

1. The rotation intensity of Maize-Mustard-Mung crop is
  - A. 100%
  - C. 300%
  - B. 200%
  - D. 400%
  
2. Which of the following is NOT a Kharif crop ?
  - A. Soyabean
  - B. Lentil
  - C. Cotton
  - D. Pigeon pea
  
3. 'Five Star Village Scheme' started by Government of India in September 2020 relates to which one of the following?
  - A. Electricity Supply
  - B. Postal Service Schemes
  - C. Health Services
  - D. Primary Education
  
4. Who won the US Open 2020, Mens Tennis Singles Title on 14<sup>th</sup> September 2020?
  - A. Alex Zverev
  - B. Dominic Thiem
  - C. D. Medvedev
  - D. P. C. Busta
  
5. Which of the following pairs is NOT correctly matched ?
 

Ancient name		Modern name
Of the Cities		of the Cities
A. Esipattan	-	Saranath
B. Dashapur	-	Talked
C. Banvasi	-	Talked
D. Mahoday	-	Kannauj

6. The early farming site located on the bank of lake is
- A. Mehargarh
  - B. Lahuradeva
  - C. Chirand
  - D. T. Narsipur
7. Author of the 'Dastane Mazahib' which discusses about the Din-i-Ilahi of Akbar, was
- A. Mohammad Rabbani
  - B. Mohsin Faani
  - C. Badauni

8. Match List-I Which List-II and select the correct answer using the code given below.

<b>List-I</b>	<b>List-II</b>
<b>(State)</b>	<b>(Highest Peaks)</b>
A. Tamil Nadu	1. Dhoopgarh
B. Rajasthan	2. Saramati
C. Nagaland	3. Guru Shikhar
D. Madhya Pradesh	4. Doda Betta

Codes:

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

9. Who was appointed the Minister of 'Ministry of Rehabilitation' set up on 06 September, 1947 ?
- A. S. P. Mukerji

- B. Sardar Vallabhabhai Patel
  - C. J. L. Nehru
  - D. K. C. Niyogi
10. 'Leopold Matrix' is associated with
- A. Weather Forecasting
  - B. Disaster Management
  - C. Environmental Impact Assessment Method
  - D. Environmental Law
11. The Joint Sitting of the Indian Parliament for transacting a legislative business is presided over by
- A. The President of India
  - B. The senior most Member of Parliament
  - C. The Chairman of the Rajya Sabha
  - D. The Speaker of the Lok Sabha
12. The term 'Office of Profit' has been defined by the
- A. Constitution
  - B. Parliament
  - C. Supreme Court
  - D. Union Council of Ministers
13. While deciding any question relating to the disqualification of a Member of Parliament, the President shall obtain the opinion of
- A. Election Commission
  - B. Chief Justice of India
  - C. Attorney General
  - D. Speaker of the Lok Sabha
14. Soyabean seed contains
- A. 20% protein and 40 % oil

- B. 40% protein and 10 % oil  
C. 40% protein and 20 % oil  
D. 20% protein and 20 % oil
15. As per the results of 'Swachh Sarvekshan 2020', announced by Ministry of Housing and Urban Affairs on 20<sup>th</sup> August 2020 , which is the Cleanest City in Uttar Pradesh ?
- A. Agra  
B. Gaziabad  
C. Lucknow  
D. Prayagraj
16. How many teachers from Uttar Pradesh were selected for 'National Award' on Teachers day 5<sup>th</sup> Sept., 2020?
- A. Six  
B. Five  
C. Four  
D. Three
17. 'Poshan Maah' was celebrated by Government of India in the year 2020, in which of the following months ?
- A. September  
B. August  
C. July  
D. June
18. Match List-I with List-II and choose the correct answer using the code given below.
- | List-I            | List-II    |
|-------------------|------------|
| (Text)            | (Writer)   |
| A. Kiratarjuniyam | 1. Dandi   |
| B. Dashakumar     | 2. Kalidas |

