

Question Booklet Code :

Register
Number

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2019
ELECTRICAL ENGINEERING
(DEGREE Std.)

Time Allowed : 3 Hours]

[Maximum Marks : 300

Read the following instructions carefully before you begin to answer the questions.

IMPORTANT INSTRUCTIONS

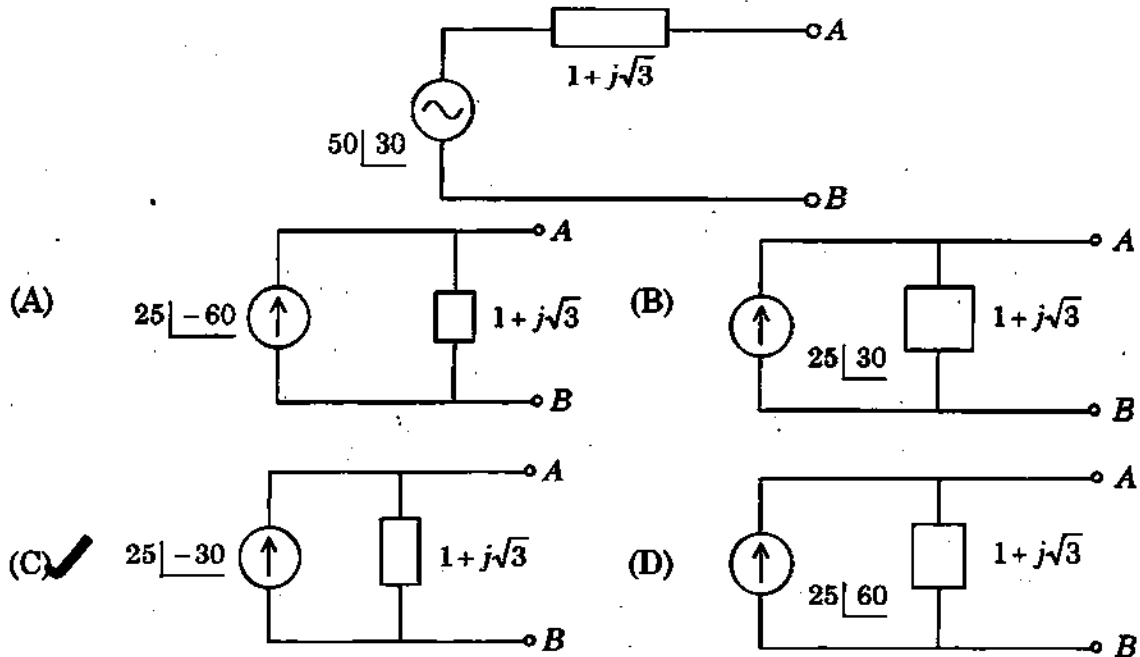
1. The applicant will be supplied with Question Booklet 15 minutes before commencement of the examination.
2. This Question Booklet contains **200** questions. Prior to attempting to answer, the candidates are requested to check whether all the questions are there in series and ensure there are no blank pages in the question booklet. **In case any defect in the Question Paper is noticed, it shall be reported to the Invigilator within first 10 minutes and get it replaced with a complete Question Booklet. If any defect is noticed in the Question Booklet after the commencement of examination, it will not be replaced.**
3. Answer **all** questions. All questions carry equal marks.
4. You must write your Register Number in the space provided on the top right side of this page. Do not write anything else on the Question Booklet.
5. An answer sheet will be supplied to you, separately by the Room Invigilator to mark the answers.
6. You will also encode your Question Booklet Code with Blue or Black ink Ball point pen in the space provided on the side 2 of the Answer Sheet. If you do not encode properly or fail to encode the above information, action will be taken as per Commission's notification.
7. Each question comprises *four* responses (A), (B), (C) and (D). You are to select **ONLY ONE** correct response and mark in your Answer Sheet. In case you feel that there are more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each question. Your total marks will depend on the number of correct responses marked by you in the Answer Sheet.
8. In the Answer Sheet there are **four** circles (A), (B), (C) and (D) against each question. To answer the questions you are to mark with Blue or Black ink Ball point pen **ONLY ONE** circle of your choice for each question. Select one response for each question in the Question Booklet and mark in the Answer Sheet. If you mark more than one answer for one question, the answer will be treated as wrong. e.g. If for any item, (B) is the correct answer, you have to mark as follows :

(A) ● (C) (D)
9. You should not remove or tear off any sheet from this Question Booklet. You are not allowed to take this Question Booklet and the Answer Sheet out of the Examination Hall during the time of examination. After the examination is concluded, you must hand over your Answer Sheet to the Invigilator. You are allowed to take the Question Booklet with you only after the Examination is over.
10. **Do not make any marking in the question booklet except in the sheet before the last page of the question booklet, which can be used for rough work. This should be strictly adhered.**
11. Applicants have to write and shade the total number of answer fields left blank on the boxes provided at side 2 of OMR Answer Sheet. An extra time of 5 minutes will be given to specify the number of answer fields left blank.
12. Failure to comply with any of the above instructions will render you liable to such action or penalty as the Commission may decide at their discretion.

SEAL

SPACE FOR ROUGH WORK

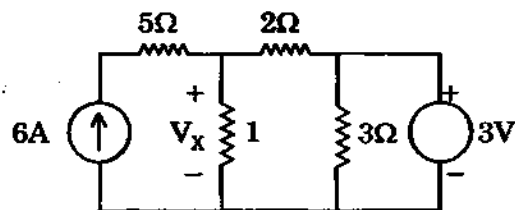
1. The voltage source is represented as shown in fig. The equivalent current source is



2. Unit of reactive power is

- (A) VA
 (B) VAR
 (C) W
 (D) KW hr

3. The voltage marked V_x is given by



- (A) 5V
 (B) 30V
 (C) 3V
 (D) 1V

4. The condition $AD - BC = 1$ for two port network implies that the network is a

- (A) Reciprocal network
 (B) Lumped element network
 (C) Losses less network
 (D) Unilateral element network

5. The current through the inductor is given by

(A) $\frac{1}{L} \int_{t_0}^t V(t) dt + i(t_0)$

(B) $L \frac{dV}{dt}$

(C) $L \int_{t_0}^t V(t) dt + i(t_0)$

(D) $\frac{1}{L} \frac{dV}{dt}$

6. In a balanced Y - Y circuit, the $V_{an} = V_p \angle 0$, $V_{bn} = V_p \angle -120$, $V_{cn} = V_p \angle +120$. The line voltages are

(A) $V_{ab} = \sqrt{3} V_p \angle 0$, $V_{bc} = \sqrt{3} V_p \angle -120$, $V_{ca} = \sqrt{3} V_p \angle +120$

(B) $V_{ab} = \sqrt{3} V_p \angle 30$, $V_{bc} = \sqrt{3} V_p \angle -90$, $V_{ca} = \sqrt{3} V_p \angle -210$

(C) $V_{ab} = V_p \angle 30$, $V_{bc} = V_p \angle -90$, $V_{ca} = V_p \angle -210$

(D) $V_{ab} = V_p \angle 30$, $V_{bc} = V_p \angle 90$, $V_{ca} = V_p \angle 210$

