105. Using the RSA public key crypto system, if p = 13, q = 31 and d = 7 then the value of e is
1. 101
2. 103
3. 105
4. 107

106. A ———— can forward or block packets based on the information in the network layer and transport layer header.
1. Proxy firewall
2. Firewall
3. Packet filter firewall
4. Message digest firewall

107. In ———— substitution, a character in the plaintext is always changed to the same character in the cipher text, regardless of its position in the text.
1. Polyalphabetic
2. Monoalphabetic
3. Transpositional
4. Multialphabetic

108. The uplink frequency of P-GSM system is
1. 1850 – 1910 MHz
2. 1710 – 1785 MHz
3. 890 – 915 MHz
4. None of the above

109. ———— are typically characterized by very small cells, especially in densely populated areas.
1. 2G system
2. 3G system
3. 2.5G system
4. 3.5 system

110. ———— is based on a mathematical concept called Fast Fourier Transform (FFT).
1. Universal Mobile Telecommunication System (UMTS)
2. Dynamic Host Configuration Protocol version (DHCP)
3. Dynamic Packet Assignment (DPA)
4. Orthogonal Frequency Division Multiplex (OFDM)

111. ———— is written in RDF, W3C's language for modeling metadata, descriptive information about items on the Web.
1. BB/PP
2. DD/CC
3. CC/PP
4. XML

112. Consider the following statements :
(i) A graph in which there is a unique path between every pair of vertices is a tree.
(ii) A connected graph with e = v – 1 is a tree.
(iii) A graph with e = v – 1 that has no circuit is a tree.
Which of the above statements is/are true?
1. (i) and (iii)
2. (ii) and (iii)
3. (i) and (ii)
4. All of the above

113. The context free grammar for language $L = \{a^n b^m c^k \mid k = |n - m|, n \geq 0, m \geq 0, k \geq 0\}$ is
1. $S \rightarrow S_1S_3$, $S_1 \rightarrow aS_1c \mid S_2 \mid \lambda$, $S_2 \rightarrow aS_2b \mid \lambda$, $S_3 \rightarrow aS_3b \mid S_4 \mid \lambda$, $S_4 \rightarrow bS_4c \mid \lambda$
2. $S \rightarrow S_1S_3$, $S_1 \rightarrow aS_1S_2c \mid \lambda$, $S_2 \rightarrow aS_2b \mid \lambda$, $S_3 \rightarrow aS_3b \mid S_4 \mid \lambda$, $S_4 \rightarrow bS_4c \mid \lambda$
3. $S \rightarrow S_1 \mid S_2$, $S_1 \rightarrow aS_1S_2c \mid \lambda$, $S_2 \rightarrow aS_2b \mid \lambda$, $S_3 \rightarrow aS_3b \mid S_4 \mid \lambda$, $S_4 \rightarrow bS_4c \mid \lambda$
4. $S \rightarrow S_1 \mid S_3$, $S_1 \rightarrow aS_1c \mid S_2 \mid \lambda$, $S_2 \rightarrow aS_2b \mid \lambda$, $S_3 \rightarrow aS_3b \mid S_4 \mid \lambda$, $S_4 \rightarrow bS_4c \mid \lambda$

114. A simple graph G with n-vertices is connected if the graph has
1. (n – 1) (n – 2)/2 edges
2. More than (n – 1) (n – 2)/2 edges
3. Less than (n – 1) (n – 2)/2 edges
4. $\sum ki = 1$ C (ni, 2) edges

115. Which of the following is not accepted by a PDA but accepted by a two-stack PDA?
1. $a^n b^n$
2. $a^n b^m c^m d^n$
3. $a^n b^n c^i$
4. $a^n b^n c^n d^n$

67. A balanced star connected load with impedance of 20 Ω is across a 3-phase, 4 wire , 173 V system with the voltages to neutral as 100 –90°, 100 30° and 100 150°. The current in the neutral wire is

