

पुस्तिका में पृष्ठों की संख्या : 16

Number of Pages in Booklet : 16

पुस्तिका में प्रश्नों की संख्या : 100

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प्रश्न-पत्र पुस्तिका संख्या /

Question Paper Booklet No.

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ELECTRICAL ENGINEERING

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अधिकतम अंक : 100
Maximum Marks : 100

प्रश्न-पत्र पुस्तिका एवं उत्तर पत्रक के पेपर सील/पॉलिथीन बैग को खोलने पर परीक्षार्थी यह सुनिश्चित कर लें कि उसके प्रश्न-पत्र पुस्तिका पर वही प्रश्न-पत्र पुस्तिका संख्या अंकित है जो उत्तर पत्रक पर अंकित है। इसमें कोई भिन्नता हो तो वीक्षक से दूसरा प्रश्न-पत्र प्राप्त कर लें। ऐसा न करने पर जिम्मेदारी अभ्यर्थी की होगी।

The candidate should ensure that Question Paper Booklet No. of the Question Paper Booklet and Answer Sheet must be same after opening the Paper Seal / Polythene bag. In case they are different, a candidate must obtain another Question Paper. Candidate himself shall be responsible for ensuring this.

परीक्षार्थियों के लिए 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 है। अभ्यर्थी को सही उत्तर निर्दिष्ट करते हुए उनमें से केवल एक गोले अथवा बबल को उत्तर पत्रक पर नीले बॉल प्वाइंट पेन से गहरा करना है।
6. OMR उत्तर पत्रक इस परीक्षा पुस्तिका के अन्दर रखा है। जब आपको परीक्षा पुस्तिका खोलने को कहा जाए, तो उत्तर पत्र निकाल कर ध्यान से केवल नीले बॉल प्वाइंट पेन से विवरण भरें।
7. 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।
8. मोबाइल फोन अथवा इलेक्ट्रॉनिक यंत्र का परीक्षा हॉल में प्रयोग पूर्णतया वर्जित है। 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 सावधानीपूर्वक सही भरें। गलत अथवा अपूर्ण रोल नम्बर भरने पर 5 अंक कुल प्राप्तकों में से काटे जा सकते हैं।

चेतावनी: अगर कोई अभ्यर्थी नकल करते पकड़ा जाता है या उसके पास से कोई अनधिकृत सामग्री पाई जाती है, तो उस अभ्यर्थी के विरुद्ध पुलिस में प्राथमिकी दर्ज कराते हुए विविध नियमों-प्रावधानों के तहत कार्यवाही की जाएगी। साथ ही विभाग ऐसे अभ्यर्थी को भविष्य में होने वाली विभाग की समस्त परीक्षाओं से विवर्जित कर सकता है।

INSTRUCTIONS FOR CANDIDATES

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. The OMR Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully with blue ball point pen only.
7. 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.
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 correctly fill your Roll Number in O.M.R. Sheet. 5 Marks can be deducted for filling wrong or incomplete Roll Number.

Warning: If a candidate is found copying or if any unauthorized 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. Department may also debar him/her permanently from all future examinations.

इस परीक्षा पुस्तिका को तब तक न खोलें जब तक कहा न जाए।
Do not open this Test Booklet until you are asked to do so.

02



1. A coil of resistance 10Ω and inductance 0.8 H is connected to 200 V dc supply. The initial rate of change of current is
- (1) 16 A/s (2) 160 A/s
 (3) 250 A/s (4) 4000 A/s
2. A network delivers maximum power to the load, when the load impedance Z_L is
- (1) Zero
 (2) Infinite
 (3) Equal to the complex conjugate of the impedance Z of the network
 (4) Reciprocal of the complex conjugate of the impedance Z of the network
3. Inverse Laplace Transform of function $\frac{S}{s^2 - a^2}$ is
- (1) $\sin at$ (2) $\cos at$
 (3) $\sinh at$ (4) $\cosh at$
4. A single phase ac voltage source has 200 V rms and is connected to a load which consumes an active power of 300 W . What is the reactive power consumed by the load if 2.5 A rms current is drawn from the supply ?
- (1) 100 VAR (2) 200 VAR
 (3) 300 VAR (4) 400 VAR