7. The effective value of a periodic signal is its

(A) Average value

(B) Maximum value

(C) Root mean square value

(D) Peak-Peak value

8. The primary and secondary of the autotransformers are coupled

(A) Conductively alone

(B) Magnetically alone

(C) Magnetically and conductively

(D) Neither magnetically nor conductively

9. The average power consumed by any network composed of ideal inductor and capacitor is

(A) ∞

(B) 0

(C) $\frac{1}{2} VI \cos \phi$

(D) VI

10. The value of $\text{div } D$ at origin if $D = e^{-x} \sin y a_x - e^{-x} \cos y a_y + 2z a_z$
- (A) 1 (B) 0
(C) 2 (D) 4
11. If $r = x a_x + y a_y + z a_z$, the position vector of point (x, y, z) and $r = |r|$, which of the following is incorrect
- (A) $\nabla r = r/\gamma$ (B) $\nabla \cdot r = 1$
(C) $\nabla^2(r \cdot r) = 6$ (D) $\nabla \times r = 0$
12. A disc is uniformly charged with a charge density $\sigma \text{ C/m}^2$. The electric field of the disc is given by
- (A) $E = 2\epsilon\sigma$ (B) $E = \sigma/2\epsilon$
(C) $E = \frac{\sigma\epsilon}{2}$ (D) $E = \frac{2\sigma}{\epsilon}$
13. Which part of the magnetic path requires largest mmf?
- (A) Coil (B) Core
(C) Air gap (D) Inductance
14. Which of the following statement holds for the divergence of electric and magnetic fields?
- (A) Both are zero
(B) These are zero for static field but non zero for varying fields
(C) It is zero for electric flux density
(D) It is zero for magnetic flux density
15. Consider the following statements associated with boundary condition between two media.
- Normal component of B is continuous at the surface of Discontinuity
 - Normal component of D may or may not be continuous
- Which statements are correct?
- (A) 1 only (B) 2 only
(C) Both 1 and 2 (D) Neither 1 nor 2

16. If \vec{E} is the electric field intensity, then $\nabla \cdot (\nabla \times \vec{E})$ is equal to
 (A) \vec{E} (B) $|\vec{E}|$
 (C) Null vector (D) Zero
17. The inductance of a solenoid of length 1000mm would uniformly wound with 3000 turns on a cylindrical paper tube of 60mm diameter is
 (A) $3.2\mu H$ (B) $3.2mH$
 (C) $32mH$ (D) $3.2H$
18. Two equal point charges of 20nC are located at $x = 2, 3$ m respectively. What is the potential at the origin?
 (A) 270V (B) 200V
 (C) 261V (D) 0V
19. Energy stored in a capacitor in terms of charge and capacitance
 (A) $W = 2 QV$ (B) $W = \frac{1}{2} QV$
 (C) $W = \frac{1}{2} QV^2$ (D) $W = \frac{1}{2} Q^2V$
20. A dual beam CRO uses
 (A) Electronic switch (B) Two electron guns
 (C) One electron gun (D) Two time base generator circuit
21. The range of an ammeter can be extended by the use of a
 (A) Shunt in series (B) Shunt in parallel
 (C) Induction in series (D) Capacitor in series
22. AC meters indicate
 (A) Maximum value (B) Average value
 (C) RMS value (D) Crest value
23. Q meter works on the principle of
 (A) Mutual inductance (B) Self inductance
 (C) Series resonance circuit (D) Parallel resonance circuit

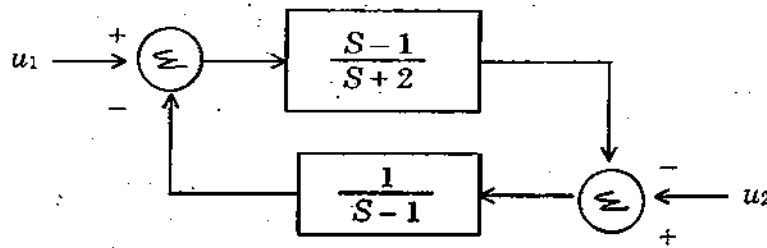
24. The bridge used for measurement of capacitance is
- (A) Schering Bridge (B) Wheat stone Bridge
(C) Wien's Bridge (D) Hay's Bridge
25. Match List I with List II and given correct answer using the given code :

List I		List II	
(a) Anderson Bridge		1. Low resistance measurement	
(b) Kelvin Bridge		2. Medium resistance measurement	
(c) Schering Bridge		3. Inductance measurement	
(d) Wheat stone Bridge		4. Capacitance measurement	
(a)	(b)	(c)	(d)
(A) 4	2	3	1
(B) 3	2	4	1
(C) 3	1	4	2
(D) 4	1	3	2

26. The deflecting torque in a measuring instrument can be produced by
- (A) Gravity control (B) Spring control
(C) Air friction (D) Magnetically
27. Megger is combination of
- (A) Motor and generator (B) Generator and voltmeter
(C) Generator and Ammeter (D) Generator and ohm meter
28. The meter constant of energy meter is given by
- (A) Rev/Kw (B) Rev/Kwh
(C) Rev/watt (D) Rev/Joule
29. Two watt meter method for 3 phase power measurement can be used for
- (A) Only balanced load
(B) Only unbalanced load
(C) Both Balanced and unbalanced load
(D) Star connected loads
30. The internal resistance of an ammeter should be
- (A) Medium (B) High
(C) Small (D) Infinity

31. If the gain of the critical damped system is increased, it will behave as
- (A) Oscillatory
 - (B) critically damped
 - (C) Overdamped
 - (D) Underdamped
32. In pneumatic control systems, the control valve used as final control element converts
- (A) Pressure signal to electric signal
 - (B) Pressure signal to position change
 - (C) electric signal to pressure signal
 - (D) Position change to Pressure signal
33. _____ directly converts temperature into voltage.
- (A) Thermocouple
 - (B) Potentiometer
 - (C) Gear train
 - (D) LVDT
34. The number of positive real roots of characteristic equation $S^2 - 2S + 2 = 0$ are
- (A) 1
 - (B) 2
 - (C) 0
 - (D) cannot be obtained

35. The system shown in figure is

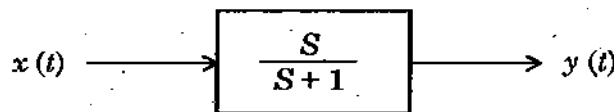


- (A) Stable
- (B) Unstable
- (C) Conditionally stable
- (D) Stable for input u_1 , but unstable for input u_2

36. Which of the following signal is a bounded signal

- (A) e^{2t}
- (B) t
- (C) e^{-3t}
- (D) $e^t \sin t$

37. In the system shown in figure, the input $x(t) = \sin wt$, In the steady state response $y(t)$ will be



- (A) $\frac{1}{\sqrt{2}} \sin(t - 45^\circ)$
- (B) $\frac{1}{\sqrt{2}} \sin(t + 45^\circ)$
- (C) $\sin(t - 45^\circ)$
- (D) $\sin(t + 45^\circ)$

38. A second order system has closed loop transfer function as $G(s) = \frac{(s/a)(s+a)}{(s+1)(s+16)}$ The value of a steady state error such that position error constant is 100 is

- (A) 2
- (B) 0.5
- (C) 4
- (D) -0.5

39. The position and velocity errors of a type-2 system are

- (A) Constant, constant
- (B) Constant, infinity
- (C) Zero, constant
- (D) Zero, zero

40. Point out the WRONG statement (from the choices) Blocked rotor test on a 3-P induction motor helps to find
- (A) Short-Circuit current with normal voltage
 - (B) Short-Circuit power factor
 - (C) Fixed losses
 - (D) Motor resistance as referred to stator
41. The starting torque of a capacitor-start induction-run motor is directly related to the phase angle α between its two winding currents by the relation
- (A) $\cos \alpha$
 - (B) $\sin \alpha$
 - (C) $\tan \alpha$
 - (D) $\sin \frac{\alpha}{2}$
42. When applied rated voltage per phase is reduced by one-half, the starting torque of a squirrel cage induction motor becomes _____ of the starting torque with full voltage
- (A) $\frac{1}{2}$
 - (B) $\frac{1}{4}$
 - (C) $\frac{1}{\sqrt{2}}$
 - (D) $\frac{\sqrt{3}}{2}$
43. If an induction motor has a rotor resistance of 0.02Ω and a stand still reactance of 0.1Ω , then the value of total resistance of starter for rotor circuit for maximum torque to be exerted at starting is
- (A) 0.002Ω
 - (B) 5Ω
 - (C) 0.12Ω
 - (D) 0.08Ω
44. Crawling of an induction motor is due to
- (A) Space harmonics in the stator teeth
 - (B) The number of teeth on stator being equal to number teeth on rotor.
 - (C) The fluctuation in load torque
 - (D) Unequal distribution of winding
45. The rotor slots are slightly skewed in squirrel cage induction motor to
- (A) Increase the strength of the rotor bars
 - (B) Reduce the magnetic hum and locking tendency of the rotor
 - (C) Economize the copper to be used
 - (D) Provide ease of fabrication
46. A Transformer having 1000 primary turns is connected to a 250 V a.c. supply. For a secondary voltage of 400V, the number of secondary turns should be
- (A) 1600
 - (B) 250
 - (C) 400
 - (D) 1250