1. 5A
2. 8.85A
3. Zero
4. 50A

68. The fourier series of an odd periodic function contains only

1. Odd harmonics
2. Even harmonics
3. Cosine terms
4. Sine terms

69. Electric field inside a hollow conducting sphere is

1. Zero
2. Non-zero constant
3. Changes with the magnitude of the charge on the conductor
4. Changes with the distance from the centre of the sphere

70. Three concentric spherical shells of radii R_1, R_2 and R_3 $(R_1 < R_2 < R_3)$ carry charges –1, –2 and 4 Coulomb respectively. The change in Coulomb on the inner and outer surfaces respectively of the outer most shell is

1. 0 and 4
2. –3 and 1
3. –3 and 7
4. –2 and 6

71. Two infinite parallel metal plates are charged with equal surface charge densities of opposite polarity. The electric field in the gap between the plates is

1. Same as that produced by one plate
2. Double the field produced by one plate
3. Dependent on the distance between the plates
4. Zero

72. The type of magnetic force between two monopolar DC lines

1. attractive
2. repulsive
3. zero
4. vibrative

73. Magnetic flux density for a long solenoid near its centre is _____ compared to its ends.

1. same
2. half
3. double
4. one fourth

74. A transformer produces harmonics because of

1. leakage flux
2. saturation
3. non-sinusoidal excitation current
4. both (2) and (3)

75. A doubly excited rotating machinery develops torque if

1. reluctance between stator and rotor MMFs is minimum
2. permeance between stator and rotor MMFs is maximum
3. mutual inductance between the stator and rotor changes with respect to position
4. both (1) and (2)

76. The critical resistance of a DC shunt generator can be obtained from the slope of the

1. saturation region of its open circuit characteristics
2. air-gap line of its open circuit characteristics
3. external load characteristics
4. internal load characteristics

77. The speed (N) and torque (T) relationship of the DC motor used in electric traction is such that,

1. $N \propto 1/T$
2. $N \propto 1/\sqrt{T}$
3. $N \propto T$
4. $N \propto \sqrt{T}$

78. Star-Delta starter helps in reducing the starting current of a three-phase induction motor to

1. $1/\sqrt{3}$ times of its direct on line starting current
2. 1/3 times of its direct on line starting current
3. $1/\sqrt{3}$ times of its full load current
4. 1/3 times of its full load current

79. A three-phase induction motor that can drive a load torque defined by $T_L \alpha \ N^2$, (T_L is the load torque and N is the speed) has to follow a speed control method called

1. Supply voltage control method
2. Frequency control method
3. Voltage / Frequency control method
4. Cascade connection method

80. A three-phase induction motor can develop maximum torque at starting if it uses

1. star-delta starter
2. rotor resistance starter
3. stator resistance starter
4. auto-transformer

81. Capability curves of a three-phase alternator are used to

1. determine the alternator's maximum armature heating and field heating limits
2. operate it within real power and reactive power limits
3. graphically check its operating power limits and initiate suitable control action
4. all of the above

82. Which segment register is augmented with IP register to get the physical address of the next instruction to be fetched?

1. Code segment
2. Data segment
3. Extra segment
4. Stack segment

83. ALE is an important signal available in 8085, 8051 and 8086. The expansion for ALE is :

1. Arithmetic and Logic enable
2. Address Latch enable
3. Arithmetic and logic encoder
4. Address latch encoder

84. The time taken for fetching and execution of the instruction INRM is

1. 4 T- states
2. 7 T-states
3. 10 T- states
4. 16 T- states

85. The 8085 instruction which is an example for 'register indirect addressing mode' is

1. LXI B, 0000
2. LDAX B
3. MVI B, 00
4. ADD B

86. Pick out the correct 8051 instruction from the following.

1. ADD B , R4
2. SUB A, R3
3. DEC DPTR
4. INC DPTR

87. At standard temperature and pressure the electric field at which breakdown occur in air with a small gap d(cm) is given by