5. The set of equations in matrix form, in terms of h-parameters of a two port network is

$$(1) \begin{bmatrix} V_1 \\ V_2 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} I_1 \\ I_2 \end{bmatrix}$$

$$(2) \begin{bmatrix} I_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \end{bmatrix}$$

$$(3) \begin{bmatrix} V_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} h_{11} & -h_{12} \\ -h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} I_1 \\ V_2 \end{bmatrix}$$

$$(4) \begin{bmatrix} V_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} \\ h_{21} & h_{22} \end{bmatrix} \begin{bmatrix} I_1 \\ V_2 \end{bmatrix}$$

6. In a series RLC circuit, $R = 3\Omega$, $X_L = 6\Omega$, $X_C = 2\Omega$. The required voltage to be applied across the RLC circuit to get series current of $10 \angle -143^\circ$ amp is
- (1) $10 \angle 0^\circ$ volt
 (2) $100 \angle 90^\circ$ volt
 (3) $50 \angle 90^\circ$ volt
 (4) $50 \angle -90^\circ$ volt
7. For a two port network the condition for being symmetrical network in terms of Z parameters is
- (1) $Z_{11} = Z_{22}$ (2) $Z_{12} = Z_{21}$
 (3) $Z_{11} = Z_{12}$ (4) $Z_{21} = Z_{22}$

8. The transfer function of a system is given as $\frac{100}{s^2 + 20s + 100}$

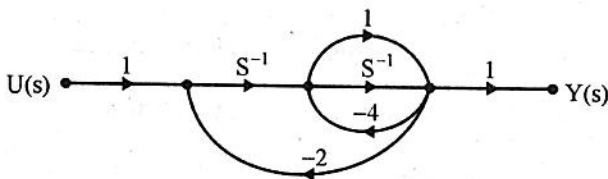
The system is

- (1) an overdamped system
- (2) an underdamped system
- (3) a critically damped system
- (4) an unstable system

9. The position and velocity error coefficients for the system having open loop transfer function $G(s) = \frac{100}{(1+s)(1+2s)}$ are respectively

- (1) 100 and zero
- (2) 100 and infinity
- (3) zero and infinity
- (4) zero and zero

10. The signal flow graph for a system is given below. The transfer function $\frac{Y(s)}{U(s)}$ for this system is



- (1) $\frac{s+1}{5s^2+6s+2}$
- (2) $\frac{s+1}{s^2+6s+2}$
- (3) $\frac{s+1}{s^2+4s+2}$
- (4) $\frac{1}{s^2+6s+2}$

11. A network has a transfer function

$$H(s) = \frac{V(s)}{I(s)} = \frac{2s+5}{s+2}$$

If the current $i(t)$ is a unity step function, the steady state value of $v(t)$ is given by

- (1) 0
- (2) 2.5 A
- (3) 2 A
- (4) Infinity

12. The open loop transfer function of a unity negative feedback system is given by

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

The closed loop transfer function will have poles at

- (1) -2, -2
- (2) -2, -1
- (3) -2 + j, -2 - j
- (4) -2, 2

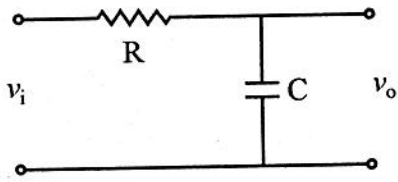
13. Which of the following effects in the system is not caused by negative feedback?

- (1) Reduction in gain
- (2) Increase in bandwidth
- (3) Increase in Sensitivity / Distortion
- (4) Reduction in output impedance

14. The total number of branches in a network is equal to b . The graph of network has n number of nodes. The minimum number of independent mesh equation

- (1) $b+n$
- (2) b
- (3) $b-n$
- (4) $(b-n+1)$

15. The transfer function for the simple lag network shown assuming no external load is



- (1) $\frac{1}{1+sT}$ for $T = RC$
 (2) $\frac{1}{1+sT}$ for $T = \frac{1}{RC}$
 (3) $1 + \frac{1}{sT}$ for $T = RC$
 (4) $\frac{1}{s+T}$ for $T = RC$