47. The peripheral speed of a 4 pole wave wound dc machine which has an armature of 25 cm diameter and runs at 1200 rpm is
- (A) 7.85 m/s (B) 15.7 m/s
(C) 31.4 m/s (D) 62.8 m/s
48. In a DC motor the unidirectional torque is produced with the help of
- (A) Brushes (B) Commutator
(C) End plates (D) Both (A) and (B)
49. The maximum efficiency occurs in a separately excited DC generator when the terminal voltage is 220 V and the induced EMF is 240 V. The armature resistance is 0.2Ω . The stray losses will be
- (A) 1000 W (B) 2000 W
(C) 3000 W (D) 4000 W
50. A star connected synchronous machine with neutral point grounded through a reactance x_n and winding zero sequence reactance x_0 experiences a single-line to ground fault, through an impedance x_f . The total zero sequence impedance is
- (A) $x_0 + x_n + x_f$ (B) $x_0 + 3x_n + x_f$
(C) $x_0 + 3(x_n + x_f)$ (D) $3(x_0 + x_n + x_f)$
51. Which of the following is true?
- (A) MHO relay is a non-directional relay
(B) All impedance relays are directional relays
(C) A reactance relay needs a MHO relay as a starting relay
(D) Reactance relays are never preferred for ground fault relaying
52. For visual critical voltage, breakdown must extend from the conductor surface to a distance of
- (A) $r \left(1 + \frac{0.3}{\sqrt{8r}} \right)$ (B) $r + \frac{0.3}{\sqrt{8r}}$
(C) $\sqrt{8r} (1 + 0.3r)$ (D) $\sqrt{r} \left(1 + \frac{0.3}{8r} \right)$

53. A synchronous generator is supplying power to an infinite bus through a transmission line. If a shunt capacitor is added near the middle of the line, the steady state stability limit will
- (A) increase (B) decrease
(C) remain unaltered (D) become zero
54. A single line to ground fault occurs on a three-phase isolated neutral system with a line to neutral voltage of V kV. The potentials on the healthy phases rise to a value equal to
- (A) $\sqrt{2}V$ kV (B) $\sqrt{3}V$ kV
(C) $3V$ kV (D) $\frac{1}{\sqrt{3}}V$ kV
55. Suspension insulators are used when transmission voltage is
- (A) high (B) low
(C) fluctuating (D) steady
56. Which one of the following is not true in HVDC transmission?
- (A) Corona loss is much more in HVDC transmission
(B) The power transmission capability of bipolar line is almost the same as that of single-circuit ac line
(C) HVDC link can operate between two ac systems whose frequencies need not be equal
(D) There is no distance limitation for HVDC transmission by underground cable
57. Which one of the following matrices reveals the topology of the power system network?
- (A) Bus incidence matrix (B) Primitive impedance matrix
(C) Primitive admittance matrix (D) Bus impedance matrix
58. For which of the following reasons is a differential relay biased to avoid maloperation when used for transformer protection?
- (1) Saturation of CTs;
(2) Mismatch of CT ratios;
(3) Difference in connection of both sides;
(4) Current setting multiplier.
- Select the correct answer using the codes given below :
- (A) 1 and 4 (B) 1 and 2
(C) 2, 3 and 4 (D) 1, 2 and 3
59. In a power system with negligible resistance, the fault current at a point is 8.0 pu. The series reactance to be included at the fault point to limit the short-circuit current to 5.0 pu is
- (A) 3.0 pu (B) 0.2 pu
(C) 0.125 pu (D) 0.075 pu

60. Express the following Boolean expression using exclusive - OR and AND gate operators.

$$F = AB'CD' + A'BCD' + AB'C'D + A'BC'D$$

- (A) $F = (A \oplus C)(B \oplus D)$ (B) $F = (A \oplus B)(C \oplus D)$
 (C) $F = (A \oplus D)(B \oplus C)$ (D) $F = (AB) \oplus (CD)$

61. Direct coupled amplifiers are used to amplify

- (A) low frequencies (B) very low frequencies
 (C) high frequencies (D) very high frequencies

62. The d.c. load line of a transistor circuit is a,

- (A) graph between I_C and V_{CC} (B) graph between I_C and I_B
 (C) graph between I_C and V_{CE} (D) graph between I_B and V_{CE}

63. If the input impedance of an amplifier is Z in without feedback, then with negative voltage feedback, its value is

- (A) $Z_{in}(1 + A_v M_v)$ (B) $Z_{in} / (1 + A_v M_v)$
 (C) $(1 + A_v M_v) / Z_{in}$ (D) $Z_{in}(1 - A_v M_v)$

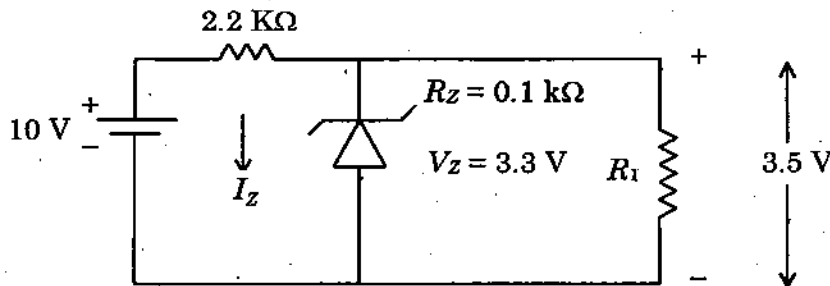
64. The maximum overall efficiency of a transformer-coupled class-A amplifier is,

- (A) 78.5% (B) 85%
 (C) 25% (D) 50%

65. In a half wave rectifier, the peak value of the a.c. voltage across the secondary of the transformer is $20\sqrt{2}$ V. If no filter circuit is used, the maximum d.c voltage across the load will be

- (A) 28.28 V (B) 25 V
 (C) 14.14 V (D) 9 V

66. The current through the zener diode in the given figure is



- (A) 33 mA (B) 3.3 mA
 (C) 2 mA (D) 0 mA

67. What is the maximum range of memory that can be accessed using 10 address lines?
 (A) 1000 bytes (B) 2048 bytes
 (C) 1024 bytes (D) 100 bytes

68. Match the following

Logic family		Characteristics of Logic family	
(a) TTL		1. maximum power dissipation	
(b) ECL		2. Highest packing density	
(c) NMOS		3. Least power dissipation	
(d) CMOS		4. Saturate Logic	

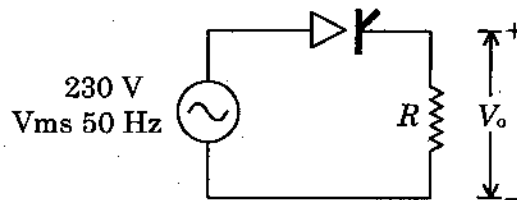
	(a)	(b)	(c)	(d)
(A)	1	4	2	3
(B)	1	4	3	2
(C)	4	1	2	3
(D)	4	1	3	2