Charitam

- C. Buddha Charitam                      3. Bharavi  
D. Vikramorvashiyam                    4. Ashvaghosha

Code:

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

19. A large tank near Mahoba, temples at Ajaygarh and Mahoba and city of Rajavasini were built by a Chandella King

- A. Nannuk  
B. Vakpati  
C. Rahil  
D. Jayashakti

20. Which of the following Rights a cultivator enjoyed on his own land during the Mughal period?

- A. Right to mortgage only  
B. Right to sell and gift  
C. Right to mortgage and gift  
D. All the above rights

21. Match List-I with List-II and select the correct answer using the code given below.

List-I	List-II
(Tribes)	(States)
A. Tharus	1. Madhya Pradesh
B. Todas	2. Jharkhand
C. Santhal	3. Uttarakhand
D. Gond	4. Tamil Nadu

Codes:-

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

22. Match List-I with List-II and select the correct answer using the code given below.

List-I

- A. Nokrek
- B. Agasthyamalai
- C. Nandadevi
- D. Dehang Debang

List-II

- 1. Uttarakhand
- 2. Arunachal Pradesh
- 3. Kerala
- 4. Meghalaya

Code :

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

23. States get share of the revenue from

- A. Income Tax
- B. Customs Revenue
- C. Excise Tax
- D. Surcharge on Income Tax

24. Which Article of the Indian Constitution empowers Parliament to make law for implementing international agreements ?

- A. Article 249
- B. Article 250

C. Article 252

D. Article 253

25. Who appoints the acting Chief Justice of India?

A. Chief Justice of India

B. Chief Justice of India with previous consent of the President

C. President of India

D. President in consultation with the Chief Justice of India

26. A combination circuit has inputs A, B and C, its K-map is given below. The output of circuit is given by

		<b>AB</b>			
		<b>00</b>	<b>01</b>	<b>11</b>	<b>10</b>
<b>C</b>	<b>0</b>		<b>1</b>		<b>1</b>
	<b>1</b>	<b>1</b>		<b>1</b>	

A.  $(\bar{A}B + A\bar{B})C$

B.  $(\bar{A}B + A\bar{B})\bar{C}$

C.  $\bar{A}\bar{B}\bar{C}$

D.  $A \oplus B \oplus C$

27. Find out the integrating type analog to digital converter from the following.

A. flash type converter

B. tracking converter

C. successive approximation type converter

D. dual-slope analog to digital converter

28. The minimum number of 2 -input NAND gates required to realize the logic function  $Y = A\bar{B} + \bar{A}B$  is

A. 5

- B. 3
- C. 6
- D. 4

29. Find the cut-off frequency for an RC low pass filter of  $R = 8.2 \Omega$   $C = 0.0033 \mu\text{F}$ .
- A. 6 kHz
  - B. 5.88 kHz
  - C. 4.26 kHz
  - D. 7.91 kHz
30. Why synchronous transmission is preferred more?
- A. it has no start and stop bit
  - B. it is cheaper than asynchronous
  - C. it is easier to implement
  - D. less complex
31. A 400 W carrier is amplitude modulated with  $m = 0.75$ . The total power in AM is
- A. 400 W
  - B. 512 W
  - C. 588 W
  - D. 650 W
32. An air filled rectangular waveguide has inner dimensions of  $3\text{cm} \times 2\text{cm}$ . The wave impedance of the  $\text{TE}_{20}$  mode of propagation in the waveguided at a frequency of 30 GHz is \_\_\_\_\_ (free space impedance  $\eta_0 = 377 \Omega$ )
- A.  $308 \Omega$
  - B.  $355 \Omega$
  - C.  $400 \Omega$
  - D.  $461 \Omega$



