AEn. (Pre.) 2013

कोड / Code : **13**

विषय / Subject : Electrical Engineering

```
┌─────────────────────────────────┐
│ पुस्तिका में पृष्ठों की संख्या /          │
│ Number of Pages in Booklet : 16  │
└─────────────────────────────────┘
```

13
विषय कोड

Electrical Engineering

A बुकलेट सीरीज

```
┌─────────────────────────────────┐
│ पुस्तिका में प्रश्नों की संख्या /         │
│ Number of Questions in Booklet : 100 │
└─────────────────────────────────┘
```

समय / Time : **2.00** घंटे / Hours   पूर्णांक / Maximum Marks : **200**

INSTRUCTIONS

1. Answer all questions.
2. All questions carry equal marks.
3. Only one answer is to be given for each question.
4. If more than one answers are marked, it would be treated as wrong answer.
5. Each question has four alternative responses marked serially as **1, 2, 3, 4**. You have to darken only one circle or bubble indicating the correct answer on the Answer Sheet using **BLUE BALL POINT PEN.**
6. **1/3 part of the mark(s) of each question will be deducted for each wrong answer.** (A wrong answer means an incorrect answer or more than one answers for any question. Leaving all the relevant circles or bubbles of any question blank will not be considered as wrong answer.)
7. The candidate should ensure that Series Code of the Question Paper Booklet and Answer Sheet must be same after opening the envelopes. In case they are different, a candidate must obtain another question paper of the same series. Candidate himself shall be responsible for ensuring this.
8. Mobile Phone or any other electronic gadget in the examination hall is strictly prohibited. A candidate found with any of such objectionable material with him/her will be strictly dealt as per rules.
9. Please cirrectly fill your Roll Number in O.M.R. Sheet. 5 marks will be deducted for filling wrong or incomplete Roll Number.
10. If there is any sort of ambiguity/mistake either of printing or factual nature then out of Hindi and English Version of the question, the English Version will be treated as standard.
    Warning : If a candidate is found copying or if any unauthorised material is found in his/her possession, F.I.R. would be lodged against him/her in the Police Station and he/she would liable to be prosecuted under Section 3 of the R.P.E. (Prevention of Unfairmeans) Act, 1992. Commission may also debar him/her permanently from all future examinations of the Commission.

निर्देश

1. सभी प्रश्नों के उत्तर दीजिए ।
2. सभी प्रश्नों के अंक समान हैं ।
3. प्रत्येक प्रश्न का केवल एक ही उत्तर दीजिए।
4. एक से अधिक उत्तर देने की दशा में प्रश्न के उत्तर को गलत माना जाएगा ।
5. प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं, जिन्हें क्रमशः 1, 2, 3, 4 अंकित किया गया हैं। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर–पत्रक पर नीले वॉल प्वाइंट पेन से गहरा करना है ।
6. प्रत्येक गलत उत्तर के लिए प्रश्न अंक का 1/3 भाग काटा जायेगा। गलत उत्तर से तात्पर्य अशुद्ध उत्तर अथवा किसी भी प्रश्न के एक से अधिक उत्तर से है। किसी भी प्रश्न से संबंधित गोले या बबल को खाली छोड़ना गलत उत्तर नहीं माना जायेगा।
7. प्रश्न–पत्र पुस्तिका एवं उत्तर पत्रक के लिफाफे की सील खोलने पर परीक्षार्थी यह सुनिश्चित कर लें कि उसके प्रश्न–पत्र पुस्तिका पर वही सीरीज अंकित हैं जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से प्रश्न–पत्र की ही सीरीज वाला दूसरा प्रश्न–पत्र का लिफाफा प्राप्त कर लें। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।
8. मोबाईल फोन अथवा इलेक्ट्रोनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित हैं। यदि किसी अभ्यर्थी के पास ऐसी कोई वर्जित सामग्री मिलती है तो उसके विरुद्ध आयोग द्वारा नियमानुसार कार्यवाही की जायेगी।
9. कृपया अपना रोल नम्बर ओ.एम.आर. पत्रक पर सावधानी पूर्वक सही भरें । गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तांको में से अनिवार्य रूप से काटे जाएंगे।
10. यदि किसी प्रश्न में किसी प्रकार की कोई मुद्रण या तथ्यात्मक प्रकार की त्रुटि हो तो प्रश्न के हिन्दी तथा अंग्रेजी रूपान्तरों में से अंग्रेजी रूपान्तर मान्य होगा।