69. A JFET has the following parameters : $I_{DSS} = 32 \text{ mA}$; $V_{GS(off)} = -8 \text{ V}$; $V_{GS} = -4.5 \text{ V}$. Calculate the drain current.
 (A) 0.6125 mA (B) 61.25 mA
 (C) 6.125 mA (D) .06125 mA

70. A four quadrant operation requires
 (A) two full converters in series
 (B) two full converters connected back to back
 (C) two full converters connected parallel
 (D) two semiconverters connected back to back

71. The output ripple frequency is 'x' times of the input supply frequency in 3ϕ full wave AC to DC converter. The value of the 'x' is
 (A) 2 (B) 3
 (C) 6 (D) 12

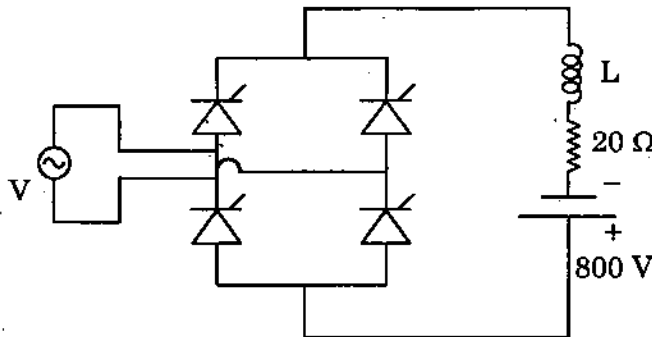
72. Consider a phase controlled converter shown in the figure. The thyristor is fired at an angle α in every positive half of input voltage. If peak value of instantaneous output voltage is 230, then the firing angle α is close to



- (A) 45° (B) 135°
 (C) 90° (D) 185°

76. A 1 ϕ AC voltage regulator feeding a pure R-load has a load voltage of 200V RMS, when fed from a source of 250 V RMS. The input power factor of the controller is
- (A) 0.64 (B) 0.8
(C) 0.894 (D) 0.75

77. A full bridge converter supplying an RLE load is shown. The firing angle is 120° supply voltage is $V = 200\pi \sin(100\pi t)$ V, $R = 20\Omega$, $E = 800$ V. The inductance is large enough to make current smooth. The real power fed back to the source is KW is



- (A) 10 kw (B) 6 kw
(C) 50 kw (D) 30 kw
78. A three phase semi converter feeds the armature of a separately excited DC motor supplying a non zero torque. For the steady state operation, the motor current is found to drop to zero at certain instant of time. At such points, the output voltage is
- (A) Equal to the instantaneous value of AC phase vol
(B) Equal to the instantaneous value of motor Back EMF
(C) Arbitrary.
(D) Zero
79. Initial content of register D is decimal number 20. If the following program for 8085 is executed what is the final content in register D
- ```
MOV A, D
RAL
MOV D, A
```
- (A) decimal 10 (B) decimal 20  
(C) decimal 30 (D) decimal 40



80. The final value of  $\frac{2s+1}{s^4+8s^3+16s^2+s}$  is

- (A)  $\infty$  (infinity) (B) 2  
 (C) 1 (D) 0 (zero)

81. The magnitude function of Butterworth low pass filter is given by

(A)  $|H(j\Omega)| = \frac{1}{\left[1 + \left(\frac{\Omega}{\Omega_c}\right)^{2N}\right]^{\frac{1}{2}}} \quad N=1, 2, 3$

(B)  $|H(j\Omega)| = \frac{1}{\left[2 + \left(\frac{\Omega}{\Omega_c}\right)^{2N}\right]^{\frac{1}{2}}} \quad N=1, 2, 3$

(C)  $|H(j\Omega)| = \frac{1}{\left[1 + \left(\frac{\Omega}{\Omega_c}\right)^{2N}\right]} \quad N=1, 2, 3$

(D)  $|H(j\Omega)| = \frac{1}{\left[1 + \left(\frac{\Omega_c}{\Omega}\right)^{2N}\right]^{\frac{1}{2}}} \quad N=1, 2, 3$

82. The given discrete time system  $y(n) = x(-n+2)$

- (A) dynamic, non causal and stable  
 (B) static, causal and unstable  
 (C) dynamic, causal and stable  
 (D) dynamic, non causal and unstable

83. Convolve the two sequences  $x(n) = \{1, 2, 3\}$  and  $h(n) = \{5, 4, 6, 2\}$ . Therefore  $x(n) * h(n)$  would be

- (A)  $\{5, 14, 29, 26, 22, 6\}$  (B)  $\{5, 14, 29, 26, 22, 6\}$   
 (C)  $\{14, 5, 26, 29, 6, 22\}$  (D)  $\{6, 22, 26, 29, 14, 5\}$

84. Truncating numbers that are represented in sign-magnitude form result in a quantization error that is

- (A) negative for positive numbers (B) negative for negative numbers  
 (C) positive for positive numbers (D) unsymmetrical about zero

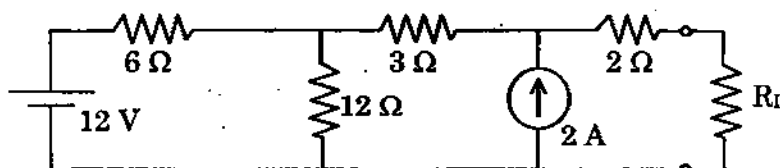
85. In Digital multiplexer, T1 carrier system is designed to accommodate,
- (A) 12 Voice Channels primarily for short distance
  - (B)  24 Voice Channels for short distance
  - (C) 48 Voice Channels for short distance
  - (D) 64 Voice Channels for short distance
86. In PCM, if transmission path is very long then the reconstruction of PCM wave is done by.
- (A) increasing the pulse width
  - (B)  regenerative repeater stations
  - (C) increasing the pulse amplitude
  - (D) decreasing the spacing in pulses
87. Which among the following is true for DMA Data transfer
- (i) The microprocessor does not execute any instructions during hold period.
  - (ii) Used for data transfer in slow I/O devices.
  - (iii) The microprocessor is forced to hold on by an I/O device until data transfer is complete.
- (A) (ii) only
  - (B) (i) and (ii)
  - (C) (i), (ii) and (iii)
  - (D)  (i) and (iii)
88. For an interface between silicon and zinc oxide often used in solar cell technology, the critical angle of refraction is
- (A) 10.1°
  - (B) 20.2°
  - (C)  30.3°
  - (D) 40.4°
89. Solar cells are connected in series in order to
- (A)  Increase the voltage rating
  - (B) Increase the current rating
  - (C) Increase the thermal rating
  - (D) Increase the life of the cell

90. The typical life time of a PV system is
- (A) 20 years (B)  25 years  
(C) 25 decades (D) 30 years
91. The specific gravity of electrolyte in a battery is measured by
- (A) Manometer (B) Anemometer  
(C)  Hydrometer (D) PH meter
92. In a lead acid battery dilute sulphuric acid (electrolyte) approximately comprises the following.
- (A) One part of  $H_2O$ , three parts of  $H_2SO_4$   
(B) Two parts of  $H_2O$ , two parts of  $H_2SO_4$   
(C)  Three parts of  $H_2O$  and one part of  $H_2SO_4$   
(D) All  $H_2SO_4$
93. The storage battery generally used in electric power station is
- (A) Nickel – Cadmium battery (B) Zinc – Carbon battery  
(C)  Lead – Acid battery (D) Lithium – ion battery
94. The output voltage  $V_o$  of a boost converter is related to the duty cycle  $D$  as
- (A)   $V_o = V_{in} / (1 - D)$  (B)  $V_o = V_{in} / (1 - D)^2$   
(C)  $V_o = V_{in} / (1 + D)$  (D)  $V_o = V_{in} / (1 + D)^2$
95. A device consuming 15 W is switched on for 6 hours a day and another device consuming 20 W is operated for 3 hours a day. The minimum Ah rating of a 12 V battery supplying power to the devices is
- (A)  12.5 Ah (B) 35 Ah  
(C) 15 Ah (D) 20 Ah