33. Noise temperature of Sun is more than \_\_\_\_\_ K.
- A. 1000
  - C. 100000
  - B. 5000
  - D. 500
34. A cavity magnetron uses strapping to
- A. prevent mode jumping
  - B. prevent cathode back heating
  - C. ensure bunching
  - D. improve the phase focussing effect
35. A microwave tube amplifier uses an axial magnetic field and a radial electric field. This is a
- A. Reflex klystron
  - B. Co-axial magnetron
  - C. Travelling wave magnetron
  - D. CFA
36. In a circular waveguide, the dominated mode is
- A.  $TE_{01}$
  - B.  $TE_{11}$
  - C.  $TE_{20}$
  - D.  $TE_{21}$
37. A hollow rectangular waveguide can NOT propagate TEM wave because
- A. Of the existance of only one conductor
  - B. Of the losses caused
  - C. It is dependent on the type of the material used
  - D. None of the above

38. The most commonly used method for the protection of three phase feeder is
- A. Time graded protection
  - B. Differential protection
  - C. Reverse power protection
  - D. None of these
39. Discrimination between main and backup protection is provided by the use of relays which are
- A. Fast
  - B. Sensitive
  - C. Slow
  - D. None of these
40. Which of the following statements is correct?
- A. Station batteries are used to operate relay only
  - B. The lightning arrestors have surge divertors
  - C. An impedance relay has maximum fault current near the relay
  - D. A high speed relay has an operation of 1-2 cycles
41. With the use of high speed circuit breakers, which among the following stability is increased?
- A. Steady-state stability
  - B. Transient stability
  - C. Frequency stability
  - D. All of the above
42. The arcing contacts in a circuit breaker is made of
- A. Copper tungsten alloy
  - B. Porcelain
  - C. Electrolytic copper
  - D. Aluminium alloy

43. A shunt reactor at 100 MVAR is operated at 98% of its rated voltage and at 96 % of its rated frequency. The reactive power absorbed by reactor is
- A. 98 MVAR
  - B. 104.02 MVAR
  - C. 96.04 MVAR
  - D. 100.04 MVAR
44. Protective relays can be designed to respond to
- A. Light intensity, impedance
  - B. Temperature, resistance, reactance
  - C. Voltage and current
  - D. All of these
45. Which one of the following methods used for solution of ordinary differential equations is conditionally stable?
- A. Euler's method
  - B. Milne's method
  - C. Taylor's series method
  - D. Adams-Bashforth method
46. Which one of the following methods used for solving non-linear algebraic equations has rate of convergence 2.0 ?
- A. Bisection method
  - B. Secant method
  - C. Newton-Raphson method
  - D. Muller's method
47. Which one of the following methods is NOT used for solution of non-linear algebraic equations ?
- A. Regula-Falsi Method
  - B. Milne's-Predictor-Corrector Method

- C. Seoant Method
- D. Bisection Method

48. In a Triclinic crystal, a lattice plane makes intercepts at a length  $a$ ,  $2b$  and  $-\frac{3c}{2}$ .

The Miller indices of the plane are

- A. 3 : 6 : 4
- B. 6 : 3 : 4
- C. 6 : 3 : -4
- D. 6 : 3 : -2

49. The critical field needed to destroy super conductivity, is known as

A.  $H_0(T_c/T)$

B.  $H_0(T/T_c)^2$

C.  $H_0 \left[ 1 - \left( \frac{T_0}{T_c} \right)^2 \right]$

D.  $H_0 \left[ 1 - \left( \frac{T_c}{T_0} \right)^2 \right]$

50. The instruction for starting the computer are housed in

- A. Random Access Memory
- B. CD-ROM
- C. Read Only Memory Chip
- D. All of the above

