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UKPSC AE
Electrical
Previous Year Paper
27 April 2022 Paper II



1. A certain non-inverting amplifier has $R_i = 1 \text{ k}\Omega$ and $R_f = 100 \text{ k}\Omega$. The closed loop voltage gain is

- (a) 100000 (b) 1000 (c) 101 (d) 100

2. In which of the following method, we approximate the curve of solution by the tangent in each interval ?

- (a) Picard's method (b) Euler's method
 (c) Newton's method (d) Runge Kutta method

$$\left(1 + \frac{100}{1}\right)$$



3. The common mode gain of Op – Amplifier is -

- (a) very high (b) very low (c) always unity (d) unpredictable

4. The quality factor of a tuned amplifier is

- (a) Directly proportional to Bandwidth (b) Inversely proportional to Bandwidth
 (c) Follows square law (d) Not related to Bandwidth

5. Consider the following components in a multistage R-C coupled amplifier :

1. Parasitic capacitance of transistor 2. Coupling capacitance
 3. Stray capacitance 4. Wiring capacitance

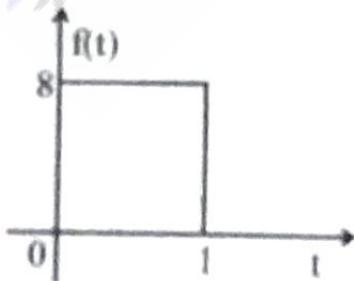
Which of the above components effectively control high frequencies ?

- (a) 1, 2 and 3 (b) 1, 2 and 4 (c) 1, 3 and 4 (d) 2, 3 and 4

6. In an R-C phase shift oscillator using FET and 3 section R-C phase shift network, the condition for sustained oscillation is

- (a) $\beta > 6n$ (b) $\beta > 29$
 (c) $\beta > 23 + 29/n$ (d) $\beta > 23 + 29/n$ where $n = R_{d/R}$

7. The Laplace transform of the below function is :



$$8u(t) - 8u(t-1) = 8 \left[\frac{1}{s} - \frac{e^{-s}}{s} \right] = \frac{8}{s} (1 - e^{-s})$$



- (a) $F(S) = 8S (1 - e^{-S})$ (b) $F(S) = \frac{8}{S} (1 + e^{-S})$
 (c) $F(S) = 8S (1 + e^{-S})$ (d) $F(S) = \frac{8}{S} (1 - e^{-S})$

17. अवकल समीकरण को अंकीय रूप से हल करने के लिए कौन सा तरीका प्रयोग करते हैं ?

- (a) न्यूटन-रेफसन तरीका (b) रूंगे-कुट्टा तरीका
(c) गॉस-एलीमिनेशन तरीका (d) उपरोक्त सभी

18. मैट्रिक्स A की रैंक है

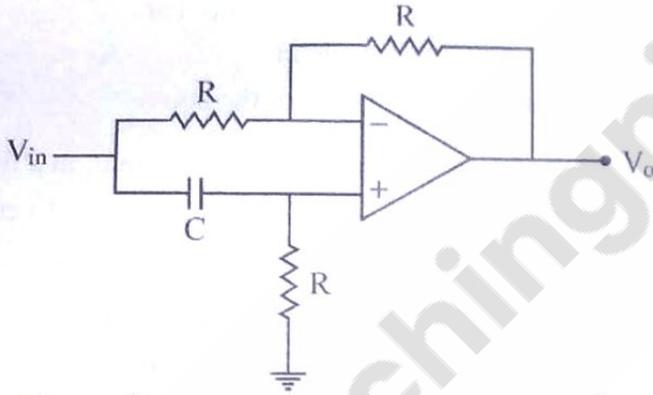
$$A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 5 \\ 4 & 6 & 8 \end{bmatrix}$$

- (a) 0 (b) 1 (c) 2 (d) 3

19. एक अनन्त क्रम फलन $f(x) = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \dots \infty$ मिलता है

- (a) $\cos x$ (b) $\sin x$ (c) $\sin hx$ (d) e^x

20. निम्न चित्र में दर्शाया गया परिपथ है



- (a) सभी-पास फिल्टर (b) बैंड-पास फिल्टर
(c) उच्च-पास फिल्टर (d) निम्न-पास फिल्टर

21. एक आदर्श Op-Amp (ऑप-एम्.) के लक्षण होते हैं, एक आदर्श

- (a) वोल्टेज नियंत्रित वोल्टेज स्रोत (b) वोल्टेज नियंत्रित धारा स्रोत
(c) धारा नियंत्रित वोल्टेज स्रोत (d) धारा नियंत्रित धारा स्रोत

22. एक वास्तविक महत्त्वपूर्ण निरन्तर फलन $f(t)$ को परिभाषित किया है $[0, 1]$, $\lim_{t \rightarrow 0} \int_0^t f(x) dx$ जिसमें फलन x है

