APGENCO Assistant Engineers (AE) Electrical 2012 Question Paper with Key

1. Transfer Function of a System in 1/(s+1)(s+2) the impulse response of the System is

A) $e^{-2t} - e^{-t}$ B) $e^{-2t} + e^{-t}$ C) $e^{-t} + e^{-2t}$ D) $e^{-t} - e^{-2t}$

2. In a thermal power plant, ash is Collected in

A) Mills B) hoppers C) Bunkers D) Boiler

3. The average life of neutrons after they decay is

A) 1 sec B) 10 sec C) 100 sec D) 1000 sec

4. The Operating time of instantaneous relay is

A) 0.001 sec B) 0.01 sec C) 0.1 sec D) 1 sec

6. Stringing chart is useful for

A) the design of tower B) the design of insulator String

C) finding the Sag in the Conductor D) finding the distance between the towers

7. The Self GMD method is used to evaluate

A) inductance B) capacitance C) inductance and capacitance D) resistance

8. The velocity of travelling Wave through a cable of relative permittivity 36 is

A) 3×10^8 m/sec B) 2×10^8 m/sec C) 0.5×10^8 m/sec D) 10^8 m/sec

9. The Coefficient of reflection for current wave is

A) 1 B) 2 C) -1 D) 0

10. A relay has a rating of 5A, 2.2 sec IDMT and relay setting of 125% TMS =0.6. It is connected to a supply circuit through a C.T. 400/5 ratio. The Fault Current is 4000 A. The operating current of the relay is

A) 6.25 A B) 5A C) 8A D) 2.2 A

12. A single Phase transformer has resistance and reactance of 0.2 pu and 0.6 pu respectively. Its pu voltage regulation at 0.8 pf lagging would be
A) 0.52 B) 0.42 C) 0.62 D) 0.36

14. A Differential amplifier has a differential gain of 20,000, CMRR : 80 dB. The common mode gain is given by
A) 1 B) 1/2 C) 2 D) 250

15. An amplifier has input power of 2 microwatts. The Power gain of the amplifier is 60 dB. The Output power will be
A) 2 mill watts B) 6 microwatts C) 2 Watts D) 120 microwatts

16. The voltage gains of the amplifier with and without feedback are 20 and 100 respectively. The percentage of negative feedback would be
A) 40% B) 80% C) 4% D) 8%

17. For OPAMP in differential configuration, open loop gain is 100000, and differential input voltage is 2 μ V. Power supply for OPAMP is ± 12 V. Then Output voltage will be
A) + 12 V B) -12 V C) 0 V D) 2 μ V

18. A 3-stage ripple counter has Flipflop with propagation delay of 25 nsec and pulse width of strobe input 10 nsec. Then the maximum operating frequency at which counter operates reliably
A) 16.67 MHz B) 17.6 MHz C) 12.67 MHz D) 11.76 MHz

19. The percent resolution of an 8-bit D/A converter is
A) 0.392 B) 1/256 C) 1/255 D) (A) and (B) both

20. The Diode used in a clipping circuit has $R_f = 25\Omega$ and $R_r = 1\ M\Omega$. The External resistor R is

A) 50 KΩ B) 5KΩ C) 1/25 MΩ D) 25 MΩ

21. Which circuit is used as amplitude comparator?
A) Bistable B) Monostable C) Astable D) Schmitt Trigger

23. An example of a bounded signal is

A) e^{-4t} B) e^{2t} C) t D) e^{t} sint

25. A Transfer function has a Second order denominator and constant gain in the numerator
A) the System has two zeros at the origin B) the system has two finite zeros
C) the System has two zeros at infinity D) the System has one zero at infinity

26. A system is linear if and only if it satisfies
A) principle of Superposition B) principle of Homogeneity
C) both (A) and (B) above D) neither (A) and (B) above

29. A 200 V dc shunt motor is running at 1000 rpm and drawing a current of 10 A. Its armature
winding resistance is 2Ω. It is braked by plugging. The resistance to be connected in series with armature to restrict armature current to 10A, is
A) 32 Ω B) 36 Ω C) 38 Ω D) 40 Ω

30. A transformer has maximum efficiency at 3/4 th of full load. The ratio of its iron loss (p_i) and full load copper loss (P_C), is
A) 4/3 B) 16/9 C) 9/16 D) 3/4