51. When memory write or I/O read are active, data remains of the processor.

- A. Input
- B. Output
- C. Processor
- D. None of these

52. While performing read operation, one must taken care that much current should NOT be
- A. Sourced from data lines
  - B. Sunked from data lines
  - C. Sourced or sunked from data lines
  - D. Sunked from address lines
53. A three phase induction motor has shaft output of 16 kW. The constant losses are 1 kW. If the slip be 4%, the rotor copper losses would be
- A. 600 W
  - B. 625 W
  - C. 667 W
  - D. 720 W
54. In a three stack 12/8 pole variable reluctance motor, rotor pole pitch is
- A. 15°
  - B. 30°
  - C. 45°
  - D. 60°
55. The condition of a three phase induction motor at no-load resembles those of a transformer whose secondary
- A. Short circuited
  - B. Open circuited
  - C. Supplying a variable resistive load
  - D. Supplying an inductive load
56. The torque angle ' $\delta$ ' is the angle between
- A. Rotor field axis and resultant field axis
  - B. Stator field axis and rotor field axis

- C. Stator field axis and mutual field axis
  - D. Stator field axis and resultant field axis
57. In case of the air gap in an induction motor is increased
- A. The magnetizing current of the rotor will decrease
  - B. The power factor will decrease
  - C. The speed of motor will increase
  - D. The windage losses will increase
58. A stepper motor having a resolution of 300 steps/revolution and running at 2400 rpm has a pulse rate of \_\_\_\_\_ pps.
- A. 4000
  - C. 6000
  - B. 8000
  - D. 10000
59. A 3-phase, 6-pole, 50 Hz, squirrel cage induction motor is running at a slip of 5%. The speed of stator magnetic field to rotor magnetic field and speed of rotor with respect to stator magnetic field are
- A. Zero, -50 rpm
  - B. Zero, 955 rpm
  - C. 1000 rpm – 50 rpm
  - D. 1000 rpm, 955 rpm
60. In a commutation circuit used to turn-off an SCR, satisfactory turn-off is obtained, when
- A. Circuit turn-off time < device turn-off time
  - B. Circuit turn-off time > device turn-off time
  - C. Circuit time constant > device turn-off time
  - D. Circuit time constant < device turn-off time
61. A TRIAC is a
- A. 2-terminal switch

- B. 2-terminal bilateral switch
  - C. 3 -terminal unidirectional switch
  - D. 3 -terminal bidirectional switch
62. Two thyristors of same rating and same specifications
- A. Will have equal turn-on and turn-off periods
  - B. Will have equal turn-on, but unequal turn-off periods
  - C. May have equal or unequal turn-on and turn-off periods
  - D. Will have unequal turn-on and turn-off periods
63. **Assertion (A):** Inverter and choppers use fast switching thyristors.  
**Reason (R) :** Fast switching SCR has low turn-off time.
- A. Both A. and (R) are correct and (R) is the correct explanation of (A)
  - B. Both A. and (R) are correct but (R) is not the correct explanation of (A)
  - C. A. is correct but (R) is wrong
  - D. A. is wrong but (R) is correct
64. In a single phase fully controlled bridge rectifier, the output load current  $I$  is ripple free. The r.m.s. value of source current would be
- A.  $2\sqrt{2}I/\pi$
  - B.  $I$
  - C.  $I/2$
  - D.  $I/4$
65. Consider the following statements related to dc drives :
1. Wide speed control range
  2. High starting torque
  3. High power to weight ratio
  4. Fast transient response
  5. No limit on highest operating voltage
- Out of these statements

- A. 1,2 and 3 are correct
  - B. 2,3 and 4 are correct
  - C. 1,2 and 4 are correct
  - D. 3,4 and 5 are correct
66. A 20 kW electric motor has heating time constant 60 min. Iron loss is equal to full load copper loss. The short time rating of the motor for 15 minute is
- A. 43.5 kW
  - B. 56.7 kW
  - C. 60.0 kW
  - D. None of the above
67. A 220 V, 20 A, 1000 rpm, separately excited d.c. motor has armature resistance of 1 ohm. The motor is supplied from 250 V dc supply via a step down chopper, for operation of motor at 500 rpm at the rated torque, the duty ratio of the chopper should be
- A. 0.40
  - B. 0.44
  - C. 0.48
  - D. 0.50
68. The consideration involved in the selection of the type of electric drive for a specific application depends upon
- A. Speed control range and its nature
  - B. Starting nature
  - C. Environmental condition
  - D. All the above
69. A single phase half-wave rectifier circuit has free-wheeling diode, the free-wheeling diode will conduct only if
- A. load is purely resistive
  - B. load is purely inductive