- (a) ∞ (b) 0 (c) $f(1)$ (d) $f(0)$

23. यदि डिफरेंशियल मोड गेन $ADM = 3500$ और कोमन मोड गेन $ACM = 0.35$, तो $CMMR$ _____

- (a) 1225 (b) 10,000 (c) 0.1 (d) 0.001

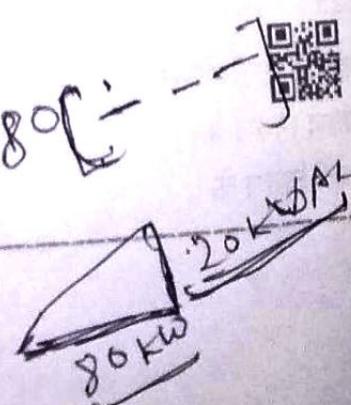
24. एक डिकोडर डीमल्टीप्लेक्सर है बिना -

- (a) नियंत्रण निवेश के (b) डाटा निवेश के
(c) इनैबल निवेश के (d) उपरोक्त में से कोई नहीं

25. Reactance Relay is normally preferred for protection against
- (a) Earth faults (b) Phase faults
(c) Open circuit faults (d) None of these
26. A relay is connected to a 400/5A current transformer and set for 150%. The primary fault current of 2400 A needs a plug setting multiple of
- (a) 2 (b) 4 (c) 6 (d) 8
27. Linear couplers are used for providing protection to
- (a) Low voltage lines (b) EHV lines operating at 750 kV ac
(c) EHV lines operating above 500 kV dc (d) EHV bus bars
28. Buchholz relay is infact
- (a) A gas pressure relay (b) An over voltage relay
(c) An over frequency relay (d) An over current relay
29. The synchronising power of a synchronous machine is maximum at
- (a) full load (b) no load
(c) a load slightly more than full load (d) None of the above
30. Automatic Generation Control (AGC) action is done in a power system, in a time
- (a) Milliseconds (b) 4-6 seconds (c) 60 seconds (d) Every one hour
31. For dielectric heating, which frequency is used ?
- (a) 1 KHz to 10 KHz (b) 10 KHz to 100 KHz
(c) 100 KHz to 1000 KHz (d) 10 MHz to 40 MHz
32. For stability and economic reasons, transmission lines are operated at a power angle in the range
- (a) 15° to 25° (b) 30° to 45° (c) 50° to 65° (d) 70° to 85°
33. The power factor of a 100 KVA load is 0.8, it is required to improve the power factor to 0.9. What is the rating of the required shunt Capacitor Bank ?
- (a) 16.4 KVAR (b) 43.6 KVAR (c) 29 KVAR (d) 60 KVAR
34. Which one of the following relays has directional properties ?
- (a) IDMT relay (b) Impedance relay (c) Reactance relay (d) MHO relay
35. For three phase lines, the complete protection is provided by
- (a) one phase relay & two earth fault relays
(b) two phase relays & one earth fault relay
(c) three phase relays
(d) three earth fault relays

Series-D

$$\frac{80}{x} = 0.9$$



36. Short line fault of 132 kV or above is most effectively cleared by
 (a) Vacuum circuit breaker (b) Minimum oil circuit breaker
 (c) SF6 circuit breaker (d) Air blast circuit breaker
37. Which one of the following protection is not used for protection of Turbo alternator ?
 (a) Over-speed protection (b) Over-flexing protection
 (c) Thermal protection (d) Earth fault protection
38. A negative sequence relay is commonly used to protect
 (a) An alternator (b) A transformer
 (c) A transmission line (d) A busbar
39. Which one of the following does not have an effect on Corona ?
 (a) spacing between conductors (b) conductor size
 (c) line voltage (d) length of conductor
40. A fuse acts as
 (a) fault detector (b) interruptor (c) Both (a) & (b) (d) None of these
41. Basic quantity measured in a distance relay is
 (a) Impedance (b) Current difference
 (c) Voltage difference (d) None of these
42. Time interval between closure of trip circuit and final arc extinction in circuit breaker is called
 (a) Relay time (b) Fault clearing time
 (c) Breaker time (d) Overshoot time
43. The operating time of circuit breaker between instant of receiving trip signal and final contact separation is
 (a) 0.06 – 0.09 sec (b) 0.1 – 0.2 sec
 (c) 0.03 – 0.06 sec (d) 0.3 – 0.6 sec
44. The operating time of an impedance relay is a function of
 (a) Ratio of time voltage at the relay to fault current.
 (b) Ratio of the fault current to the line voltage of the relay.
 (c) CT and PT ratios.
 (d) Frequency of the fault current.
45. Two transmission lines having surge impedance of 100 ohms are joined by a cable. For no reflection to occur the surge impedance of the cable should be
 (a) $100 / \epsilon_o \epsilon_r \Omega$ (b) $100 \epsilon_o \epsilon_r \Omega$ (c) 50 Ω (d) 100 Ω