16. The state-variable formulation of a system is

$$\dot{x} = Ax + Bu; y = [1 \ 0] x$$

where

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -2 \end{bmatrix} \quad B = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$$

The system transformation would be

- (1) $\frac{s+2}{s^2+5s+6}$ (2) $\frac{2s+5}{s^2+5s+6}$
 (3) $\frac{2s-5}{s^2+5s-6}$ (4) $\frac{s+1}{s^2+5s+6}$

17. The open loop transfer function of a unity feedback system is

$$G(s) = \frac{K}{s^2(s+5)}; K > 0$$

The system is stable for

- (1) $K > 5$
 (2) $K < 5$
 (3) $K > 0$
 (4) It is unstable for all values of K .

18. The characteristic equation of a feedback control system is given by $2s^4 + s^3 + 2s^2 + 5s + 10 = 0$. The number of roots in the right half of the s -plane are

- (1) zero (2) 1
 (3) 2 (4) 3

19. Which bridge is normally used for the measurement of frequency ?

- (1) Anderson bridge
 (2) De Sauty's bridge
 (3) Wien bridge
 (4) None of these

20. The eigen values of the matrix

$$A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix} \text{ can be found by solving}$$

- (1) $\lambda^2 - 7\lambda + 6 = 0$
 (2) $\lambda^2 - 7\lambda + 10 = 0$
 (3) $\lambda^2 - 5\lambda + 4 = 0$
 (4) $\lambda^2 - 2\lambda + 4 = 0$

21. Which of the following instrument can be used for measurement of alternating current only ?
- (1) Permanent magnet type ammeter
 - (2) Induction type ammeter
 - (3) Moving iron voltmeter
 - (4) Moving iron ammeter
22. The pressure coil of dynamometer type wattmeter is
- (1) highly inductive
 - (2) highly resistive
 - (3) purely resistive
 - (4) purely inductive
23. Torque / weight ratio of an instrument indicates
- (1) Selectivity
 - (2) Accuracy
 - (3) Fidelity
 - (4) Sensitivity
24. In a ballistic galvanometer, the deflecting torque is proportional to
- (1) the current through coil
 - (2) square of current through coil
 - (3) square root current through coil
 - (4) sine of measurand
25. For low resistance (from few micro ohms to one ohm) measurement, which bridge is used ?
- (1) Wheatstone bridge
 - (2) Kelvin bridge
 - (3) Guarded Wheatstone bride
 - (4) Maxwell bridge
26. The capacitance and loss angle of a given capacitor specimen are best measured by
- (1) Wheatstone bridge
 - (2) Maxwell bridge
 - (3) Anderson bridge
 - (4) Schering bridge
27. A null type of instrument as compared to a deflection type instrument has
- (1) a higher accuracy
 - (2) a lower sensitivity
 - (3) a faster response
 - (4) All the above
28. Which one of the following decides the time of response of an indicating instruments ?
- (1) Deflecting system
 - (2) Controlling system
 - (3) Damping system
 - (4) Pivot & Jewel bearing

29. In two wattmeter method of measuring 3-phase power, power factor is 0.5, then one of the wattmeter will read
- (1) $\frac{W}{2}$ (2) zero
 (3) $\sqrt{2}W$ (4) $\frac{W}{\sqrt{3}}$
30. Which bridge is used for the measurement of capacitance ?
- (1) Maxwell Inductance Bridge
 (2) De Sauty's Bridge
 (3) Hay's Bridge
 (4) Kelvin's Double Bridge
31. Zener diode is used as the main component in dc power supply for
- (1) Rectification
 (2) Voltage regulation
 (3) Filter action
 (4) Both (1) and (2)
32. A voltmeter has a resistance of 2000 Ω . When it is connected across a DC circuit its power consumption is 2 mW. When the voltmeter is replaced by other voltmeter of 4000 Ω resistance, the power consumed by voltmeter will be
- (1) 4 mW (2) 2 mW
 (3) 1 mW (4) 10 mW
33. FM broadcast standards specify a maximum deviation of frequency to be equal to 75 kHz and a maximum modulating frequency of 15 kHz. What is the modulation index for FM wave ?
- (1) $\frac{1}{5}$ (2) 5
 (3) 60 (4) 125
34. The complete set of only those logic Gates designated as universal gates is
- (1) NOT, OR and AND Gates
 (2) XNOR, NOR and NAND Gates
 (3) NOR and NAND Gates
 (4) XOR, XOR and NAND Gates
35. In a 2-bit half adder, the sum and the carry bits are obtained, respectively by the
- (1) NAND and OR gates
 (2) AND and NOR gates
 (3) NOR and EXCLUSIVE-OR gates
 (4) EXCLUSIVE-OR and AND gates
36. The numbers of flip-flops required in a decade counter are
- (1) 2 (2) 3
 (3) 4 (4) 10