33. A single phase fully controlled rectifier has an average output voltage of 200 V when alpha=0 . Its output voltage when alpha = 30^{0} is approximately

A) 200 V B) 160 V C) 173 V D) 183 V

34. A 200 V dc-dc converter is turned ON for 30 μ sec and turned off for 10 μ sec. The output voltage will be
A) 200 V B) 150 V C) 175 V D) 120 V

35. In Single Pulse Modulation used in PWM Inverters, for eliminating third harmonic component in the output voltage , the pulse width should be
A) 60^0 B) 90^0 C) 110^0 D) 120^0

36. The Dynamic resistance of a p-n junction germanium diode at room temperature with current of 1 mA under forward biasing is
A) 100 Ω B) 13 mΩ C) 13 Ω D) 26 Ω

37. Thermal runway is not possible in FET because as temperature of FET increases
A) mobility increases B) mobility Decreases
C) drain current decrease D) transconductance increases

38. The initial value of f(t), with transform F(s) = s+1/ (s+2)(s+3) is
A) 0 B) 1 C) ∞ D) 1/6

39. The two-port parameter h_{21} is called
A) open-circuit output admittance B) short-circuit input impedance C) open-circuit reverse voltage gain D) short-circuit forward current gain

41 . The impedance of a two-element series circuit is represented by (20-j10) Ω at a certain frequency. If the frequency is doubled, the new value of impedance is
A) (20-j5) Ω B) (40-j20) Ω C) (10-j10) Ω D) (20-j20) Ω

42. A unity feedback control system has forward-path transfer function G(s) = K/s(s+2) . If the design specification is that the steady-state error due to a unit ramp input is 0.05,the value of K allowed is
A) 20 B) 40 C) 10 D) 80

43. The transfer function of a system has the form $G(s) = 200(s+2)/s(s^2+10s+100)$. At very high frequencies the Bode gain curve has a slope of
A) -6 dB/octave B) -12 dB/octave C) 6 dB/octave D) 12 dB/octave

44. A Unity feed-back system has open-loop transfer function $GH(s) = K/s(s+4)(s+6)$, It's root locus plot intersects the jw axis at
A) $\pm j2$ B) $\pm j4$ C) $\pm j8$ D) does not intersect the jw axis

45. Auto reclosing used in case of
A) Lightning arrester B) bulk oil C.B C) air blast C.B D) minimum oil C.B

46. A transmission line has 1 P.U impedance on a base of 11 KV,100 MVA. on a base of 55KV, it will have a P.U impedance of
A) 1 P.U B) 0.2 P.U C) 0.02 P.U D) 0.1 P.U

47. A 50 Hz, 4 pole turbo alternator rated at 20 MVA, 13.2 KV has an inertia constant $H = 4$ KW sec/KVA. The K.E Stored in the rotor at Synchronous speed is
A) 80 KJ B) 80 MJ C) 40 MJ D) 20 MJ

48. The inertia constants of two groups of machines which do not swing together are M_1 and M_2. The equivalent inertia constant is
A) $M_1 + M_2$ B) $M_1 - M_2$ if $M_1 > M_2$ C) $\sqrt{M_1 M_2}$ D) $M_1 M_2 / (M_1 + M_2)$

50. A 36-slot, 4-pole, dc machine has a simplex lap winding with two conductors per slot. The back pitch and front pitch adopted could be respectively
A) 15, 13 B) 19,17 C) 21,19 D) 23,21

53. Two Synchronous generators G_1, G_2 are operating in parallel and are equally sharing KVAR (lag) component of load. To shift part of KVAR from G2 to G1, while keeping terminal voltage fixed, the following action must be done
A) Raise If_1 and lower If_2 B) Lower If_1 and raise If_2
C) Lower If_1 or raise If_2 D) Raise If_1 or lower If_2

APTITUDE SECTION 30 Questions:-

71. H1(x) = 1-x , 0<x<1
= 1, x ≥ 1
= 0, otherwise
H2(x) = -H1(x) for all x
H3(x) = H2(-x) for all x
H4(x) = -H3(x) for all x

72. How many of the following products are necessarily zero for every value of "x"?

H1(x) * H3(x) ; H3(x) * H2(x) ; H1(x) * H2(x)
A) 0 B) 1 C) 2 D) 3

73. The length of the bridge, which a train 130 m long and traveling at 45 km/hr can cross in 30 sec is
A) 200 m B) 225 m C) 245 m D) 250 m