46. Series compensation of EHV lines is
- Reduce the fault level
 - improve the steady state stability limit
 - as a substitute for synchronous pulse modifier
 - None of the above
47. The power transmission capability of an EHV AC transmission line is
- directly proportional to the length of the line.
 - proportional to the square of the length of the line.
 - inversely proportional to the length of the line.
 - independent of the length of the line.
48. Which of the following statement is correct ?
- load factor = capacity factor \times utilization factor
 - utilization factor = capacity factor \times load factor
 - capacity factor = load factor / utilization factor
 - capacity factor = load factor \times utilization factor
49. Consider the following tests related to testing of circuit breakers –
- | | |
|----------------------|-------------------------|
| 1. Mechanical test ✓ | 2. Short circuit test ✓ |
| 3. Dielectric test ✓ | 4. Thermal test ✓ |
- Out of these routine tests are
- 1, 2 and 3
 - 2, 3 and 4
 - 1, 2, 3 and 4
 - 1, 2 and 4
50. The frequency modulation FM radio frequency range is nearby
- 250 – 300 MHz
 - 150 – 200 MHz
 - 90 – 105 MHz
 - 30 – 70 MHz
51. The fidelity of a receiver relates to variation of the output with the modulating frequency when the output load is
- resistive
 - inductive
 - capacitive
 - a combination of all above
52. High frequency waves follow
- The line of sight direction
 - The ground wave propagation
 - The ionosphere propagation
 - The curvilinear propagation
53. The signal contaminated with large noise are demodulated by
- envelop detector
 - synchronous detector
 - envelope detector followed by low filter ✓
 - envelope detector followed by high pass filter ✓

54. Which one of the following system offers the best trade off between bandwidth & SNR ratio ?
 (a) PAM (b) PDM (c) PPM (d) PCM
55. In, F.M. the noise can be further decreased by
 (a) decreasing deviation (b) increasing deviation
 (c) keeping deviation constant (d) None of these
56. F.M. system as compared to A.M. system
 (a) are equally affected by noise (b) are less affected by noise
 (c) are more affected by noise (d) None of these
57. The refractive index of the Ionosphere
 (a) is always smaller than 1.0
 (b) is always equal to 1.0
 (c) is always greater than 1.0
 (d) is smaller than 1.0 during the day and greater than 1.0 during the night
58. If a carrier of a 100 percent modulated AM wave is suppressed, then the percentage power saving will be
 (a) 50 (b) 150 (c) 100 (d) 66.66

$$= \frac{0.5 P_c \times 100}{P_c} = \frac{0.5 P_c}{1.5 P_c} = \frac{1}{3}$$
59. A high power microwave pulse of the order of megawatts can be generated by a
 (a) Travelling wave tube (b) Magnetron
 (c) Reflex klystron (d) Gunn diode
60. When a wave travelling in air enters into a wave guide
 (a) The phase velocity will increase (b) The group velocity will increase
 (c) The phase velocity will decrease (d) None of these
61. Before transmitting to the satellite the wide band satellite signal is amplified by
 (a) Klystron (b) Travelling wave tube
 (c) Tunnel diode amplifier (d) Wave guide
62. The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
 (a) unchanged (b) halved (c) doubled (d) increase by 50%
63. A 200 watt carrier is modulated to a depth of 75 percent. The total power of the modulated wave is given by
 (a) 128 W (b) 156.3 W (c) 256.25 W (d) 288.33 W
64. A system has receiver noise resistance of 100 Ω . It is connected to an antenna with impedance resistance of 50 Ω . What would be the noise figure of the system ?
 (a) 1 (b) 2 (c) 3 (d) 4

Series-D

$$P_t = P_c$$

$$P_t = P_c \left(1 + \frac{1}{2}\right)^2$$

$$0.75 = \frac{1.5 P_c}{P_c}$$

$$\left(1 + \frac{1}{2}\right)^2 = 1.5$$

$$1 + \frac{1}{2} = \sqrt{1.5}$$

$$\frac{1}{2} = \sqrt{1.5} - 1$$

$$\frac{1}{2} = \frac{1.5 - 1}{1} = \frac{0.5}{1}$$

$$\frac{1}{2} = \frac{0.5}{1}$$

$$\frac{1}{2} = \frac{0.5}{1}$$

65. The characteristics impedance of a loss less transmission line is given by

- (a) $Z = \sqrt{LC}$ (b) $Z = \sqrt{\frac{L}{C}}$ (c) $Z = LC$ (d) $Z = \sqrt{\frac{C}{L}}$

66. The fabrication of microstrip line is done by

- (a) Photo etching (b) Printed circuit technique
(c) Oxidation (d) Cladding

67. Maximum range of a transmitter depends upon

- (a) its frequency (b) its power
(c) both its frequency & power (d) None of the above

68. The conversion from DC to AC is a form of

- (a) Frequency Modulation (b) Amplitude Modulation
(c) Rectification (d) Filtration

69. A radio cab company with its antenna at height of 16 m, communicates with cab having antenna 1.0 m, find the maximum communication distance without obstacle.