37. The input resistance R_i and output resistance R_o of an ideal operational amplifier in ohms, are
- (1) 0 and 0 (2) 0 and ∞
 (3) ∞ and 0 (4) ∞ and ∞
38. What is the purpose of impedance matching between the output of previous stage and input of next stage in a cascaded amplifier ?
- (1) to achieve high efficiency
 (2) to achieve maximum power transfer
 (3) to achieve reduced distortion
 (4) to achieve reduced noise
39. The binary equivalent of $(11.6275)_{10}$ is
- (1) 101.11011
 (2) 1011.1011
 (3) 101.0011
 (4) 1011.0011
40. In an amplifier, the increase in gain is 12 dB, if the frequency doubled. If the frequency is increased by 10 times, then the increase in gain will be
- (1) 2.4 dB (2) 20 dB
 (3) 40 dB (4) 60 dB
41. Negative feedback enhances all performance parameters of an amplifier except its
- (1) gain
 (2) 3-dB frequency
 (3) noise figure
 (4) input impedance
42. In a clocked S – R flip-flop made with NAND gates, the input combinations S = 1, R = 1, is not permitted because it leads to
- (1) reset set of the Flip-Flop
 (2) both the outputs being zero simultaneously
 (3) an unpredictable output
 (4) the output becoming available before the clock goes low
43. In the common emitter configuration, if the transistor is in the active region, then
- (1) $I_C = \beta I_E$ (2) $I_E = \alpha I_B$
 (3) $I_B = \beta I_C$ (4) $I_C = \beta I_B$

44. A generating station has a maximum demand of 30 MW, a load factor of 60% and a plant capacity factor of 50%. The reserve capacity of the plant is
- (1) 5 MW (2) 4 MW
 (3) 6 MW (4) 10 MW
45. For a fault in a power system, the term critical clearing time is related to
- (1) Reactive power limit
 (2) Transient stability limit
 (3) Short circuit current limit
 (4) Steady state stability limit
46. For a synchronous generator connected to an infinite bus through a transmission line, how are the change of voltage (ΔV) and the change of frequency (Δf) related to the active power (P) and the reactive power (Q)?
- (1) ΔV is proportional to P and Δf to Q.
 (2) ΔV is proportional to Q and Δf to P.
 (3) Both ΔV and Δf are proportional to P.
 (4) Both ΔV and Δf are proportional to Q.

47. In load flow studies of a power system, a voltage control bus is specified by
- (1) Real power and reactive power
 (2) Reactive power and voltage magnitude
 (3) Voltage and voltage phase angle
 (4) Real power and voltage magnitude
48. To protect the power transformer (Y – Y with neutral grounded) against fault, what type of connection do the CTs have?
- (1) Δ – Y connection
 (2) Δ – Δ connection
 (3) Y – Y connection
 (4) Y – Δ connection
49. The per unit impedance $Z_{(PU)}$ in a 3-phase system is
- (1) $\frac{Z_{(ohm)} \times (MVA)_B}{(kV)_B^2}$
 (2) $\frac{Z_{(ohms)} \times (kV)_B^2}{(MVA)_B}$
 (3) $\frac{1000 \times (kV)_B}{\sqrt{3} I_B}$
 (4) $\frac{1000 \times (kV)_B}{I_B \times 10^6}$