1. $30 + 6.08/d$
2. $24.2 + 6.08/d$
3. $24.2 + 6.08/\sqrt{d}$
4. $30d\left[1 + \frac{0.301}{\sqrt{d}}\right]$

88. A 400 Ω overhead line is connected to a cable having a surge impedance of 50 Ω, the transmission coefficient into the cable is

1. 2/9
2. 1/4
3. −16/9
4. 1/9

89. The rating of an impulse voltage generator with generator capacitance C_g and voltage rating V with n stages if (kJ)

1. $0.5\, C_g\, V^2$
2. $(n/2)\,(C_g\, V^2)$
3. $(C_g\, V^2)/2n$
4. $(C_g\, V^2)/2n^2$

90. The skin depth for resistance material used for impulse shunts is given by

1. $(\pi\, f\, \mu\sigma)^{1/2}$
2. $(\pi\, f\, \mu\sigma)^{-1/2}$
3. $2\sqrt{x\, f\, \mu\sigma}$
4. $0.5(\pi\, f\, \mu\sigma)^{-1/2}$

91. A 16-stage impulse voltage generator has stage capacitance of 0.125 μF and a charging voltage of 200kV. The energy rating in kJ is

1. 40
2. 50
3. 80
4. 640

92. Six MOSFETs connected in a bridge configuration (having no other power device) MUST be operated as a Voltage Source Inverter (VSI) ". This statement is

1. True, because being majority carrier devices, MOSFETs are voltage driven
2. True, because MOSFETs have inherently anti parallel diodes
3. False, because it can be operated both as current source Inverter (CSI) or a VSI
4. False, because MOSFETs can be operated as excellent constant current sources in the saturation region

93. A switched mode power supply operating from 20kHz to 100 kHz range uses which one of the following as the main switching element?

1. Thyristor
2. MOSFET
3. Triac
4. UJT

94. The MOSFETs have lower turn-off time and they can be operated at higher frequencies when compared to BJTs because

1. the minority carrier storage time is absent in MOSFETs
2. MOSFETs have higher input impedance
3. MOSFETs are voltage controlled.
4. MOSFETs have positive temperature coefficient

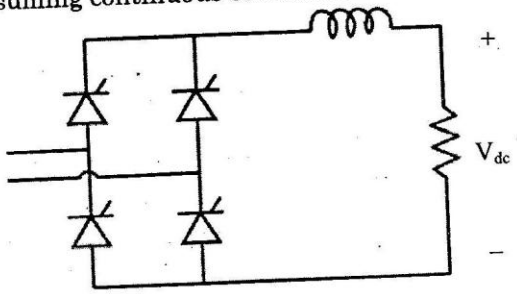
95. Buck boost operation is possible in

1. impedance source converters
2. cycloconverters
3. voltage source inverters
4. current source inverters

96. Voltage source inverters

1. Have voltage gain <1
2. Increase the input power factor
3. Reduce the converter losses
4. Reduce the line side harmonics

97. The fully controlled thyristor converter in the figure is fed from a single–phase source. When the firing angle is 0°, the dc output voltage of the converter is 300 V. What will be the output voltage for a firing angle of 60°, assuming continuous conduction?



1. 150 V
2. 210 V
3. 300 V
4. 100 πV

98. PM brushless dc motor has

1. Sinusoidal induced emf
2. Unipolar trapezoidal induced emf
3. Bipolar trapezoidal induced emf
4. Bipolar triangular induced emf

99. The small signal control to output transfer function of the boost converter has /have

1. a right half plane zero
2. two half plane zeros
3. two left half plane zeros
4. a left half plane zeros

100. Drawback of the individual phase control scheme used for firing angle control in a HVDC link.

1. Less output voltage
2. Less output power
3. Harmonic instability problem
4. Voltage instability problem

101. The bus incidence matrix of a power system is

1. unique
2. non-singular matrix
3. not unique
4. none of the above

102. If n is the number of bridges connected in series in a HVDC transmission link and p be the pulse number, the harmonics that can be expected is