चेतावनी : अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराई जायेगी और आर. पी. ई. (अनुचित साधनों की रोकथाम) अधिनियम, 1992 के नियम 3 के तहत कार्यवाही की जायेगी। साथ ही आयोग ऐसे अभ्यर्थी को भविष्य में होने वाली आयोग की समस्त परीक्षाओं से विवर्जित कर सकता है।

1   If two resistances R_1 and R_2 are connected in series, its effective resistance is 4.5 ohm and 1 ohm when connected in parallel, then the values of R_1 and R_2 are :

(1)   4 ohm and 0.5 ohm   (2)   3 ohm and 1.5 ohm

(3)   2 ohm and 2.5 ohm   (4)   1 ohm and 3.5 ohm

2   In the circuit shown below the current I_0 in 2Ω resistance is :
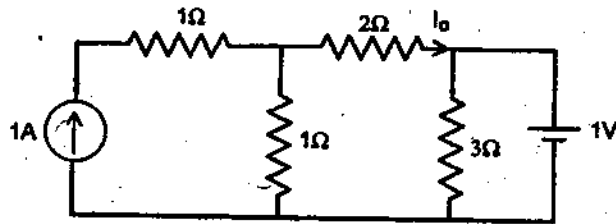
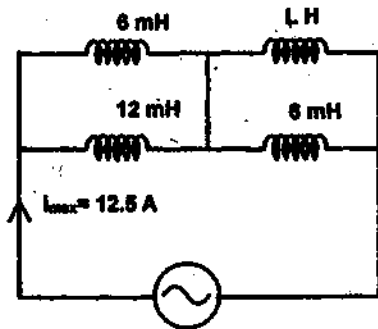
(1)   0.4 A   (2)   0.333 A

(3)   0.2 A   (4)   0.0 A

3   In the circuit shown below the switch is closed at $t = 0$. The current in the circuit i(t) for $t > 0$ is :
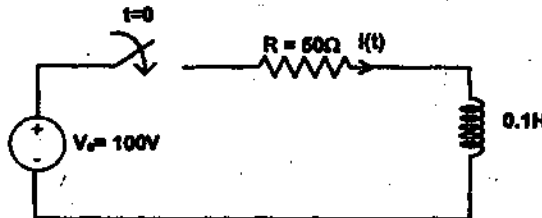
(1) $2(1-e^{-t/500})$ (2) $2(1-e^{-500t})$

(3) $2e^{-500t}$ (4) $2e^{-t/500}$

4   For the circuit shown below, the value of inductance L, for which the source current has a peak value of 12.5 A is :

(1)   4 mH   (2)   6 mH

(3)   8 mH   (4)   12 mH

5   If unit impulse current is applied to an inductor with zero initial current, then the waveshape of the voltage across the inductor is an/a unit

(1)   ramp   (2)   impulse

(3)   square   (4)   doublet

6 Match list I with list II and select the correct answer using the codes given below the list :

List-1 (Cause)
(A) Magnetostriction
(B) Hall effect
(C) Grain orientation
(D) Flux linkage to current

List-II (Effect)
(1) Inductance
(2) Mechanical vibration
(3) Magnetic field improvement
(4) Voltage generation

(1) (A)-(2), (B)-(4), (C)-(3), (D)-(1)
(2) (A)-(2), (B)-(4), (C)-(1), (D)-(3)
(3) (A)-(1), (B)-(4), (C)-(3), (D)-(2)
(4) (A)-(4), (B)-(2), (C)-(3), (D)-(1)

7 The electric field on equipotential surface is always :
(1) perpendicular to the surface
(2) parallel to the surface
(3) infinite
(4) zero