- (a) 10 km (b) 20 km (c) 30 km (d) 40 km

70. If, as per block diagram shown in the figure, the input power is 1 mW then output power P_o will be



- (a) 2 mW (b) 1 mW (c) 0.5 mW (d) 0.0 mW

71. If the diameter of the parabolic reflectors of a microwave antenna is doubled, its gain will be increased by

- (a) 0 db (b) 2 db (c) 4 db (d) 6 db

72. To convert narrow band FM to wide band FM, modulation is increased by ?

- (a) Frequency multiplication (b) Frequency division
(c) Frequency translation (d) None of the above

73. Which of the following pulse communication system is inherently immune to noise ?

- (a) PPM (b) PCM (c) PWM (d) PAM

74. The modulation index of a FM wave is changed from 0 to 4, the transmitted power is

- (a) Unchanged (b) Half (c) Increase by 50% (d) Double

75. In DSB-SC system with 100% modulation, the power saving is
 (a) 50% (b) 66% (c) 75% (d) 100% $P_c \left(1 + \frac{1}{2}\right)$
76. Universal motor can run on
 (a) AC only (b) DC only (c) Either AC or DC (d) None of these
77. The type of single phase induction motor used in hair drier is
 (a) Capacitor start motor (b) Capacitor start capacitor run motor
 (c) Capacitor run motor (d) Shaded pole motor
78. The stator core of a synchronous machine is the limitations of
 (a) stainless steel (b) silicon steel (c) cast iron (d) cast steel
79. The slip rings employed in 3- ϕ synchronous machine are insulated for
 (a) output rated voltage (b) DC low voltage
 (c) Very low voltage (d) Very high voltage
80. If load angle of a 4-pole synchronous motor is 8° (electric) its value in mechanical degree is
 (a) 4° (b) 2 (c) 0.5 (d) 0.25
 $\alpha_e = \frac{2}{p} \alpha_m$ $\alpha_e = \frac{2}{4} \alpha_m$ $\alpha_e = 0.5 \alpha_m$
81. If the field of synchronous motor is under excited, the power factor will be :
 (a) lagging (b) leading (c) unity (d) can't say
82. The maximum possible speeds in rpm at which an alternator can be driven to generate voltages at 60 Hz and 50 Hz are respectively
 (a) 2000, 2400 (b) 3000, 3600 (c) 2400, 2000 (d) 3600, 3000
83. In AC rotating machines the generated emf
 (a) is in phase with the working flux ϕ (b) lead ϕ by 90°
 (c) lag ϕ by 90° (d) lag ϕ by 180°
84. A pole pitch in electrical machine is
 (a) $\leq 180^\circ$ electrical (b) $= 180^\circ$ mechanical
 (c) $> 180^\circ$ electrical (d) $< 180^\circ$ electrical
85. The power factor of a squirrel cage inductor motor is
 (a) low at light loads only (b) low at heavy loads only
 (c) low at light & heavy loads both (d) low at rated load only

86. The torque speed characteristic of a repulsion motor resembles which of the following motor characteristics ?
 (a) separately excited (b) shunt
 (c) series (d) compound
87. Which single phase induction motor has the lowest speed ?
 (a) Shaded pole (b) Universal (c) Hysteresis (d) Repulsion
88. A star delta starter is equivalent to an auto transformer starter with a tapping of
 (a) 86.6% (b) 57.73% (c) 57% (d) 58%
89. The voltage regulation of a dc generator at full load being zero implies that the generator is
 (a) Shunt connected (b) differentially compounded
 (c) cumulatively compounded (d) series connected
90. V - curves of a synchronous motor give relation between
 (a) Armature current & field current (b) Applied voltage and field current
 (c) Power factor and field current (d) Armature current & power factor
91. The frequency of emf generated per revolution in an alternator is equal to
 (a) number of poles
 (b) number of pairs of poles
 (c) twice the number of poles
 (d) number of armature conductors per pole
92. A transformer has 95% efficiency at full load and 0.85 pf lag. Efficiency at full load 0.85 pf lead will be
 (a) > 95% (b) < 95% (c) = 95% (d) 100%
93. The neutral of a 3 phase generator is solidly grounded. For a fault at generator's terminals the fault current is maximum for
 (a) 3-phase fault (b) LL fault (c) SLG fault (d) DLG fault
94. A 200/100 V, 50 Hz transformer is to be excited at 40 Hz from the 100 V side. For the exciting current to remain same, the applied voltage should be
 (a) 150 V (b) 125 V (c) 100 V (d) 80 V
95. A 12 pole, 440 V, 50 Hz, 3 phase synchronous motor takes a line current of 100 A at 0.8 pf leading. Neglecting losses, the torque developed will be
 (a) 750 Nm (b) 1165 Nm (c) 1058 Nm (d) 525 Nm
96. A permanent magnet stepper motor with 8 poles in stator and 6 poles in rotor will have a step angle of
 (a) 7.5° (b) 15° (c) 30° (d) 60°