- C. load is combination of R and L
- D. load is purely inductive or combination of R and L

70. Find the expression for peak capacitor voltage in case of current commuted chopper circuit.

A.  $I_0 \sqrt{\frac{LC}{C}}$

B.  $V_s + \sqrt{\frac{L}{C}}$

C.  $V_s + I_0 \sqrt{\frac{L}{C}}$

D. 0 (Zero)

71. Which one of the following is NOT inherently constant torque motor?

- A. DC series motor
- B. DC shunt motor
- C. Three phase induction motor
- D. Single phase induction motor

72. A 4-bit R/2R digital to analog converter (DAC) has a reference of 5 Volts. What is the analog output for input code 0101 ?

- A. 0.125 V
- B. 3.125 V
- C. 0.78125 V
- D. -3.125 V

73. Which of the following equations satisfy the J-K flip-flop?

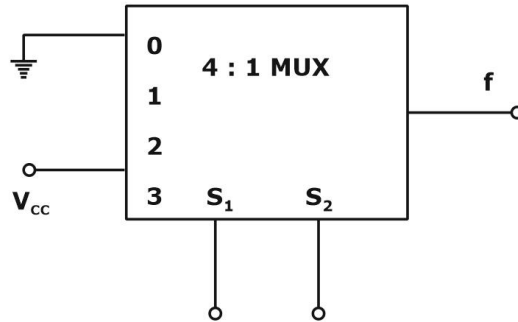
A.  $Q_{n+1} = J\bar{Q}_n + \bar{K}_n Q_n$

B.  $Q_{n+1} = \bar{J}_n \bar{Q}_n + \bar{K}_n Q_n$

C.  $Q_{n+1} = J_n Q_n + K_n Q_n$

D.  $Q_{n+1} = \bar{J}_n \bar{Q}_n + \bar{K}_n \bar{Q}_n$

74. The output  $f$  of the 4 : 1 MUX shown in fig. is



- A.  $\overline{xy} + x$
- B.  $x + y$
- C.  $\overline{x} + \overline{y}$
- D.  $xy + \overline{x}$

75. POS form of Boolean expression is suitable for circuit implementation, using

- A. XOR
- B. NAND
- C. AND
- D. NOR

76. The Boolean function  $A + BC$  is a reduced form of

- A.  $AB + BC$
- B.  $(A + B)(A + C)$
- C.  $A'B + AB'C$
- D.  $(A + C)B$

77. A 10-bit D/A converter gives a maximum output of 10.23 V. The resolution is

- A. 10 mV
- B. 20 mV

- C. 15 mV
- D. 25 mV

78. Which of the following expressions does NOT represent exclusive NOR of x and y ?
- A.  $xy + \overline{xy}$
  - B.  $x \oplus \overline{y}$
  - C.  $\overline{x} \oplus y$
  - D.  $\overline{x} \oplus \overline{y}$
79. A ripple counters speed is limited by the propagation delay of
- A. each flip-flop
  - B. all flip-flop and gates
  - C. flip-flops only with gates
  - D. only circuit gates
80. When aliasing take place
- A. Sampling signals less than Nyquist rate
  - B. Sampling signals more than Nyquist rate
  - C. Sampling signals equal to Nyquist rate
  - D. Sampling signals at a rate which is twice of Nyquist rate
81. Consider sinusoidal modulation in an AM system. Assuming no over modulation, the modulation index ( $\mu$ ) when the maximum and minimum values of the envelope, respectively are 3 V and 1 V is
- A. 0.7
  - B. 0.5
  - C. 0.3
  - D. 0.8
82. The Q-factor of a waveguide resonator is given by ( $\omega_0$  is resonant frequency, U is energy storage and  $\omega_L$  is power loss)