96. A capacitor stores energy in
- (A) magnetic field                      (B) ✓ electric field
- (C) electromagnetic field              (D) rotating magnetic field

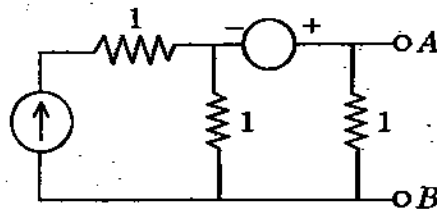
97. A circuit whose properties are not the same in either direction is called
- (A) Bilateral circuit                      (B) ✓ Unilateral circuit
- (C) Reversible circuit                    (D) Inverted circuit

98. Find the value of  $R_L$  for which maximum power to be transferred to the circuit



- (A)  $2\Omega$                                   (B)  $5\Omega$
- (C)  $31\Omega$                                 (D) ✓  $9\Omega$
99. If a two port network is passive, then with the usual notation which of the following relationship is true
- (A)  $h_{12} = h_{21}$                       (B)  $h_{12} = -h_{21}$
- (C)  $h_{11} = h_{22}$                       (D) ✓  $h_{11}h_{22} - h_{12}h_{21} = 1$
100. A circuit contains linear resistors and ideal voltage sources. If values of all resistors are doubled, then the voltage across each resistor is
- (A) Halved                                  (B) Doubled
- (C) Increased by four times              (D) ✓ Not changed

101. The Thevenin's equivalent circuit to the left of  $AB$  has  $R_{eq}$  given by



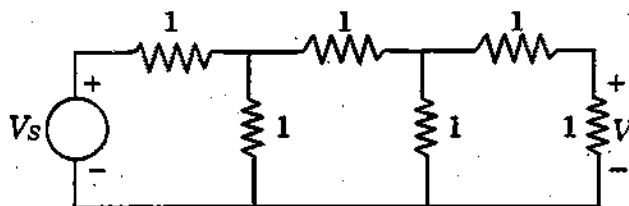
(A)  $\frac{1}{3}$

(B)  $\frac{1}{2}$

(C) 1

(D)  $\frac{3}{2}$

102. The voltage across last resistor is  $V$ . All the resistors are unity. Then  $V_s$  is given by



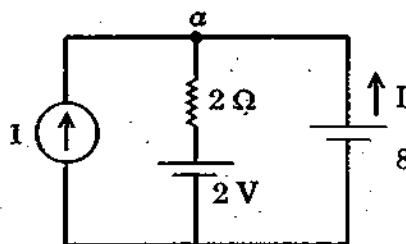
(A) 13 V

(B) 8 V

(C) 4 V

(D) 10 V

103. In the circuit shown current  $I$  is given by



(A) -2 A

(B) 2 A

(C) 3 A

(D) 4 A

104. All \_\_\_\_\_ are loops but all \_\_\_\_\_ are not meshes.

(A) Loops, Meshes

(B) Meshes, Loops

(C) Branches, Loops

(D) Nodes, Branches

105. Susceptance offered by a impedance with  $R$  and  $X$  is given by
- (A)  $R/R^2 + X^2$  (B)  $-R/R^2 + X^2$   
 (C)  $X/R^2 + X^2$  (D)   $-X/R^2 + X^2$
106. Kirchoff's current law is based on
- (A) Law of conservation of energy  
 (B)  Law of conservation of charges  
 (C) Faraday's law  
 (D) Ampere's circuital law
107. If  $\bar{A}$  is a vector magnetic potential then  $\nabla \cdot \bar{A} = ?$
- (A)  0 (B) 1  
 (C)  $\infty$  (D) Constant
108. The force between two long parallel conductors is inversely proportional to
- (A) Radius of the conductor  
 (B) Current in one conductor  
 (C)  Distance between the conductors  
 (D) Product of currents in two conductors
109. A toroid has a core of cross sectional area of  $2500 \text{ mm}^2$ , mean diameter  $250 \times 10^{-6}$  and  $\mu_r = 1000$ . What is the number of turns to be wound on the core to obtain an inductance of 1 Henry?
- (A) 250 (B) 1000  
 (C)  500 (D) 750
110. What is the electric field inside a perfect conductor?
- (A) Infinity  
 (B)  Zero  
 (C) Uniform throughout the conductor  
 (D) Maximum compared to other part

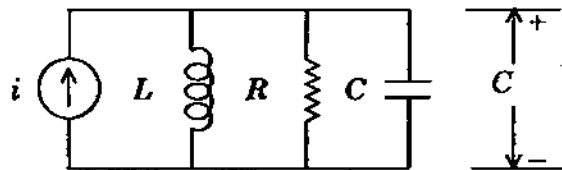
111. Which one of the following is zero as applied to electro magnetic fields?
- (A)  $\text{grad div } \vec{A}$  (B)  $\text{div grad } \vec{A}$   
 (C)  $\text{div curl } \vec{A}$  (D)  $\text{curl curl } \vec{A}$
112. If the static magnetic flux density is  $\vec{B}$  then
- (A)  $\nabla \times \vec{B} = 0$  (B)  $\nabla \cdot \vec{B} = 0$   
 (C)  $\nabla \cdot \vec{B} = \vec{J}$  (D)  $\nabla^2 \vec{B} = 0$
113. The magnetic field required to reduce the residual magnetism to zero is called
- (A) Retentivity (B) Coercivity  
 (C) Hysteresis (D) Saturation magnetism
114. Which one of the following statement is correct?
- On a conducting surface boundary, electric field lines are
- (A) Always tangential  
 (B) Always Normal  
 (C) Neither tangential nor normal  
 (D) At an angle depending on the field intensity
115.  $\nabla \vec{B}$  is based on
- (A) Gauss's Law (B) Lenz's Law  
 (C) Ampere's Law (D) Continuity equation
116. Point charges  $Q_1 = 1nc$  and  $Q_2 = 2nc$  are at a distance apart. Which of the following statement is incorrect?
- (A) The force on  $Q_1$  is repulsive  
 (B) The force on  $Q_2$  is the same in magnitude as that on  $Q_1$   
 (C) As the distance between decreases, the force on  $Q_1$  increases linearly  
 (D) The force on  $Q_2$  is along the line joining them

117. Most commonly used watt meter is
- (A) Induction type (B) Electro static type  
(C)  Electro dynamometer type (D) Moving Iron type
118. To measure voltage and current in a circuit, voltmeter and ammeter are connected in the following manner respectively
- (A) Series and series (B) Series and parallel  
(C) Parallel and parallel (D)  Parallel and series
119. Digital instrument have input impedance in the order of
- (A) Less than  $100 \Omega$   
(B) Greater than  $100 \Omega$  and less than  $1 K \Omega$   
(C) Greater than  $1 K \Omega$   
(D)  Mega ohm
120. Which one of the following is a passive transducer
- (A) Piezo electric (B) Thermo couple  
(C) Photovoltaic cell (D)  LVDT
121. For a monotonic D/A converter, the error allowed is less than
- (A) 1 LSB (B)   $+1/2$  LSB  
(C)  $-1/2$  LSB (D) 2 LSB
122. Statements I : Dual slope ADC is most preferred digital conversion approach.  
Statement II : It provides high accuracy and suppress the human effect.
- (A)  Statements I and II are true. Statement II is correct explanation of I.  
(B) Statements I and II are true. II is not correct explanation of I.  
(C) Statement I is true and II is false.  
(D) Statement II is true and statement I is false.
123. Which one of the following gives gauge factor of a strain gauge?
- (A)  $\frac{(\Delta L/L)}{(\Delta R/R)}$  (B)   $(\Delta R/R)/(\Delta L/L)$   
(C)  $(\Delta R/R)/(\Delta D/D)$  (D)  $(\Delta R/R)/(\Delta e/e)$