Series-D

CES-09

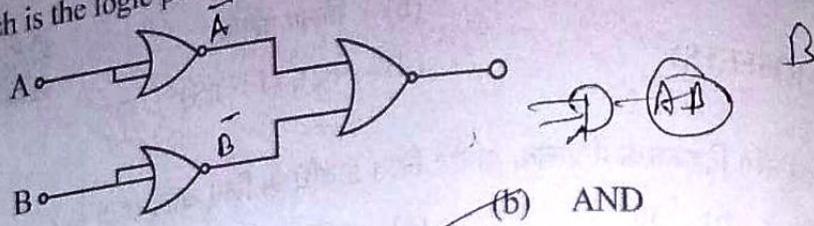
97. A 3-phase, 50 Hz, 10 pole induction motor runs at a speed of 576 rpm at full load, find rotor speed with respect to the rotating field ?
 (a) 600 rpm (b) 48 rpm (c) 24 rpm (d) 552 rpm
98. Flux linkage per unit current is called
 (a) Capacitance (b) Inductive Reactance
 (c) Resistance (d) Inductance
99. Which law is synonymous to the occurrence of diamagnetism ?
 (a) Lenz's law (b) Ampere's law
 (c) Maxwell's law (d) Coulomb's law
100. Keeping in view the requirement of parallel operation, which of the three phase connections are possible ?
 (a) YY to Δ-Y (b) Δ-Δ to Y-Δ (c) Δ-Δ to Δ-Y (d) Δ-Y to Y-Δ
101. A stepper motor is a
 (a) DC motor (b) Single phase AC motor
 (c) Multi-phase motor (d) Two phase motor
102. In three phase current source inverter, the rms value of fundamental component of line current is –
 Where I_d is input dc current.
 (a) $\frac{4}{\pi} I_d$ (b) $\frac{4\sqrt{3}}{\sqrt{2}\pi} I_d$ (c) $\frac{4\sqrt{3}}{2\pi\sqrt{2}} I_d$ (d) $\frac{4}{\pi\sqrt{3}} I_d$
103. Which one of the following is the most suitable device for low & medium power dc to dc converter ?
 (a) BJT (b) GTO (c) MOSFET (d) All of the above
104. The standard power dissipation of an MOS inverter is of the order of :
 (a) 100 mW (b) 100 nW (c) 10 nW (d) 10 mW
105. For a 3-phase half wave rectifier, the source is star connected. The supply frequency is 40 Hz. The ripple frequency at the output is
 (a) 400 Hz (b) 600 Hz (c) 1200 Hz (d) 2000 Hz
106. A 3-wire dc supply is required in
 (a) Single phase full-bridge inverter (b) Single phase half-bridge inverter
 (c) Three phase full-bridge inverter (d) All voltage source invertors
107. A Voltage Source Inverter (VSI)
 (a) is fed from a DC source of high impedance
 (b) is fed from a dc source of low impedance
 (c) is fed from an AC source
 (d) is fed from a variable dc source

108. IGBT has input characteristics of a _____, and an output characteristic of a _____.
- (a) MOSFET, BJT (b) MOSFET, SCR
(c) BJT, SCR (d) BJT, MOSFET
109. A boost regulator has an input voltage 5V and the average output voltage of 15V the duty cycle is
- (a) 3/2 (b) 2/3 (c) 5/2 (d) 15/2
110. Which of the followings does not cause permanent damage of a SCR ?
- (a) High current (b) High rate of rise of current
(c) High temperature rise (d) High rate of rise of voltage
111. A sharp rising trigger signal is preferred for triggering of thyristors because
- (a) it decrease switching losses (b) it increases di/dt capability of device
(c) Both (a) and (b) (d) it decrease power loss of device
112. When armature current of a rectifier fed separately excited DC motor is continuous
- (a) The speed regulation is very good (b) The speed regulation is poor
(c) The power factor of the drives improve (d) The shaft exhibits fluctuation in motion
113. The input power factor of a cyclo-converter is
- (a) high (b) always unity (c) low (d) leading
114. A single phase CSI has capacitor C as the load for a constant current, the voltage across the capacitor is
- (a) Square wave (b) Triangular wave (c) Step function (d) Pulsed wave
115. In a single phase modulation of PWM inverters, third harmonics can be eliminated if pulse width is equal to
- (a) 60° (b) 72° (c) 120° (d) 144°
116. The turn off time of a thyristor is $30 \mu\text{s}$ at 50°C . What is its turn off time at 100°C ?
- (a) $15 \mu\text{s}$ (b) $30 \mu\text{s}$ (c) $60 \mu\text{s}$ (d) $120 \mu\text{s}$
117. A free wheeling diode in phase controlled rectifiers
- (a) enables inverters operation
(b) is responsible for additional reactive power
(c) improve the line power factor
(d) is responsible for additional harmonics
118. Time margin for series inverter ensures
- (a) Low Power loss (b) Safety of the device
(c) Improved Power Factor (d) Absence of harmonics