A.  $Q = \frac{\omega_0 U}{\omega_L}$

B.  $Q = \frac{\omega_0 \omega_L}{U}$

C.  $Q = \omega_0 U \omega_L$

D.  $Q = \frac{U \omega_L}{\omega_0}$

83. A speech signal is sampled at 8 kHz and encoded in PCM format using 8-bit/sample PCM data is transmitted through a baseband channel via 4-level PAM. Minimum Bandwidth required for transmission is
- A. 16 kHz
  - B. 8 kHz
  - C. 24 kHz
  - D. 10 kHz
84. For best low level noise performance in the X-band, an amplifier should use
- A. A bipolar transistor
  - B. A gunn diode
  - C. A step-recovery diode
  - D. An IMPATT diode
85. A lossless line of characteristic impedance  $z_0$  is terminated in pure reactance of  $-jz_0$  Voltage Standing Wave Ratio (VSWR) is
- A. 10
  - B. 2
  - C. 1
  - D. infinity
86. In colour TV receiver, varactor diode is used for
- A. Deflection
  - B. Rectification

- C. Tuning
  - D. Both A. and (b)
87. FDM is an analog multiplexing technique used to combine
- A. Analog signals
  - B. Digital signals
  - C. Both analog and digital signals
  - D. Alternatively passes analog and digital signal
88. Large internal faults in transformer are protected by
- A. Merz-price percentage differential protection
  - B. Mho and ohm relays
  - C. Horn gaps and temperature relays
  - D. Earth fault and positive sequence relays
89. If the fault current is 2000 A, the relay setting is 50% and CT ratio is 400: 5, the PSM will be
- A. 25
  - B. 15
  - C. 50
  - D. 10
90. An ideal circuit breaker should offer
- A. Zero and infinite impedances before and after arc interruption respectively
  - B. Infinity and zero impedances before and after arc interruption respectively
  - C. Equal impedance before and after arc interruption
  - D. None of these
91. A three-phase, 33 kV, oil circuit breaker is rated 1200 A, 2000 MVA, 3 sec. The symmetrical breaking current will be
- A. 1200 A
  - B. 3600 A

- C. 35 A
- D. 104.8 kA

92. With the help of reactive compensator, it is possible to have
- A. Constant voltage operation only
  - B. Unity p.f. operation only
  - C. Both constant voltage and unit p.f.
  - D. Either constant voltage operation or unity p.f. operation
93. The most efficient torque producing actuating structure for the induction type relays
- A. Shaded pole structure
  - B. Watt hour meter structure
  - C. Induction cup structure
  - D. Single induction loop structure
94. Why are the ternary lead cables used near the railway track ?
- A. Because they have high tensile strength
  - B. Have a low coefficient of thermal expansion
  - C. Have low specific gravity
  - D. Can withstand shocks and vibrations
95. Given that  $\frac{dy}{dx}x^2 + y$ , with  $y(0) = 1$ ,  
when  $x = 0$ , taking  $h = 0.2$ . The value of  $y$  after I iteration using Euler's modified method is
- A. 1.2
  - B. 1.224
  - C. 1.228
  - D. 1.232
96. The points where Newton-Raphson method fails are called

- A. Floating
- B. Continuous
- C. Non-stationary
- D. Stationary

97. Newton-Raphson method is used to compute a root of the equation  $x^2 - 13 = 0$  with 3.5 as initial value. The approximation after one iteration is

- A. 3.575
- B. 3.676
- C. 3.667
- D. 3.607

98. Which one of the following materials is a diamagnetic material ?

- A. Copper
- B. Nickel
- C. Iron
- D. Aluminium

99. The structure sensitive property of a super conductor is

- A. Critical magnetic field
- B. Transition temperature
- C. Critical current density
- D. None of the above