124. The deflection sensitivity of a CRT is  $0.01 \text{ mm/V}$ . Calculate the shift produced in the spot when  $400 \text{ V}$  is applied to the vertical plates
- (A)  $4 \text{ mm}$  (B)   $4 \text{ mm}$   
 (C)  $4 \text{ cm}$  (D)  $0.04 \text{ mm}$
125. The sensitivity of a voltmeter is given by
- (A)   $\Omega/V$  (B)  $V/\Omega$   
 (C)  $I/\Omega$  (D)  $\Omega/I$
126. Addition of Zeros in transfer function causes
- (A) lead compensation (B)  lag compensation  
 (C) lead-lag compensation (D) Zero compensation
127. Which of the following is an open loop control system?
- (A)  Field controlled DC motor (B) Ward leonard control  
 (C) Metadyne (D) Stroboscope
128. A car is running at a constant speed of  $50 \text{ km/h}$ , which of the following is the feedback element for the driver?
- (A) Clutch (B) Eyes  
 (C)  Needle of the speedometer (D) Steering wheel
129. \_\_\_\_\_ technique is not applicable to non-linear system.
- (A)  Nyquist criterion (B) Quasi Linearization  
 (C) Functional analysis (D) Phase - Plane representation

130. The transfer function of L-R-C circuit, with Zero initial condition



- (A)   $\frac{1}{s} \frac{I(s)}{C} = E_o(s)$                       (B)  $\frac{1}{I(s)} \frac{s}{C} = E_o(s)$   
 (C)  $\frac{C}{s} I(s) = E_o(s)$                       (D) 0

131. The loop gain of a closed loop system is given by  $\frac{K}{s(s+2)(s+4)}$  the value of  $K$  for which the system just becomes unstable is

- (A)  $K = 6$                                       (B)  $K = 8$   
 (C)   $K = 48$                                       (D)  $K = 96$

132. The Nyquist plot of a loop transfer function  $G(s)1 + (s)$  of a closed loop transfer function passes through  $(-1, j0)$  in  $G(s)1 + (s)$  plane. The phase margin of the system is

- (A)   $0^\circ$                                       (B)  $45^\circ$   
 (C)  $90^\circ$                                       (D)  $180^\circ$

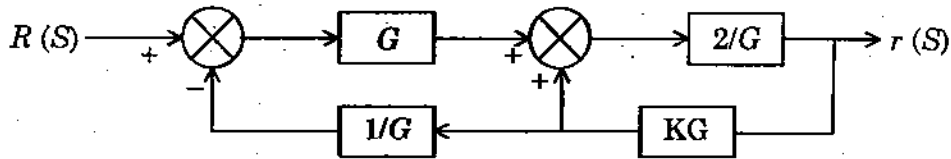
133. In a closed loop control system, which of the following signal runs the plant?

- (A) Reference                                      (B) Error  
 (C)  Actuating                                      (D) Feedback

134. A quadratic equation  $F(s) = s^5 - 3s^4 + 5s^3 - 7s^2 + 4s + 20$  is given.  $F(s) = 0$  has

- (A) A single complex root with remaining roots real  
 (B) One positive real root and four complex roots with positive real part  
 (C)  One negative root, two imaginary with positive real part roots  
 (D) One positive real root, two imaginary roots and two roots with negative real part

135. The system shown in the following figure has gain 2, then the value of k is



- (A) 2  
 (B)  $\frac{1}{2}$   
 (C) 1  
 (D)  k can have any value

136. Transfer function can be obtained from

- (A)  Signal flow graph  
 (B) Analogous table  
 (C) Output-input ratio  
 (D) Zeros

137. A synchronous machine has higher capacity for:

- (A)  Leading p.f  
 (B) Lagging p.f  
 (C) It doesn't depend upon the p.f of the machine  
 (D) It depends upon the p.f. of the load  
 (Note : p.f = power factor)

138. In an alternator, if 'm' is the number of slots per pole per phase,  $\nu$  is the slot pitch angle, then the breadth Or distribution factor for armature winding is

- (A)  $\frac{\sin \nu/2}{m \cdot \sin(m\nu/2)}$   
 (B)   $\frac{\sin(m\nu/2)}{m \cdot \sin(\nu/2)}$   
 (C)  $m \sin(\nu/2) / \sin(m\nu/2)$   
 (D)  $\sin(m\nu/2) / \sin(\nu/2)$

139. In a synchronous motor, the magnitude of stator back emf  $E_b$  depends on

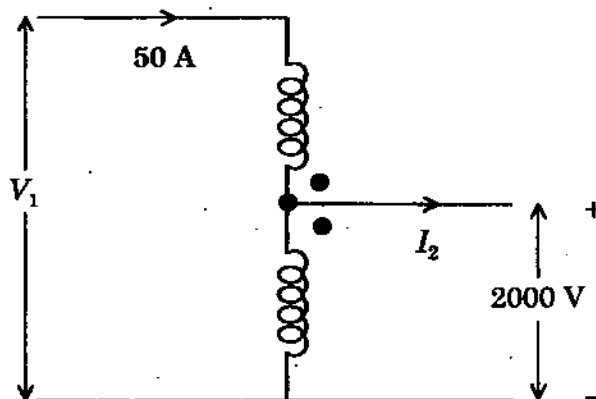
- (A) Speed of the motor  
 (B) Load on the motor  
 (C) Both the speed and rotor flux  
 (D)  d.c. excitation only

140. Match the following

- | Motor                           | Typical Application       |
|---------------------------------|---------------------------|
| 1. Permanent magnet dc motor    | P. Cassette tape recorder |
| 2. Stepper motor                | Q. Ceiling fan            |
| 3. Simple phase Induction motor | R. Hand drills            |
| 4. Universal motor              | S. Digital control system |

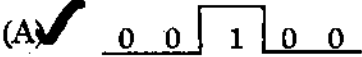
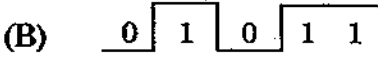
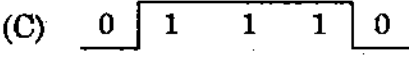
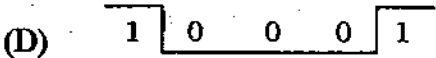
- (A) 1-S 2-P 3-R 4-Q  
 (B)  1-P 2-S 3-Q 4-R  
 (C) 1-Q 2-R 3-P 4-S  
 (D) 1-Q 2-P 3-S 4-R

141. The saving in copper achieved by converting a 2-winding transformer into an auto transformer is determined by  
 (A) ✓ Voltage transformation ratio (B) Load on the secondary  
 (C) Magnetic quality of core material (D) Size of the transformer core
142. If the iron core of a transformer is replaced by an air core, then the hysteresis losses in the transformer will  
 (A) Increase (B) Decrease  
 (C) Remain unchanged (D) ✓ Becomes zero
143. A transformer rated at 2000 KVA, 250 Hz is operated at 50 Hz. Its KVA rating should be revised to  
 (A) ✓ 400 KVA (B) 20,000 KVA  
 (C) No change in KVA (D) 10,000 KVA
144. A single phase, 10 KVA, 2000/200 V, 50 Hz, transformer is connected to form an autotransformer as shown in figure. What are the values of  $V_1$  and  $I_2$  respectively.