8 Which of the following motors will give relatively high starting torque ?
(1) Capacitor run motor
(2) Capacitor start motor
(3) Shaded pole motor
(4) Split phase motor

9 A 3-phase induction motor is running at slip 's'. If its two supply leads are interchanged, then its slip, at that instant, will be :
(1) 2s
(2) 2-s
(3) 1-s
(4) zero

10 The shape of the field mmf wave in a turbo alternator is approximately :
(1) Square
(2) Trapezoidal
(3) Triangular
(4) Sinusoidal

11 A dc shunt motor is driving a mechanical load at rated voltage and rated excitation. If the load torque becomes double then the speed of motor :
(1) decreases slightly
(2) increases slightly
(3) becomes double
(4) becomes half

12 For dc shunt motor, speed control by armature resistance variation is best suited for :
(1) constant torque drive
(2) constant power drive
(3) variable torque and variable power drive
(4) none of the above

13 For a uniformly distributed winding, with β degree phase spread, the distribution Factor at fundamental frequency is :

(1) $\sin\beta/\beta$

(2) $(\sin\beta/\beta)\cdot(180/\pi)$

(3) $2\sin(\beta/2)/\beta$

(4) $(\sin(\beta/2)/\beta)\cdot(360/\pi)$

14 Under short circuit condition the power factor of synchronous machine is :
(1) unity
(2) about 0.8 leading
(3) almost zero lagging
(4) about 0.5 lagging

15 Guard ring in transmission line :
(1) improves regulation
(2) improves power factor
(3) reduces voltage across the lowest disc
(4) increases transmission losses

16 Equal area criterion gives the information regarding :
(1) stability region
(2) swing curves
(3) absolute stability
(4) relative stability

17 The maximum demand of a consumer is 2 kW and his daily energy consumption is 20 units. The load factor is :
(1) 1%
(2) 41.7%
(3) 50%
(4) 60%

18 For an existing ac transmission line the string efficiency is 80. If dc voltage is applied to the same setup, the string efficiency will
(1) remain 80%
(2) become more than 80%
(3) become less than 80%
(4) become 100% :

19 Load flow study is carried out for :
(1) Fault calculations
(2) Stability studies
(3) System planning
(4) Load frequency control

20 If a system has some of the poles lying on the imaginary axis, it is :
(1) unconditionally stable
(2) conditionally stable
(3) marginally stable
(4) unstable

21 To increase the stability of a feedback system :
(1) reduce the gain and increase the phase of open loop transfer function
(2) reduce the gain and reduce the phase of open loop transfer function
(3) increase the gain and increase the phase of open loop transfer function
(4) increase the gain and reduce the phase of open loop transfer function

22. Root locus plot of a feedback system with open loop transfer function

$$G(s)H(s) = \frac{K}{s^2}$$

(1)

s-plane

(2)

s-plane

(3)

s-plane

(4)

s-plane
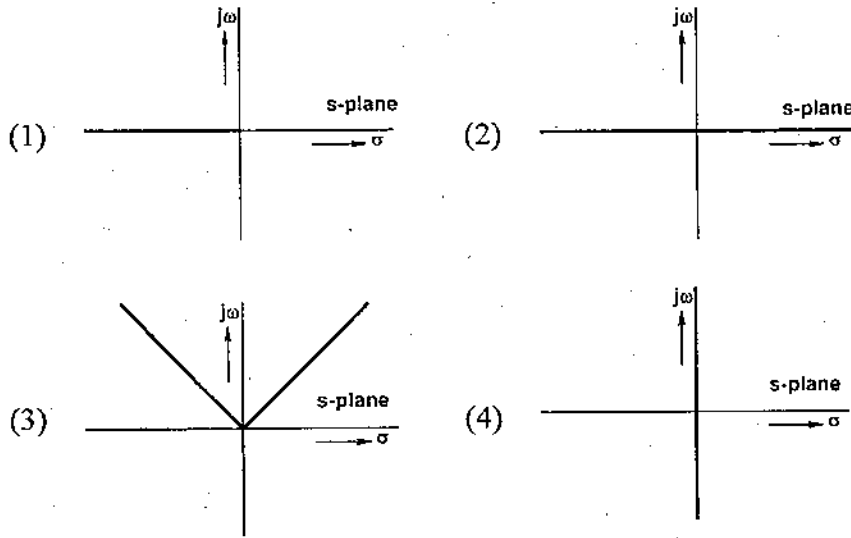
23. The open loop transfer function of a unity feedback system is :

$$G(s) = \frac{2}{(s+1)^2}$$:

The phase margin of the system is
(1) 90°
(2) 60°
(3) 45°
(4) 30°

24. The loop gain GH of a closed loop system is given by the following expression

$$\frac{K}{s(s+2)(s+4)}$$

The value of K for which the system just becomes unstable is :
(1) 6
(2) 8
(3) 48
(4) 96

25. The coil of a moving coil meter is wound on :
(1) aluminum frame
(2) iron frame
(3) insulating frame
(4) a semiconductor material

26. The function of swamping resistor, put in series with the moving coil of a moving coil meter, is :
(1) to achieve full scale sensitivity of the meter
(2) to reduce the full scale current
(3) to increase the strength of field
(4) to compensate for temperature variation

27 A strain gauge has a :
(1) piezo - electric effect   (2) piezo - resistive effect
(3) piezo - capacitive effect   (4) piezo - inductive effect

28 A galvanometer has a full scale deflection of 50 μA and an internal resistance of 500 Ω. Its sensitivity in ohms/volt is given as :
(1) 10   (2) 19.5
(3) 20   (4) 100

29 In a digital voltmeter, the oscillator frequency is 400 kHz, the ramp voltage falls from 8 V to 0 V in 0.02 sec. The number of pulses counted by the counter is :
(1) 8000   (2) 4000
(3) 2000   (4) 800

30 If the delay introduced by one inverter gate is τ sec then the time period of the output V_0 of the following circuit would be

(1) τ (2) 2τ
(3) 3τ (4) 6τ
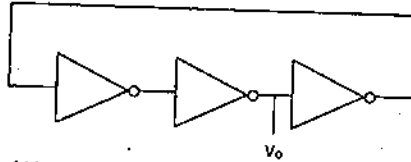
31 The simplified logic expression for the circuit shown in figure is :
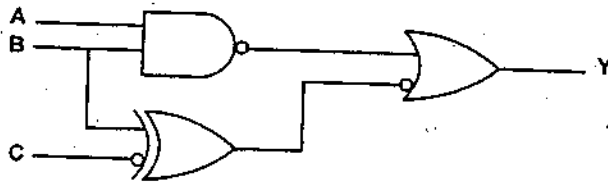
(1) $Y = \overline{A \cdot B} + B \cdot \overline{C}$ (2) $Y = \overline{A \cdot B} + C$
(3) $Y = \overline{A} + \overline{B} + \overline{C}$ (4) $Y = \overline{A} + \overline{B} + C$

32 Given a Boolean function $F = X \cdot Y + \overline{X} \cdot Z$. The representation of this function in a product of maxterm form would be :
(1) $F(X,Y,Z) = \Pi(2,3,5)$ (2) $F(X,Y,Z) = \Pi(1,2,4)$
(3) $F(X,Y,Z) = \Pi(0,1,3,5)$ (4) $F(X,Y,Z) = \Pi(0,2,4,5)$

33 The value of x in the expression :
$(101)_x + (110)_7 = (102)_8 + (28)_{16}$
(1) 2   (2) 7
(3) 8   (4) 10

34 An 8085A μP is executing a program during which HOLD signal becomes active. What the processor will do?
(1) It stops the execution until HOLD signal becomes inactive.
(2) It completes the execution of the current instruction and then stops execution.
(3) It continues the execution until the external bus is required and then stops execution.
(4) It continues the execution and does not stop at all.

35 In 8085A microprocessor, stack pointer is a 16-bit register which is :
(1) Incremented by 2 whenever data is PUSHed on to the stack.
(2) Incremented by 2 whenever data is POPed from the stack.
(3) Incremented by 1 whenever data is PUSHed on to the stack.
(4) Incremented by 1 whenever data is POPed from the stack.