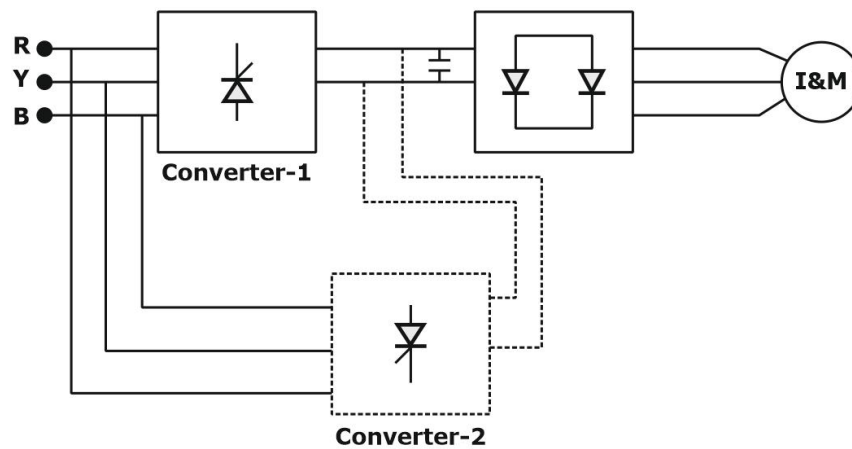
100. The 2's complement representation of decimal number [-17] is
- A. [100110]
  - B. [101111]
  - C. [111110]
  - D. [110001]
101. The smallest integer that can be represented by an 8-bit number in 2's complement form is
- A. -256
  - B. -128
  - C. -127
  - D. 0
102. In a single phase induction motor, the reason for having high resistance rotor is to achieve
- A. Reduced size
  - B. Low starting torque
  - C. High efficiency
  - D. High acceleration
103. BLDC motor is analogous to
- A. Permanent magnet synchronous motor
  - B. DC motor
  - C. Rotating transformer
  - D. Single phase induction motor
104. In a Squirrel cage rotor, the bars are NOT placed parallel to the shaft, but are skewed to have
- A. Greater mechanical strength
  - B. Less rotor losses
  - C. Uniform torque
  - D. None of the above



105. The presence of a dominant 7<sup>th</sup> harmonics in the winding distribution of 3 -phase, 6-pole, 50 Hz, induction motor may cause the motor to crawl at a speed of about
- A. 750 rpm
  - B. 143 rpm
  - C. 243 rpm
  - D. 500 rpm
106. A synchronous motor installed at the receiving end substation operates with such an excitation that it takes power at lagging power factor. Now if the applied voltage of the synchronous motor goes down, the power factor of synchronous motor will
- A. Remain constant
  - B. Go down
  - C. Be improved
  - D. None of the above
107. Slip of an induction motor increases with
- A. Increase in current and decrease in torque
  - B. Increase in current and torque
  - C. Decrease in current and torque
  - D. Decrease in current and increase in torque
108. The slip of an induction motor normally does NOT depend on
- A. Rotor speed
  - B. Synchronous speed
  - C. Shaft torque
  - D. Core-loss component
109. A precise phase control for an A.C. load can be controlled by a (an)

- A. Triac
  - B. SCR
  - C. Transformer
  - D. Trigger pulse
110. UJT is known as
- A. Voltage-controlled device
  - B. Current-controlled device
  - C. Relaxation oscillator
  - D. A transistor
111. In a step-up chopper if  $V_s$  is the source voltage and  $\alpha$  is duty cycle, then the output voltage is
- A.  $V_s/(1 + \alpha)$
  - B.  $V_s(1 + \alpha)$
  - C.  $V_s(1 - \alpha)$
  - D.  $V_s/(1 - \alpha)$
112. A modern power semi-conductor device that combines the characteristics of both BJT and MOSFET
- A. GTO
  - B. FCT
  - C. IGBT
  - D. MCT
113. In a single phase full wave converter (M-2 connection) feeding a highly inductive load, the firing angle for each thyristor is ' $\alpha$ ' in the respective half cycle. This period of conduction of each thyristor is
- A.  $\pi - \alpha$
  - B.  $\pi$
  - C.  $\pi + \alpha$
  - D.  $\pi - 2\alpha$