1. $2np \pm 1$
2. $np \pm 1$
3. $n^2p \pm 1$
4. $2(np \pm 1)$

103. Voltage instability occurs due to

1. heavy load in the power system
2. imbalance between mechanical input and electrical output
3. bad tuning of controllers in voltage regulators
4. None of these

104. For a synchronous machine with synchronizing torque coefficient = 2, H= 3. 14s and frequency 50 Hz the natural frequency of oscillation (rad/s) is

1. $\sqrt{10}$
2. 10
3. 5
4. 1

105. Time in cycles and time in seconds is related as

1. time(cycles) = time(seconds)*frequency
2. time(cycles) = time(seconds)/frequency
3. time(cycles) = time(seconds)* Synchronous speed
4. time(cycles)= time(seconds)/ Synchronous speed

106. The Constant 'K_4' in Heffron Philips model of synchronous machine is negative when

1. A hydraulic generator without damper winding is connected to a line with high R/X ratio on heavy load
2. A hydraulic generator with damper winding is connected to a line with high R/X ratio on heavy load
3. A hydraulic generator with damper winding is connected to a line with high R/X ratio on light load
4. A hydraulic generator without damper winding is connected to a line with high R/X ratio on light load

107. Match the following :

N_m = Number of measurements of a system

N_s = Number of System states

1) $N_m = N_s$	(a)	redundancy exists may J = 0 present
2) $N_m < N_s$	(b)	noredunancy
3) $N_m > N_s$	(c)	redundancy exists Bad measurements
	(d)	Psuedomeasurements

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

108. The desirable power factor to operate arc furnace is
1. Unity
2. 0.707 lagging
3. Zero
4. 0.95 lagging

109. Spot welding is used for
1. Thin metal sheets
2. Rough and irregular surfaces
3. Thick sections
4. None of above

110. The colour of sodium vapour lamp is
1. Pink
2. Yellow
3. Bluish green
4. Red

111. Which motor is preferred for quick speed reversal?
1. Synchronous motor
2. Wound rotor induction motor
3. D.C motor
4. Squirrel cage induction motor

112. The rate of acceleration on suburban or urban service is in the range of———— km phps.
1. 15 to 25
2. 1.6 to 4.0
3. 5 to 10
4. 0.2 to 0.5

113. Which filter is free of limit cycle oscillations when implemented on a finite word length digital system?
1. Butterworth filter
2. Chebyshev filter
3. IIR filter
4. FIR filter

114. In IIR filter digital filter the present output depends on
1. present and previous inputs only
2. present input and previous outputs only
3. present input only
4. present input, previous input and output

115. The linear convolution of two sequences $X_1(n) = \{1, 2\}$ and $X_2(n) = \{3,4\}$ is
1. {3.10}
2. {10, 3, 8}
3. {3, 10, 8}
4. {3, 8, 10}

ANSWER SHEET

NG 17

Answer Sheet Number: 402513

Name of the Examination Centre

Candidate's Signature

I certify that I have verified the entries, shading of Registration Number, Question Book Number and the Candidate's Signature.

Hall Superintendent's Signature

Seal of the Examination Centre

Instructions to Candidate

1. Use Black Ball point Pen for shading inside the brackets as shown below.

1	■	[2]	[3]	[4]

2. Ensure your choice before shading.
3. Do not make any stray marks inside the answer brackets as the scanner will treat it as multiple shadings. Handle this sheet with care.
4. Any malpractice committed is punishable as per Anna University norms.

Registration Number

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Subject Number

Part AA and BB are compulsory (Question Numbers 1 To 55). You have to answer the Subject Registered as Printed in the Hall Ticket. Write and shade the Subject Number for answering Question number 56 onwards.

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