36 The addressing mode used in STAX B instruction is :
(1) indirect addressing mode   (2) direct addressing mode
(3) implied addressing mode   (4) register addressing mode

37 A triac is equivalent to ....
(1) two SCRs connected in parallel
(2) one SCR and one diode connected in parallel
(3) two SCRs connected in inverse-parallel
(4) one SCR and one diode connected in inverse parallel

38 If the rotor of three-phase induction motor is driven above synchronous speed, the motor operates in :
(1) second quadrant of torque speed diagram
(2) third quadrant of torque speed diagram
(3) fourth quadrant of torque speed diagram
(4) first quadrant of torque speed diagram

39 In a 3-phase voltage source inverter used for speed control of induction motor, anti-parallel diodes are used across each switching device. The main purpose of diodes is to :
(1) protect the switching devices against over voltage
(2) provide path for freewheeling current
(3) allow the motor to return energy during regeneration
(4) help in switching off the devices

40 With three resistances of values $2\,\Omega$, $3\,\Omega$ and $6\,\Omega$, which of the following combination will give an effective resistance of $4\,\Omega$?
(1) All the three resistances in parallel
(2) $2\,\Omega$ resistance in series with parallel combination of $3\,\Omega$ and $6\,\Omega$ resistance
(3) $3\,\Omega$ resistance in series with parallel combination of $2\,\Omega$ and $6\,\Omega$ resistance
(4) $6\,\Omega$ resistance in series with parallel combination of $2\,\Omega$ and $3\,\Omega$ resistance.

41 The unit of electrical conductivity is :
(1) mho/metre
(2) mho/sq. m
(3) ohm/metre
(4) ohm/sq. m.

42 In empty space, conduction current is :
(1) Infinity
(2) Unity
(3) Zero
(4) None of these

43 Line integral of an electric field around a closed path is :
(1) infinity
(2) unity
(3) zero
(4) None of these

44 Wave speed in terms of frequency f and wavelength λ is expressed as

_____

(1) f/λ
(2) λf
(3) λ/f
(4) $(\lambda + f)$

45 Standing wave consists of two travelling waves of _____ amplitudes and _____ is direction.
(1) Unequal, same
(2) Unequal, opposite
(3) Equal, same
(4) Equal, opposite

46 The two inputs of a CRO are fed with two stationary periodic signals. In the X-Y mode, the screen shows a figure which changes from ellipse to circle and back to ellipse with its major axis changing orientation slowly and repeatedly. The following inference can be made from this.
(1) The signals are not sinusoidal.
(2) The amplitudes of the signals are very close but not equal
(3) The signals are sinusoidal with their frequencies very close but not equal
(4) There is a constant but small phase difference between the signals

47 A hot-wire ammeter :
(1) Can measure ac as well as dc
(2) Registers current changes very fast
(3) Can indicate very low voltages
(4) Measures electrical energy

48 Which relay is normally used for protection against loss of excitation ?
(1) Under voltage relay
(2) Reactance relay
(3) Mho relay
(4) Impedance relay

49 Which part of the generator is more prone to damage under heavy unbalance conditions ?
(1) Stator core
(2) Rotor core
(3) Rotor winding
(4) Stator winding

50 The transformer connection Yd 11 implies that :
(1) Primary is star connected, secondary delta connected and primary voltage is leading secondary voltage by 60°
(2) Primary is star connected, secondary delta connected and primary voltage is leading secondary voltage by 30°
(3) H.V. winding is star connected, L.V. winding is delta connected and H.V. voltage is leading L.V. voltage by 30°
(4) H.V. winding is star connected; L.V. winding is delta connected and L.V. voltage winding is leading H.V. voltage by 30°

51 The resistance of a shunt for a precision grade ammeter can be best measured by :
(1) Potentiometer
(2) Maxwell's bridge
(3) Loss of charge method
(4) Kelvin's double bridge