119. Dynamic memory cells are constructed using
 (a) transistors (b) flip flops (c) MOSFETS (d) FETS
120. In a three phase half wave rectifier, each diode conducts for a duration of
 (a) 180° (b) 30° (c) 60° (d) 45°
121. For a SCR $\frac{dv}{dt}$ protection is achieved through use of
 (a) RL in series with SCR (b) RL across SCR
 (c) L in series with SCR (d) None of these
122. A chopper where voltage as well as current remains negative is known as
 (a) Type - A (b) Type - B (c) Type - C (d) Type - D
123. The di/dt rating of a SCR specifies for it
 (a) Decaying anode current (b) Decaying gate current
 (c) Rising gate current (d) Rising anode current
124. The number of P-N junction in a Thyristor is
 (a) 1 (b) 2 (c) 3 (d) 4
125. If the open circuit voltage is 60 volt and the short circuit current is 20 Ampere, then determine the voltage required for welding is 10 Amperes?
 (a) 30 V (b) 60 V (c) 20 V (d) 40 V
 $60 \times 20 = 1200$
126. How many single phase AC voltage controllers are needed for forward and reverse speed operation, of a 3 phase induction motor?
 (a) 3 (b) 4 (c) 5 (d) 6
127. In a sequential circuit the output depends on
 (a) The interconnections in the circuit (b) The combinational of inputs
 (c) The input at the particular instant (d) The inputs and the previous output
128. Integrated circuit logic contains the properties of
 (a) Diodes (b) BJT (c) Resistors (d) All of the above
129. What is the minimum number of NOR gates required to construct an EX-NOR gate?
 (Assume inputs are available as direct and complement form.)
 (a) 3 (b) 4 (c) 5 (d) 6

Series-D

130. Which is the logic performed by the circuit shown below ?



- (a) NAND
- (c) EX-OR

- (b) AND
- (d) None of the above

131. What is the addition of $(-64)_{10}$ & $(80)_{16}$?

(a) $(-64)_{16}$

(b) $(16)_{16}$

(c) $(110000)_2$

(d) $(01000000)_2$

132. A 12 bit A/D converter has a range of 0 – 12 V. What is the approximate resolution of the converter ?

(a) 1 mV

(b) 2.5 mV

(c) 2.5 μ V

(d) 12 mV

133. What is the minimum number of flip-flops required in a counter to count 60 pulses ?

(a) 4

(b) 6

(c) 8

(d) 10

134. The Boolean Expression $X(P, Q, R) = \pi(0, 5)$ can be realised using only 2 inputs of gate. These gates are

- (a) AND and OR
- (b) NAND and OR
- (c) AND and XOR
- (d) OR and XOR

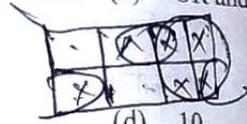
135. The number of flip flop required in a decade counter is :

(a) 2

(b) 3

(c) 4

(d) 10



136. 7EH and 5FH are XORed. The output is multiplied by 10H. The result is

(a) 2100H

(b) 5F7EH

(c) 7E5FH

(d) 0210H

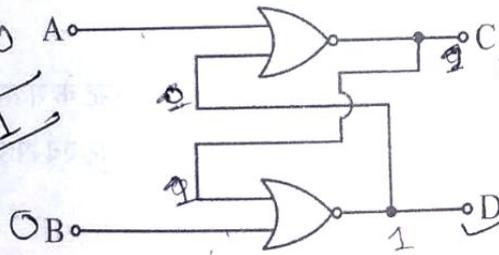
137. In the circuit shown in figure when input $A = B = 0$, the possible logic states of C & D are