50. The surge impedance of a 3-phase, 400 kV transmission line is 400Ω .

The surge impedance loading (SIL) is

- (1) 400 MW (2) 100 MW
 (3) 1600 MW (4) 200 MW

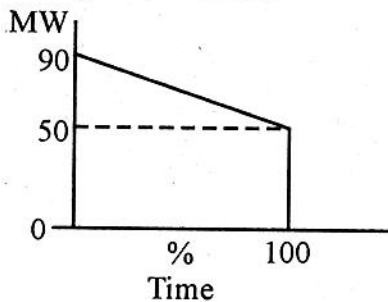
51. A relay is connected to 400/5. A current transformer and set for 150%.

The primary fault current of 2400 A needs a plug setting multiplier of

- (1) 2 (2) 4
 (3) 6 (4) 8

52. The load duration curve for a power station is as shown in the below figure.

The reserve capacity in the plant at 70% capacity factor is



- (1) zero (2) 10 MW
 (3) 30 MW (4) 50 MW

53. What is the preferred type of CB to be installed in extra high voltage AC system ?

- (1) Bulk oil type CB
 (2) Air blast CB
 (3) Vacuum CB
 (4) Sulphur hexafluoride (SF_6) CB

54. The main criterion for selection of size of conductor for a feeder is

- (1) Tensile strength
 (2) Corona loss
 (3) Temperature rise
 (4) Radio interference

55. Which relay is used to detect and protect internal faults of a transformer ?

- (1) Buchholz
 (2) Directional relay
 (3) Thermal relay
 (4) Distance relay

56. In an inter-connected power system, the most suitable power plant to meet the peak load conditions is

- (1) Hydel
 (2) Nuclear
 (3) Steam
 (4) Pumped storage



57. The sequence network of a 3-phase to ground fault has

- (1) positive sequence impedance in series of voltage source
- (2) negative sequence impedance only
- (3) positive, negative and zero sequence impedances in series
- (4) None of these

58. Power transmission lines are transposed to reduce

- (1) Skin effect
- (2) Ferranti effect
- (3) Transmission loss
- (4) Interference with neighbouring communication lines

59. In an 8085 microprocessor, the contents of the accumulator, after the following instructions are executed will become :

```
XRA    A
MVIB   F0H
SUB    B
```

- (1) 01 H
- (2) 0F H
- (3) F0 H
- (4) 10 H

60. When is the Ferranti effect on long overhead transmission lines experienced ?

- (1) The line is lightly loaded.
- (2) The line is heavily loaded.
- (3) The line is fully loaded.
- (4) The power factor is unity.

61. The full forms of the abbreviation TTL and CMOS in reference to logic families are

- (1) Triple Transistor Logic and Chip Metal Oxide Semiconductor.
- (2) Tristate Transistor Logic and Chip Metal Oxide Semiconductor.
- (3) Transistor Transistor Logic and Complementary Metal Oxide Semiconductor.
- (4) Tristate Transistor Logic and Complementary Metal Oxide Silicon.

62. The c expression ++i equivalent to writing

- (1) $i = i + 2$
- (2) $i = i + 1$
- (3) $i = i + i$
- (4) $i = i + i + i$

63. A memory system has a total of 8 memory chips each with 12 address lines and 4 data lines. The total size of the memory system is