114. In a 3-phase voltage source inverter used for speed control of induction motor anti parallel diodes are used across each switching device as shown in figure. The main purpose of diodes is to



- A. Protect the switching device against over voltage  
 B. Provide the path for free wheeling current  
 C. Allow the motor to return energy during regeneration  
 D. Help in switching off the devices
115. Consider the following statements related to induction motor drives:
1. Power to weight ratio is high.
  2. Suitable for operation at high voltage,
  3. Suitable for high speed operation
  4. Power converter is simple and economical.
  5. Speed control is easy and of low cost.
  6. Reliability is good. Out of these statements
- A. 1,2,4 and 6 are correct  
 B. 2,3,5 and 6 are correct  
 C. 1,2,3 and 5 are correct  
 D. 1,2,3 and 6 are correct
116. In constant V/F speed control of a 3-phse induction motor, if frequency is increased from low value to the rated value, the maximum torque ( $T_{max}$ ) and slip corresponding to the maximum torque ( $S_m$ ) varies as
- A.  $T_{max}$  increases,  $S_m$  decreases  
 B.  $T_{max}$  increases,  $S_m$  increases  
 C.  $T_{max}$  constant,  $S_m$  decreases

D.  $T_{\max}$  constant,  $S_m$  increases

117. The drive has following equations of motor and load torques in terms of speed

$$T = \frac{2}{\omega} + 2, T_L = 4/\omega$$

The equilibrium point is

- A. Unstable
  - B. Stable
  - C. Marginally stable
  - D. Nothing can be said
118. In a non-circulating current mode dual converters, the circulating current is avoided by
- A. Connecting a series reactor
  - B. Maintaining  $\alpha_1 + \alpha_2 = 180^\circ$
  - C. Operating only one converter
  - D. Adding an extra SCR
119. An SCR is made up of silicon because
- A. Silicon has large leakage current than germanium
  - B. Silicon has small leakage current than germanium
  - C. Silicon has small leakage voltage than germanium
  - D. Silicon has large leakage voltage than germanium
120. For an application which requires smooth and precise control over the wide range at low cost, the motor preferred is
- A. Squirrel cage induction motor
  - B. Synchronous motor
  - C. D.C. motor
  - D. Wound rotor induction motor

121. In adjustable frequency 3-phase induction motor drives, for constant power application the slip speed is kept
- Constant
  - Proportional to synchronous speed
  - Inversely proportional to synchronous speed
  - Proportional to square of synchronous speed
122. The output of logic gate is 1 when all of its input are at logic 0. The gate is either
- a NAND or an EX-OR
  - an OR or an EX-NOR
  - an AND or an EX-OR
  - a NOR or an EX-NOR
123. Hamming code is capable of
- Only detects single bit error
  - Only corrects single bit error
  - Detects and corrects single bit error
  - None of the above
124. A D-flip-flop can be made from a J-K flip-flop by making
- $J = K$
  - $J = K = 1$
  - $J = 0, K = 1$
  - $J = \bar{K}$
125. The complement of  $[(A \cdot \bar{B} + \bar{C}) \cdot D + \bar{E}] \cdot F$  is
- $[(A + \bar{B}) \cdot \bar{C} + D \cdot \bar{E}] + F$
  - $[(\bar{A} + B) \cdot \bar{C} + D + \bar{E}] \cdot F$
  - $[(\bar{A} + B) \cdot C + \bar{D}] \cdot E + \bar{F}$

$$D. [(A + \bar{B}) \cdot C + \bar{D}] \cdot \bar{E} + F$$