(a) $C=0, D=1$ or $C=1, D=0$

(b) $C=1, D=1$ or $C=0, D=0$

(c) $C=1, D=0$

(d) $C=0, D=1$



NOR

138. The D flip-flop are initialized to $Q_1 Q_2 Q_3 = 000$. After 1 clock cycle $Q_1 Q_2 Q_3$ is equal to

(a) 011

(b) 100

(c) 101

(d) 010

Series-D

10100001
A1

28
1010

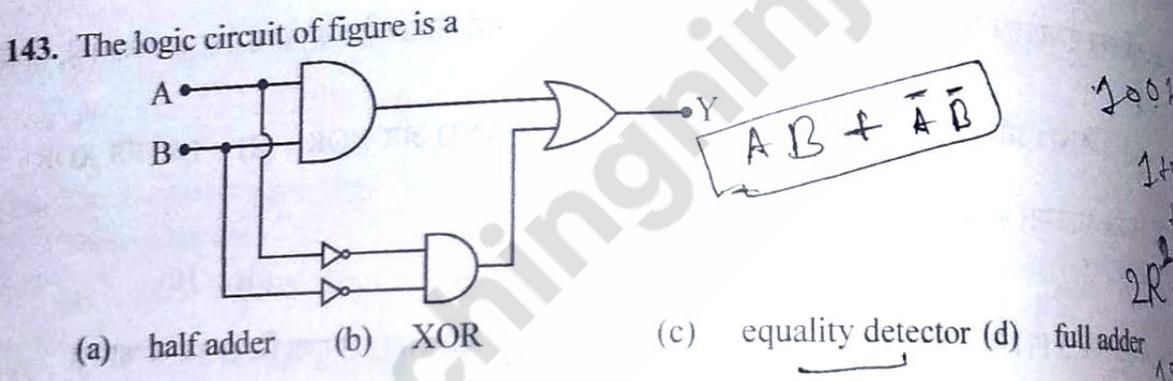
000
100

560
 (139) What are the values respectively R_1 and R_2 in the expression?
 $(235)_{R_1} = (565)_{10} = (865)_{R_2}$
 (a) 8, 16 (b) 16, 8 (c) 6, 16 (d) 12, 8
 Handwritten notes: $2R_1 + 3R_2 = 510$, $5 + 3R_1 + \dots$

140. Which one of the following logic families can be operated using a supply voltage from 0 to 15V?
 (a) TTL (b) ECL (c) PMOS (d) CMOS
 Handwritten note: $-3 \pm \sqrt{\dots}$

141. IC 7483 is a
 (a) TTL Binary adder (b) TT clock
 (c) 8-bit binary subtractor (d) None of the above

142. The power failure alarm must be connected to which one of the following inputs of 8085?
 (a) RST 7.5 (b) TRAP (c) INTR (d) HOLD



144. Terminal count of Mod-10 binary counter is
 (a) 0000 (b) 1010 (c) 1001 (d) 1111

145. A modulus - 16 ripple counter is holding the count $(1001)_2$. What will the count be after 31 clock pulses?
 (a) $(1000)_2$ (b) $(1010)_2$ (c) $(1011)_2$ (d) $(1101)_2$

146. A Decoder is a
 (a) One input many output device (b) Many input one output device
 (c) Many input many output device (d) One input one output device

147. The gain & distortion of an amplifier are respectively 150 and 5%, when used with a 10% negative feedback, the % distortion would be
 (a) 5/16 (b) 9/16 (c) 6 (d) 8

148. How fast can the output of an Op Amp change by 10V, if its slew rate is $1V/\mu s$?
 (a) $5 \mu s$ (b) $10 \mu s$ (c) $15 \mu s$ (d) $20 \mu s$

149. Decimal number 9 in Gray code is
 (a) 1100 (b) 0110 (c) 1101 (d) 1111

150. FF_{16} when converted to 8421 BCD is
 (a) 0000 0101 0101 (b) 0010 0101 0101
 (c) 1111 0101 0101 (d) 1000 0101 0101

151. The parallel outputs of a counter circuit represent the
 (a) parallel data word (b) clock frequency
 (c) counter modulus (d) clock count

152. If A and B are Boolean variables, then what is $(A + B) \cdot (A + \bar{B})$ equal to?
 (a) B (b) A (c) A + B (d) AB

153. Types of data acquisition system used in process control can be
 (a) An analog data acquisition system (b) A digital data acquisition system
 (c) (a) & (b) both (d) None of these

154. For a unity feedback system with open loop transfer function $G(S) = \frac{9}{S(S+2)}$, the damping ratio is
 (a) 1/3 (b) 1/2 (c) 2/3 (d) 2

155. The _____ translate a byte from one code to another code.
 (a) XLAT (b) XCHG (c) POP (d) PUSH

156. In a microprocessor system, suppose TRAP, HOLD, RESET pin got activated at the same time, while the processor was executing some instructions, then it will first respond to
 (a) TRAP (b) HOLD (c) RESET (d) None of above

157. Basic steps of execution of an instruction is
 (a) Fetch → Execute → Decode (b) Decode → Fetch → Execute
 (c) Execute → Fetch → Decode (d) Fetch → Decode → Execute

158. A microprocessor with a 12 bit address bus will be able to access
 (a) 1 K bytes (b) 4 K bytes (c) 8 K bytes (d) 10 K bytes

159. The _____ pin is used to select direct command word.
 (a) A0 (b) D7 - D6 (c) A12 (d) AD7 - AD6

160. Flash & EPROM are types of
 (a) Volatile memory (b) Non-volatile memory
 (c) ALU (d) Register

Series-D

161. A serial input port is receiving 8 bits in 8 successive time slots of $1 \mu\text{s}$ each. How many maximum no. of bytes can be received in 1 sec. ?
 (a) 125 (b) 1250 (c) 12500 (d) 125000