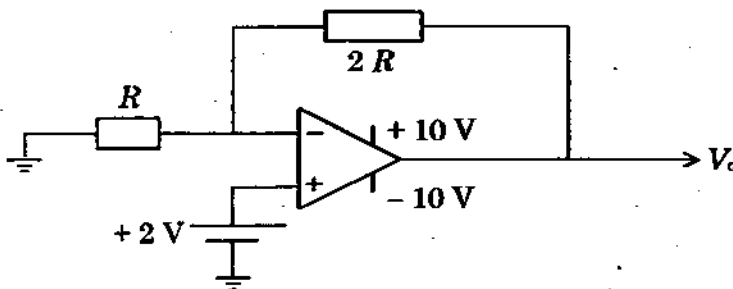


- (A) 2200V, 55A (B) ✓ 2200V, 45A  
 (C) 2000V, 45A (D) ✓ 1800V, 45A
145. The primary reason for making the coil span of a d.c. armature winding equal to a pole pitch is to  
 (A) obtain a coil span of  $180^\circ$  (electrical)  
 (B) ✓ ensure the addition of e.m.f.s of consecutive turns  
 (C) distribute the winding uniformly under different poles  
 (D) obtain a full-pitch winding
146. The location of interpole in a DC machine is  
 (A) on the main poles  
 (B) closer to the main poles  
 (C) at the right hand side of main poles  
 (D) ✓ midway between the main poles

147. Which of the following is correct?
- (A) ✓ for 110 kV and above, vacuum circuit breakers are not used
- (B) there is no fire hazard in minimum oil circuit breakers
- (C) air circuit breakers proved to be better than SF<sub>6</sub> circuit breakers in 11 kV to 33 kV applications
- (D) pure SF<sub>6</sub> is toxic
148. For a single phase two wire system compared to two wire dc system, the copper efficiency defined as the ratio of ac to dc conductor cross-section under the same maximum potential between conductor and earth is
- (A) ✓  $\frac{2}{\cos^2 \phi}$
- (B)  $\frac{\cos^2 \phi}{2}$
- (C)  $\frac{1}{\cos^2 \phi}$
- (D)  $\frac{2.67}{\cos^2 \phi}$
149. The sag produced in the conductor of a transmission line depends on
- (A) weight of the conductor only
- (B) tension in the conductor only
- (C) length of the conductor only
- (D) ✓ length, weight and tension of the conductor
150. In a short line, for zero regulation
- (A) ✓  $R \cos \phi_r = X \sin \phi_r$
- (B)  $R \sin \phi_r = X \cos \phi_r$
- (C)  $2R = X$
- (D)  $R = 2X$
151. The rate of rise of restriking voltage is given by the expression
- (A) ✓  $\omega_n E \sin \omega_n t$
- (B)  $\omega_n E \cos \omega_n t$
- (C)  $E \sin \omega_n t$
- (D)  $E \cos \omega_n t$
152. The negative sequence reactance of a synchronous machine is given by
- (A)  $j \left( \frac{Xd' + Xq'}{2} \right)$
- (B) ✓  $j \left( \frac{Xd'' + Xq''}{2} \right)$
- (C)  $j \left( \frac{Xd' - Xq'}{2} \right)$
- (D)  $j \left( \frac{Xd'' - Xq''}{2} \right)$

153. Load flow study is carried out for  
 (A) Fault calculations (B) Stability studies  
 (C)  System planning (D) Load frequency control
154. When there is a change in load in a power station having a number of generating units operating in parallel, the system frequency is controlled by  
 (A)  adjusting the steam input to the units  
 (B) adjusting the field excitation of the generators  
 (C) changing the load divisions between the units  
 (D) injecting reactive power at the station bus-bar
155. As the load factor of generating plant increases the generation cost per unit energy generated  
 (A)  decreases (B) increases  
 (C) may increase or decrease (D) remains the same
156. Ring main distribution is preferred to a radial system because  
 (A)  Voltage drop in the feeder is less and supply is more reliable  
 (B) Voltage drop in the feeder is less and power factor is high  
 (C) Power factor is high and supply is more reliable  
 (D) Power factor is high and system is less expensive
157. Which of the following flip-flop does not have race problem?  
 (A) T flip-flop (B) D flip-flop  
 (C) J-K flip-flop (D)  Master - Slave flip-flop
158. The two input signals for an AND gate are :  $x = 01100$  ;  $y = 00110$ . The timing diagram of the output signal is  
 (A)    
 (B)   
 (C)   
 (D) 
159. Convert decimal 41 to binary  
 (A)  101001 (B) 110110  
 (C) 001001 (D) 100101

160. The primary function of a filter used in the rectifier output is  
 (A) minimise a.c. input variations  
 (B) suppress odd harmonics in the rectifier output  
 (C) stabilises d.c. level of the output voltage  
 (D)  remove ripples from the rectified output
161. A power supply has no-load and full-load voltage of 30 V and 25 V respectively. The percentage of voltage regulation is  
 (A) 5% (B) 10%  
 (C)  20% (D) 40%
162. One of the conditions for oscillations is the phase shift around the feedback loop must be effectively equal to  
 (A)  $180^\circ$  (B)  $90^\circ$   
 (C)   $0^\circ$  (D)  $270^\circ$
163. In the monostable multivibrator using 555 timer, the value of  $R = 100 \text{ k}\Omega$  and the delay time  $T = 100 \text{ ms}$ , then the value of  $C$  is  
 (A)  $1.99 \mu\text{F}$  (B)   $0.9 \mu\text{F}$   
 (C)  $1.19 \mu\text{F}$  (D)  $1.95 \mu\text{F}$
164. A circuit which has  $n$  input signals and one output signal is known as  
 (A)  Multiplexer (B) De-multiplexer  
 (C) Adder (D) Decoder
165. The number of flip flops required in modulus - 10 Johnson and modulus -10 ring counter are respectively.  
 (A) 10, 10 (B) 5, 5  
 (C)  5, 10 (D) 10, 5
166. Given that the op-amp is ideal, the output voltage  $V_o$  is



- (A) 4 V (B)  6 V  
 (C) 7.5 V (D) 12.12 V

167. The number of diodes required in a bridge rectifier circuits is
- (A) one (B) two  
(C) three (D)  four
168. For a single phase pulse controlled rectifier with input voltage of  $400 \sin 314t$  and counter EMF and resistive load of 200 V, the possible range of firing angle would be
- (A) 30 to 90° (B) 30 to 180°  
(C) 60 to 120° (D)  30 to 150°
169. A single phase half controlled rectifier is driving a separately, excite DC motor. Back emf constant is 0.5 V/rpm. The armature current is 5 A. The armature resistance is  $2\Omega$ . The converter is working from 230 V, AC supply with a firing angle of 30°. The speed of the motor will be
- (A) 339 rpm (B) 359 rpm  
(C) 366 rpm (D)  386 rpm
170. In a single pulse modulated PWM inverter, third harmonic can be eliminated if pulse width is equal to
- (A) 30° (B) 60°  
(C)  120° (D) 180°
171. An SCR is a
- (A) Three layer three terminal device (B) Three layer four terminal device  
(C)  Four layer three terminal device (D) Two layer two terminal device
172. Maximum string efficiency is achieved when
- (A)  uniform distribution of voltage across SCR in the string appears  
(B) uneven voltage distribution of voltage across SCRs in a string appears  
(C) one of the SCRs share maximum voltage and rest share the same voltage in the string  
(D) First and last SCRs in the string share the maximum voltage and remaining SCRs share the same voltage



173.  $V$  – input voltage,  $V_o$  – Output voltage

$D$  – Duty cycle,  $a$  – Transformer ratio

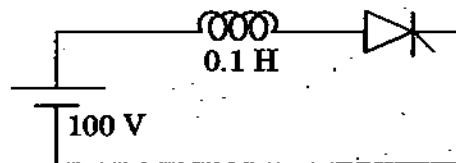
List I (SMPS Topology)

List II (output voltage)