52 At no load, a voltmeter gives 120 pulsations per minute when connected to the rotor of an induction motor. The stator frequency is 50 Hz. The slip of the motor is :
(1) 2%
(2) 2.5%
(3) 10%
(4) 5%

53 The depletion region in a semiconductor pn-junction diode largely has :
(1) Majority carriers
(2) Positive and negative ions
(3) Holes on one side and electrons on other side
(4) No ions, no electrons and no holes

54 In a full wave rectifier, the maximum possible rectification efficiency is :
(1) 81.05%
(2) 100%
(3) 48.3%
(4) 69.3%

55 In pinch-off region, FET behaves :
(1) As an open switch
(2) As a constant resistance
(3) As a Voltage controlled voltage source
(4) As a Voltage controlled current source

56 The base current in a BJT is 0.02 mA and emitter current is 1.0 mA. the values of α and β are respectively :
  (1) 5 and 50
  (2) 0.5 and 50
  (3) 0.49 and 98
  (4) 0.98 and 49

57 The Boolean expression $X+YZ$ is equivalent to :
  (1) $X.(Y+Z)$
  (2) $X.Y + X.Z$
  (3) $(X+Y).(X+Z)$
  (4) $(X+Y).Z$

58 The input voltage to a chopper circuit with a switching frequency of 100 Hz and T_{ON} time as 2.0 ms is 10V. The average DC output is :
  (1) 4V
  (2) 2V
  (3) 6V
  (4) 8V

59 The Early effect in BJT refers to :
  (1) Avalanche breakdown
  (2) Thermal runaway
  (3) Base narrowing
  (4) Zener breakdown

60 A clamper circuit :
  (1) Removes a part of input signal
  (2) Changes signal shape
  (3) Preserve the signal but changes d.c. level
  (4) Changes signal d.c. level

61 In a three phase synchronous machine, the sub transient (X"), transient (X') and steady state reactance(X) are such that :
  (1) $X'' > X' > X$
  (2) $X' < X'' < X$
  (3) $X'' < X', < X$
  (4) $X' > X > X''$

62 Under Line to line fault condition in a transmission line, following sequence currents flow :
  (1) Positive, negative and zero
  (2) Negative and zero
  (3) Positive and negative
  (4) Positive and zero

63 The relay which is most sensitive to arcing fault :
  (1) Over current relay
  (2) Mho relay
  (3) Reactance relay
  (4) Impedance relay

64 In a three phase induction motor with synchronous speed Ns rpm, running at a slip of S, the rotor magnetic field rotates with respect to stator at a speed of :
  (1) Ns rpm
  (2) SNs rpm
  (3) (1-S)Ns rpm
  (4) Zero

65 In a three phase synchronous generator, when the zero leading power factor load is increased,
    (1) Demagnetizing effect of armature reaction increases
    (2) Cross magnetizing effect of armature reaction increases
    (3) Magnetizing effect of armature reaction increases
    (4) DC Excitation should be increased

66 In a double cage induction rotor,
    (1) The outer cage has low resistance and high reactance
    (2) The outer cage has high resistance and high reactance
    (3) The inner cage has low resistance and high reactance
    (4) The inner cage has high resistance and high reactance.

67 The state transition matrix of a system represents :
    (1) The transient response of the system
    (2) The free response of the system
    (3) The steady state response of the system
    (4) The complete response of the system

68 A control system is said to be completely observable if :
    (1) Every state variable affects some of the outputs
    (2) All the state variables are affected by inputs
    (3) All the state variables can be measured from the inputs
    (4) None of these

69 If all the elements in a row of Routh's table are zero, then the characteristic equation has :
    (1) At least one pair of real roots with equal magnitude and opposite signs
    (2) One or more pair of imaginary roots
    (3) Symmetrical complex conjugate roots about the origin
    (4) All of these

70 The incremental cost curve of two units in a plant are :
$IC1 = 0.1P1 + 8.0$ Rs/MWh
$IC2 = 0.15P2 + 3.0$ Rs/MWh
When the total load is 80MW, the economic sharing of load of the unit 1 and 2 are respectively :
    (1) 10MW, 70MW   (2) 20MW, 60MW
    (3) 28MW, 52MW   (4) 37.5MW, 42.5MW