- (1) 16 kbytes
- (2) 32 kbytes
- (3) 48 kbytes
- (4) 64 kbytes



64. The addressing mode used in the instruction STAX B is
- (1) direct
 - (2) immediate
 - (3) implicit
 - (4) indirect
65. In microprocessor, the 'monitor program' is stored in micro computer system in
- (1) Read Only Memory (ROM)
 - (2) Static RAM
 - (3) Dynamic RAM
 - (4) Keyboard
66. In JAVA, identifiers are used to
- (1) name things
 - (2) store / save programs
 - (3) compile programs
 - (4) None of the above
67. Division by zero in a program gives rise to which of the following ?
- (1) Syntax error
 - (2) Run time error
 - (3) Logical error
 - (4) Semantic error
68. In a single phase semiconverter with discontinuous conduction and extinction angle $\beta < \pi$, freewheeling action takes place for
- (1) α
 - (2) $\alpha - \beta$
 - (3) $\beta - \pi$
 - (4) Zero degree
69. The most suitable solid state converter for controlling the speed of the three phase squirrel cage motor at 25 Hz is
- (1) Cyclo converter
 - (2) Current source inverter
 - (3) Voltage source inverter
 - (4) Load commutated inverter
70. For quick speed reversal the motor preferred is
- (1) dc motor
 - (2) squirrel cage induction motor
 - (3) slip ring induction motor
 - (4) synchronous motor
71. The welding load
- (1) is always intermittent.
 - (2) is always continuous and constant.
 - (3) is always continuous but varying.
 - (4) is always very very low.

72. In a single phase full wave converter, the output voltage V_o is

- (1) $2 V_m$ (2) $V_m \sin \omega t$
(3) $\frac{2 V_m}{\pi} \sin \alpha$ (4) $\frac{2 V_m}{\pi} \cos \alpha$

73. In a dual converter the values of firing angles of the two converters (α_1 and α_2) have values

- (1) $\alpha_1 = \alpha_2$
(2) $\alpha_1 + \alpha_2 = 90^\circ$
(3) $\alpha_1 + \alpha_2 = 180^\circ$
(4) $\alpha_1 > \alpha_2$

74. Carbon arc welding is suitable particularly for

- (1) all metals
(2) ferrous metals
(3) non ferrous metals
(4) plastic material

75. In variable speed dc motor drive the armature voltage control leads to

- (1) Constant power operation
(2) Constant torque operation
(3) Variable torque operation
(4) Randomly varying power operation

76. The number of output pins of an 8085 microprocessor are

- (1) 40 (2) 27
(3) 21 (4) 19

77. If the rotor resistance of a wound rotor induction motor is increased, then the impact over the speed and starting torque of the motor respectively is

- (1) Speed and starting torque both decrease
(2) Speed increase and starting torque decrease
(3) Speed decrease and starting torque increase
(4) Speed and starting torque both increases

78. Which of the following is not a transducer ?

- (1) LVDT
(2) Tacho-generator
(3) Transformer
(4) Photo-voltaic cell

79. Which of the following lamp gives nearly monochromatic light ?

- (1) CFL
(2) Sodium vapour lamp
(3) Mercury vapour lamp
(4) GLS lamp

80. An 8 pole, dc generator has a simplex wave-wound armature containing 32 coils of 6 turns each. Its flux per pole is 0.06 Wb. The machine is running at 250 rpm. The induced armature voltage is
- (1) 96 V (2) 192 V
(3) 384 V (4) 768 V
81. The number of poles on turbo-alternator is usually
- (1) 2 (2) 4
(3) 6 (4) 8
82. How can the reactive power delivered by a synchronous generator be controlled ?
- (1) By changing the prime mover input
(2) By changing the excitation
(3) By changing the direction of rotation
(4) By changing the prime mover speed
83. The armature of a d.c. machine is laminated
- (1) to reduce the hysteresis loss
(2) to reduce eddy current loss
(3) to reduce the mass
(4) to reduce the inductance

84. The overall efficiency of a d.c. generator is maximum when its variable loss is equal to
- (1) constant loss
(2) stray loss
(3) eddy current loss
(4) mechanical loss
85. The disadvantage of field control method for controlling the speed of DC shunt motor is that it
- (1) gives speeds lower than the normal speed
(2) is wasteful
(3) needs a large rheostat
(4) gives speed above the normal/rated speed
86. The low voltage winding of a 400 / 230 V single phase, 50 Hz transformer is connected to a 25 Hz supply. What should be the supply voltage to maintain the flux in the transformer core constant ?
- (1) 230V (2) 460V
(3) 115V (4) 55V
87. The reactance per phase as compared to the resistance per phase of an induction motor is
- (1) quite high (2) slightly large
(3) almost same (4) very small

88. For the development of the torque in AC machines the essential conditions are –

- (1) torque will be produced by the interaction of stator and rotor mmf.
- (2) torque is inversely proportional to the angle between stator and rotor fields.
- (3) the stator and rotor fields should rotate at different speed.
- (4) stator core should not be laminated.