- |                         |    |                           |
|-------------------------|----|---------------------------|
| (a) Boost               | 1. | $V_o = VD$                |
| (b) Buck                | 2. | $V_o = \frac{-VD}{1-D}$   |
| (c) Buck-Boost          | 3. | $V_o = \frac{VD}{1-D}$    |
| (d) Isolated Buck-Boost | 4. | $V_o = \frac{VD}{a(1-D)}$ |

- |       |     |     |     |     |
|-------|-----|-----|-----|-----|
|       | (a) | (b) | (c) | (d) |
| (A)   | 2   | 1   | 3   | 4   |
| (B) ✓ | 3   | 1   | 2   | 4   |
| (C)   | 2   | 4   | 3   | 1   |
| (D)   | 3   | 4   | 2   | 1   |

174. The latching current in the given circuit is 4 ms. The minimum width of the gate pulse required to turn on thyristor is



- |               |                 |
|---------------|-----------------|
| (A) 6 $\mu$ s | (B) ✓ 4 $\mu$ s |
| (C) 2 $\mu$ s | (D) 1 $\mu$ s   |

175. It is required to control the speed and braking operation of a DC shunt motor in both the direction of rotation. The most suitable power electronic circuit will be

- |                                 |                                  |
|---------------------------------|----------------------------------|
| (A) a half controlled converter | (B) a fully controlled converter |
| (C) a diode bridge converter    | (D) ✓ a dual converter           |

176. The number of switches in 3 $\phi$  cycloverter is

- |        |          |
|--------|----------|
| (A) 3  | (B) 6    |
| (C) 12 | (D) ✓ 18 |

177. For a type of chopper,  $V_s$ ,  $R$ ,  $I_o$  and  $\alpha$  are the DC source voltage, load resistance, constant current and duty cycle respectively. For this chopper, average and RMS values of free wheeling diode currents are

- |                                             |                                             |
|---------------------------------------------|---------------------------------------------|
| (A) $\alpha I_o, \sqrt{\alpha} I_o$         | (B) ✓ $(1-\alpha) I_o, \sqrt{1-\alpha} I_o$ |
| (C) $\alpha V_s / R, \sqrt{\alpha} V_s / R$ | (D) $(1-\alpha) I_o, \sqrt{\alpha} I_o$     |

178. In the loop instruction in 8086 procedure the following operation is performed
- (A) jump on not over flow
  - (B)  decrement CX and jump is CX  $\neq$  0
  - (C) decrement CX and jump is CX  $\neq$  0 and if ZF flag is set
  - (D) decrement CX and jump is CX  $\neq$  0 and if ZF flag is cleared
179. Why RISC processors are preferred more than CISC processors?
- (A) No. of pins in the chip is less
  - (B) No. of address and data lines are more
  - (C)  Execution of more than two or more instruction per cycle
  - (D) Processing is register intensive
180. With a control word of 2AH, and  $n$  input clock 1MHz the approximate operating frequency is
- (A) 1 Hz
  - (B) 1 kHz
  - (C) 10 kHz
  - (D)  100 kHz
181. In program status word of 8086 how many status flags and how many control flags are present
- (A) 3 and 6 respectively
  - (B)  6 and 3 respectively
  - (C) 9 and 6 respectively
  - (D) 6 and 9 respectively
182. The addressing mode of the 8085 instruction LDA 08A2H
- (A)  Direct addressing
  - (B) Register addressing
  - (C) Register indirect addressing
  - (D) Immediate addressing
183. The window function for Hamming window of a linear phase FIR filter is
- (A)  $\omega(n) = \begin{cases} 1 & 0 \leq n \leq N \\ 0 & \text{else} \end{cases}$
  - (B)  $\omega(n) = \begin{cases} 0.5 - 0.5 \cos\left(\frac{2\pi n}{N}\right); & 0 \leq n \leq N \\ 0 & \text{else} \end{cases}$
  - (C)   $\omega(n) = \begin{cases} 0.54 - 0.46 \cos\left(\frac{2\pi n}{N}\right); & 0 \leq n \leq N \\ 0 & \text{else} \end{cases}$
  - (D)  $\omega(n) = \begin{cases} 0.42 - 0.5 \cos\left(\frac{2\pi n}{N}\right) + 0.08 \cos\left(\frac{4\pi n}{N}\right) & 0 \leq n \\ 0 & \text{else} \end{cases}$

184. For decoded sensor matrix mode of 8279, the MMM bits of the control word format OOODMMMM should be
- (A) 001 (B) 110  
(C) 101 (D) 111
185. The control word 9BH sets the ports as follows in 8255
- (A) Port A as input in Mode 0, Port B as input in Mode 0  
(B) Port A as input in Mode 0, Port B as input in Mode 1  
(C) Port A as input in Mode 1, Port B as input in Mode 0  
(D) Port A as input in Mode 1, Port B as input in Mode 1
186. The Intel 8257 chip is a
- (A) Programmable Timer  
(B) Programmable keyboard/ Display controller  
(C) Programmable DMA Controller  
(D) Serial Interface Controller
187. The spacing between successive built-in vectored interrupts of 8051 is
- (A) 2 bytes (B) 4 bytes  
(C) 8 bytes (D) 16 bytes
188. Which layer is divided into two sublayers as LLC and MAC
- (A) Transport Layer (B) Network Layer  
(C) Data Link Layer (D) Physical Layer

189. The fuel formed under the earth's surface by the decomposition of organic matter is called
- (A) Organic fuel (B) Bio gas  
(C)  Fossil Fuel (D) Under ground fuel
190. Steam reforming is currently the least expensive method of producing
- (A) Coal (B) Bio gas  
(C)  Hydrogen (D) Natural gas
191. What is Betz limit? For a wind turbine
- (A) 5.93% (B)  59.3%  
(C) 60.9% (D) 55.5%
192. The minimum cut-in speed for the wind turbine blade is in the range from
- (A) 1.5 m/s to 2.5 m/s (B)  2.5 m/s to 5 m/s  
(C) 0.25 m/s to 1.5 m/s (D) 3 m/s to 6 m/s
193. The most suitable generator for large capacity wind power plant is
- (A) Permanent magnet generator  
(B) dc generator  
(C)  Induction generator  
(D) Synchronous generator
194. Savonius rotor is associated with
- (A) Tidal energy  
(B) Geothermal energy  
(C)  Wind turbine with vertical axis  
(D) Wind energy with Horizontal axis

195. The radiation in the sun light that gives us feeling of hotness is  
 (A) Visible radiation (B)  Infra Red radiation  
 (C) Red light (D) Ultra violet radiation
196. The shading of a solar module with all cells connected in series  
 (A) Increases the power output and the module temperature  
 (B) Decreases the power output and the module temperature  
 (C)  Decreases the power output and increase the module temperature  
 (D) Increases the power output and decreases the module temperature
197. The reflectivity  $R$  is given by  $[(n_1 - n_2)/(n_1 + n_2)]^2$  when the angle of incidence measured with respect to perpendicular to the surface is  
 (A)   $0^\circ$  (B)  $30^\circ$   
 (C)  $45^\circ$  (D)  $60^\circ$
198. The power density at the center of the sun is estimated to be  
 (A)  $100 \text{ W/m}^3$  (B)   $275 \text{ W/m}^3$   
 (C)  $525 \text{ kW/m}^2$  (D)  $1000 \text{ kW/m}^2$
199. An increase in the temperature of solar cells causes  
 (A)  Net reduction in power and fill factor  
 (B) Net increase in power and fill factor  
 (C) Net reduction in power and increase in fill factor  
 (D) Net increase in power and decrease in fill factor
200. The standards for testing PV modules with the widely used crystalline-silicon solar cells is  
 (A) EIC 12615 (B) ISO 61215  
 (C)  IEC 61215 (D) EIC 21615

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