71 If the fault current is 4000A, relay setting is 50% and the CT ratio is 400/5A, then the PSM of the relay is :
(1) 10
(2) 25
(3) 50
(4) 20

72 Power transfer capability of a long transmission line is 400 MW. If length of the line is reduced to $1/4^{th}$, the power transfer capability of the line :
(1) Reduces to nearly 100 MW
(2) Reduces to nearly 200 MW
(3) Remains the same
(4) Increases to nearly 1600 MW

73 A CT is normally specified as 15 VA, 5P10 where :
(1) 15 VA denotes rating, 5 denotes ratio error and 10 denotes composite error
(2) 15 VA denotes burden. 5 denotes composite error and 10 denotes ALF
(3) 15 VA denotes burden, 5 denotes accuracy class and 10 denotes composite error
(4) 15 VA denotes burden, 5 denotes ALF and 10 denotes accuracy class

74 Current chopping phenomenon in a circuit breaker is associated with :
(1) Small inductive current
(2) Resistance switching
(3) Small capacitive current
(4) Heavy short circuit current

75 A dc potentiometer is designed to measure up to 2 V. A standard cell of emf 1.18 V obtains balance at 600 mm. A test cell obtains balance at 680 mm. The emf of test cell is :
(1) 1.36 V
(2) 1.54 V
(3) 1.34 V
(4) 1.76 V

76 Given two continuous time signals $x(t) = e^{-t}$ and $y(t) = e^{-2t}$ t > 0. The convolution $z(t) = x(t)*y(t)$ is
(1) $e{-}t * e^{-2t}$
(2) $e^{-t} - e^{-2t}$
(3) $e{-}t + e^{-2t}$
(4) e^{-3t}

77 The trigonometric Fourier series expansion of a real valued function x(t) of a real variable with period T contains no term of odd frequency and no sine term is present. Then, x(t) satisfies the condition :
(1) $x(t) = - x(t{-}T)$
(2) $x(t) = x(T - t) = - x(t - T/2)$
(3) $x(t) = x(T - t) = - x(-t)$
(4) $x(t) = x(t - T) = x(t - T/2)$

78 Fourier transform of signal $x(t) = e^{-4|t|}$ is :

(1) $8/(16 + \omega^2)$

(2) $4/(16 + \omega^2)$

(3) $-4/(16 + \omega^2)$

(4) $-8/(16 + \omega^2)$

79 In a power system, frequency deviation is a measure of :
(1) Mismatch between power generation and load
(2) Dynamic stability limit violation
(3) Deficiency of reactive power
(4) Steady state limit violation

80 The limiting errors of measurement of power consumed by and the current passing through a resistance are ± 1.5% and ± 1% respectively. The limiting error of measurement of resistance will then be :
(1) ± 0.5%

(2) ± 1.0%

(3) ± 2.5 %

(4) ± 3.5%

81 The rotor slots are slightly skewed in squirrel-cage induction motor to :
(1) Prevent cogging and crawling
(2) Increase starting torque
(3) Reduce the magnetic hum and locking tendency of rotor
(4) Both (1) and (2)

82 The SF6 gas is used in circuit breaking mainly due to :
(1) Electron emission property
(2) Electron absorption property
(3) Good thermal conductivity
(4) All of the above

83 In harmonic restraint relay, additional bias is provided using :
(1) 2nd harmonic current

(2) 3rd harmonic current

(3) 5th harmonic current

(4) Difference current

84 Transmission lines are transposed to :
(1) reduce copper loss
(2) prevent interference with neighboring telephone lines
(3) reduce skin effect
(4) improve power transfer capability

85 The starting current and torque of a three phase induction motor on direct line starting is 30 Amp. and 300 Nm respectively. What are the corresponding values with star delta starter ?
(1) 10 A and 100 Nm

(2) 30 A and 300 Nm

(3) 17.32 A and 173.2 Nm

(4) 30 A and 173.3 Nm

86 A dc shunt generator has a critical field resistance of 200 Ω at a speed of 800 r.p.m. If the speed of the generator is increased to 1000 r.p.m., what will be critical field resistance of the generator?