162. Process of resetting or setting a bit or each bit of a byte by NOT operation is known as
 (a) Compare (b) Compliment (c) Decrement (d) Fetcher

163. An 8-bit timer is programmed to receive internal pulse at the rate of $1 \mu\text{s}$. What should be the value of X preloaded, so that if time outs and generate an overflow interrupt after 25 μsec . ?
 (a) E7H (b) E6H (c) E8H (d) E9H

164. In a micro-processor with 16 Address and 12 data lines, the maximum number of op-codes is _____.
 (a) 2^6 (b) 2^8 (c) 2^{12} (d) 2^{16}

165. The following 8085 instructions are executed sequentially :

XRA A
 MOV L, A
 MOV H, L
 INX H
 DAD H

0000 -
 0000 -
 0001

16	20	18	0
16	1	28	0
16	8	8	8
			0

After execution, the content of HL pair is
 (a) 0000 H (b) 0101 H (c) 0001 H (d) 0002 H

166. An m-bit microprocessor has an m-bit
 (a) Flag register (b) Instruction register
 (c) Data counter (d) Program counter

167. The Resolution of a 0 – 10 V, 4 bit DAC is
 (a) 1.25 volt (b) 0.125 volt (c) 0.0625 volt (d) 0.625 volt

168. If the size of memory of a given memory chip is 2 K byte, starting address is 0000H, find the last address.
 (a) 03FFH (b) 0400H (c) 07FFH (d) 0800H

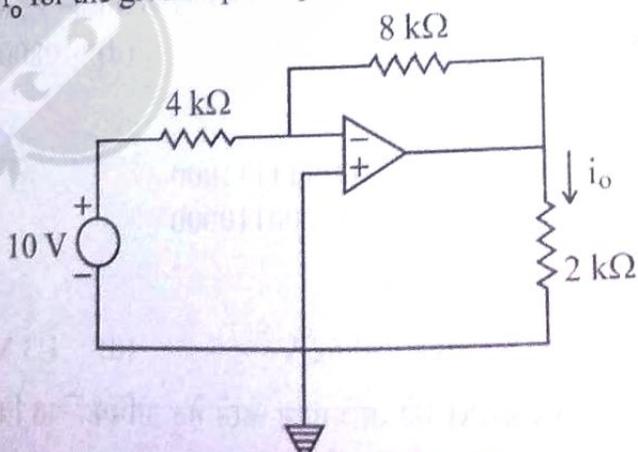
169. The Binary equivalent of Hex number 3F8 is
 (a) 011011100001 (b) 001111111000
 (c) 000110101101 (d) 011000110000

170. The value of LSB of 8-bit DAC for 5 volt supply is
 (a) 39 mV (b) 19.5 mV (c) 0.62 V (d) 1.3 V

171. A μP is designed to access 2K PROM, 4K ROM & 64K RAM. The number of address lines required to access these memories by the μP is
 (a) 16 (b) 17 (c) 18 (d) 19

172. Ready pin of microprocessor is used
 (a) to indicate that microprocessor is ready to receive inputs.
 (b) to indicate that microprocessor is ready to receive outputs.
 (c) to introduce wait – state.
 (d) to provide direct memory access.
173. The number of bits processed in a single instruction is known as
 (a) Instruction Set (b) Bandwidth
 (c) Band speed (d) Instruction speed
174. The RAM which is created using bipolar transistors is called
 (a) Dynamic RAM (b) Static RAM
 (c) Permanent RAM (d) DDR RAM
175. What type of memory is not directly addressable by the CPU and requires special software called EMS (Expanded Memory Specification) ?
 (a) Extended (b) Base (c) Expanded (d) Conventional
176. Which microprocessor pins are used to request and acknowledge a DMA transfer ?
 (a) reset & ready (b) ready & wait
 (c) HOLD and HLDA (d) None of these
177. The time required to refresh a typical DRAM is
 (a) 2-4 μ s (b) 2-4 ns (c) 2-4 ms (d) 2-4 ps
178. Process field bus (PROFI-BUS) is a/an
 (a) American Standard (b) African Standard
 (c) Asian Standard (d) German Standard
179. A system of equation represented by $AX = 0$, where X is a column vector of unknown and A is a matrix containing coefficient, has a non-trivial solution when A is
 (a) Non singular (b) Singular (c) Symmetric (d) Hermetian

180. Find i_o for the given Op-Amp circuit



$$\frac{-10}{4} + \frac{0 - V_o}{8}$$

$$\frac{V_o}{8} = -\frac{10}{4}$$

$$V_o = -20$$

- (a) 10 mA (b) 20 mA (c) ~~-2.8 mA~~ (d) -10 mA