given by

(A) $100/11s^2 + 31s + 100$

(B) $10/11s^2 + 31s + 10$

(C) $100/11s^2 + 31s$

(D) $100/11s^2 + 31s + 10$

86. An LTI system's transfer function is given as $l/(s+l)$. What is the steady-state 'value' of any unit-impulse response ?

(A) Infinite

(B) 2

(C) 1

(D) 0

87. Candela is the unit of

(A) Luminous flux

(B) Luminous intensity

(C) Wavelength

(D) None of these

88. Nitrogen or argon is filled in GLS lamps to

(A) Reduce the glare

(B) Improve efficiency

(C) Change the colour of light

(D) Retard evaporation of tungsten filament

89. What is the breaking capacity of the air blast circuit breakers ?

(A) 5000 MVA

(B) 6000 MVA

(C) 7000 MVA

(D) 10000 MVA

90. Power is transmitted over transmission-lines on high voltage because

(A) Conductor cost is reduced

(B) Current is reduced

(C) Efficiency is increased

(D) Both (A) and (C)

(54)

91. The power diode is a

(A) One terminal device

(B) Two terminal device

(C) Three terminal device

(D) Four terminal device

92. Snubber circuits protect the circuit by

(A) reducing the switching power

(B) controlling the device dv/dt losses

(C) avoiding breakdowns

(D) All of these

93. Thevenin's theorem is true for _____.

(A) Linear networks

(B) Non-linear networks

(C) Both Linear networks and Non-linear networks

(D) Millman's theorem

94. Thevenin's resistance is found by _____.

(A) shorting all voltage sources

(B) opening all current sources

(C) shorting all voltage sources and opening all current sources

(D) opening all voltage sources and shorting all current sources

95. A Varactor Diode acts as a

(A) variable resistor

(B) variable capacitor

(C) switching device

(D) None of these

96. Reverse saturation current of the PN junction diode is working as

(A) the diffusion current

(B) the drift current

(C) the displacement current

(D) None of these

97. The power factor angle of a purely inductive circuit is

(A) 45 degree

(B) 60 degree

(C) 75 degree

(D) 90 degree

98. Which type of insulator is used where there is dead end of the line or there is a corner or a sharp curve, for high voltage line ?

(A) Strain insulator

(B) Pin type insulator

(C) Shackle insulator

(D) Stray insulator

99. By decreasing the value of motor starter resistance, the back e.m.f of motor.

(A) remains same

(B) increases

(C) decreases

(D) None is correct

100. The reason of using resistance switching in an air blast circuit breaker is to

(A) reduce the magnitude of fault current

(B) control the CB operating time

(C) damp out the fast transient

(D) change the fault current power factor.