(1) 160 ohms   (2) 200 ohms

(3) 250 ohms   (4) 312.5 ohm

87 In a three-phase full wave ac to dc converter, the ratio of output ripple-frequency to the supply-voltage frequency is :

(1) 2   (2) 3

(3) 6   (4) 12

88 Two transformers of different kVA ratings working in parallel share the load in proportion to their ratings when their :

(1) Per unit leakage impedances on the same kVA base are the same

(2) Per unit leakage impedances on their respective ratings are equal

(3) Ohmic values of the leakage impedances are inversely proportional to their ratings

(4) Ohmic values of the magnetisingreactances are the same

89 Given two coupled inductors L_1 and L_2, their mutual inductance M satisfies :

(1) $M = \sqrt{L_1^2 + L_2^2}$ (2) $M > \dfrac{(L_1 + L_2)}{2}$

(3) $M > L_1 L_2$ (4) $M \leq \sqrt{L_1 L_2}$

90 An 8 pole alternator runs at 900 RPM. It supplies power to a 6 pole Induction Motor which has a full load slip of 3%. The full load speed of the motor is :

(1) 1125 rpm   (2) 875 rpm

(3) 1164 rpm   (4) 1200 rpm

91 The turn-on and turn-off times of transistor depend on :

(1) Static characteristic   (2) Junction capacitances

(3) Barrier potential   (4) None of the above

92 In a circuit of linear resistances and two ideal sources, the power consumed by a resistance R is P_1, when one source is acting alone and power consumed by the same resistance is P_2, when the other source is acting alone. If both sources are connected, the power consumed by the resistance R is given by :

(1) $\left(\sqrt{P_1} \pm \sqrt{P_2}\right)^2$ (2) $\left(\sqrt{P_1} \pm \sqrt{P_2}\right)$

(3) $\left(P_1 \pm P_2\right)^2$ (4) $P_1 \pm P_2$

93 · The torque / weight ratio of an instrument indicates :
    (1) Selectivity   (2) Accuracy
    (3) Resolution   (4) Sensitivity

94 The capacitance and loss angle of a given capacitor specimen are best measured by :
    (1) Wheatstone bridge   (2) Maxwell bridge
    (3) Schering bridge   (4) Anderson bridge

95 In load flow studies and transient stability studies loads are normally modeled respectively as :
    (1) Constant power and constant impedance
    (2) Constant impedance and constant admittance
    (3) Constant admittance and constant power
    (4) Constant admittance and constant impedance

96 A voltage source having an internal impedance of 8 + j6 ohms supplies power to a resistive load. What should be the load resistance for maximum power transferred to it ?
    (1) 8 ohm   (2) 6 ohm
    (3) 10 ohm   (4) 2 ohm

97 The magnet and core of machines are generally made of :
    (1) Hard and soft magnetic material respectively
    (2) Soft and hard magnetic material respectively
    (3) Hard magnetic material
    (4) Soft magnetic material

98 For a parallel RLC resonant circuit: the damped frequency is 8 r/s and bandwidth is 2 r/s. What is its resonant frequency ?
    (1) 2 r/s   (2) 3 r/s
    (3) $\sqrt{10}$ r/s   (4) $\sqrt{18}$ r/s

99 Wagner Earth devices in AC bridge circuits are used for :
    (1) Shielding all the bridge elements from external magnetic field
    (2) Eliminating the effect of all stray capacitances
    (3) Minimizing the effect of inter-component capacitance
    (4) Eliminating all the node to earth capacitances

100 A parallel plate capacitor with mica as dielectric medium having an effective area of 120 mm^2 and distance between the plate as 0.5 mm, has developed a damaged section equivalent to a hole of 0.5 mm diameter. Which of the following will be significantly affected :
    (1) Capacitance   (2) Charge storage
    (3) Tan δ   (4) Break down strength