89. Which DC motor cannot be started on no load ?

- (1) Shunt motor
- (2) Commulative compound motor
- (3) Series motor
- (4) Differentially compound motor

90. In which of the following machines, there are no mechanical losses involved ?

- (1) Salient pole alternator
- (2) Non-salient pole alternator
- (3) Squirrel cage induction motor
- (4) Transformer

91. A three phase transformer is connected in Delta-star, and its line voltage phasor of low voltage winding is leading by $+30^\circ$ to the corresponding line voltage phasor of high voltage side. The connection is designated as

- | | |
|-----------|-----------|
| (1) Dd 11 | (2) Yd 11 |
| (3) Dy 11 | (4) Yy 11 |

92. In a three phase induction motor, the ratio of power across air gap, rotor copper loss and gross mechanical power output is

- (1) $P_G : sP_G : (1 - S) P_G$
- (2) $P_G : sP_G : (S - 1) P_G$
- (3) $P_G : (1 - S) P_G : sP_G$
- (4) $P_G : sP_G : (1 + S) P_G$

93. Which one is not the property of an ideal transformer ?

- (1) Core has infinite permeability.
- (2) Per unit impedance of primary and secondary windings are equal.
- (3) The leakage flux and leakage reactance are zero.
- (4) The efficiency of transformer is 100%.

94. The stiffness or synchronizing power coefficient of a synchronous machine is given by

- (1) $E_f V_t \cos \delta$ (2) $\frac{E_f V_t \cos \delta}{X_s}$
 (3) $E_f V_t \sin \delta$ (4) $\frac{E_f V_t \sin \delta}{X_s}$

95. A Network function has a zero at $S = -1$ and poles at $S = -1 \pm j1$ the multiplier being unity. If the input is a unit step function, then what is the steady state response ?

- (1) $2\angle 0^\circ$ (2) $1\angle -45^\circ$
 (3) $3\angle 90^\circ$ (4) $0.5\angle 0^\circ$

96. The h parameters h_{11} and h_{22} are related to Z and Y parameters as

- (1) $h_{11} = Z_{11}$ and $h_{22} = \frac{1}{Z_{22}}$
 (2) $h_{11} = Z_{11}$ and $h_{22} = Y_{22}$
 (3) $h_{11} = \frac{1}{Y_{11}}$ and $h_{22} = \frac{1}{Z_{22}}$
 (4) $h_{11} = \frac{1}{Y_{11}}$ and $h_{22} = Y_{22}$

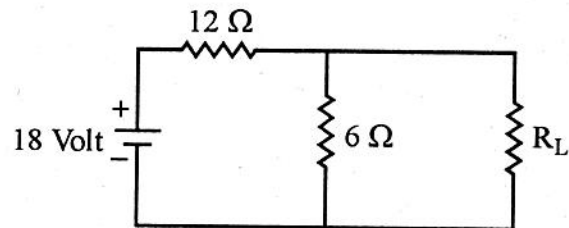
97. A single phase induction motor, rotating in the direction of forward field, the slip of the rotor with respect to forward and backward rotating fields are respectively

- (1) S and $1 - S$ (2) S and $2 - S$
 (3) S and S (4) $1 - S$ and S

98. The frequency at which maximum voltage occurs across the inductance in an RLC series circuit is

- (1) $\frac{1}{2\pi\sqrt{LC}}$
 (2) $\frac{1}{2\pi\sqrt{LC - R^2}}$
 (3) $\frac{1}{2\pi\sqrt{LC - \frac{C^2 R^2}{2}}}$
 (4) $\frac{L}{C}$

99. In the circuit shown below, the maximum power absorbed by the load resistance R_L is



- (1) 1.5 W (2) 2.25 W
 (3) 2.5 W (4) 5 W

100. In a series RLC circuit, at a frequency less than the resonant frequency

- (1) the circuit is capacitive in nature.
 (2) the circuit is inductive in nature.
 (3) the circuit is purely resistive.
 (4) power factor of the circuit is unity.

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