74. If "PAPER" is 11.20, "PENCIL" is 9.83, what will be the PEN ?
A) 12.80 B) 11.60 C) 1.66 D) 13.8

75. What is the sum of all numbers less than 100 that can be written as the sum of 9 consecutive positive integers?
A) 612 B) 630 C) 702 D) 504

78. X introduces Y saying: "He is the husband of the granddaughter of the father of my father".
How is Y related to X?
A) brother B) uncle C) co-brother D) brother-in-law

79. Ravi is 7 ranks ahead of Sumit in a class of 39. If Sumit's rank is 17th from the last, What is
Ravi's rank from the start?
A) 11 B) 15 C) 13 D) 9

80. In a certain code, 'bi nie pie' means "some good jokes";; 'nie bat lik' means "some real stories";; 'pie lik tol' means "many good stories". Which word in the code means 'jokes' ?
A) nie B) pie C) lik D) bi

81. There are five bus stops. A, B, C, D, E at equal intervals. C is not the middle stop and A,E are not terminal stops. C comes twice as many stops before D in upward jpurney as B comes after A. D is the first stop in downward journey. The correct sequence of stops in the downward journey is
A) ABDCE B) CDAEB C) DACEB D) DEBAC

82. Five persons namely Yasin,Arafat,Rasheed,Ali and Rehman are to be seated in five out of the six seats numbered 1 to 6. The following table provides information about the serial numbers of the seats on which each of the mentioned friends can possibly sit.

Name Yasir Arafat Rasheed Ali Rehman
Seat No. 1 2 or 3 2, 3 or 4 4 and 5 5 and 6
If one of the seats numbered 2 or 4 is unoccupied. Then the number of different ways five mentioned persons can be seated is
A) 1 B) 2 C) 3 D) 4

83. If $(ABCD)_a = D*a^0 + C*a^1 + B*a^2 + A*a^3$
$(8448)_9/(2112)_9=(y)_3$ then y is
A) 011 B) 101 C) 110 D) 111

84. Two straight lines can divide a circular disk into a maximum of 4 parts. Likewise, into How many maximum parts can four straight lines divide a circular disk?
A) 11 B) 21 C) 31 D) 41

85. When the numerator of a fraction is increased by 7 and denominator is increased by 13, the resulting number is equivalent to the obrained when numerator decreased by 2 and denominator decreased by 11. The sum of the numerator and denominator is 24. Find the fraction
A) 1/23 B) 7/17 C) 11/13 D) 5/19

86. A test contains 50 questions. Each correct answer fetches 1 mark and wrong answer gets 1/2 mark is deducted. A candidate who wrote the test attempted all the questions and scored 41 marks. Find the number of questions he answered correctly?
A) 46 B) 42 C) 44 D) 48

87. ABC is a three digit number. The sum of its digits is 9. If each of BA and BC are two digit numbers such that BA=BC-3. How many values C can take?
A) 16 B) 6 C) 26 D) 36

88. The sum of three digit number and numbers formed by reversing its digits is 989. The sum of its digits is 13. Find the middle digit
A) 9 B) 6 C) 4 D) 2

89. An observer 1.6 m tall is 20√3 away from a tower .The angle of elevation from his eye to the top of the tower is 30^0. The height of the tower is
A) 21.6 m B) 23.2 m C) 24.72 m D) 21.4 m

90. Identify the odd one
A) heart B) liver C) nose D) kidneys

91. 18, 10, 6, 4, 3, ?
A) 8 B) 4 C) 3.5 D) 2.5

92. Which makes the best comparison?
TOMATO : MTOOTA : : 123412 : ?
A) 312214 B) 123456 C) 321124 D) 213314

93. My brother is standing 40m South-West of my sister.I am standing 40m South-East of my brother. I am in which direction of my sister?
A) South B) West C) East D) North-East

94. Find the next letters in series : BCZ, DEY, FGK,HIW,_____
A) JKL B) JKV C) JKU D) JKT

95. Find related word ; Conscience : wrong :: Police : _____
A) thief B) law C) discipline D) crime

96. A shopkeeper sells one transistor for Rs.840 at a gain of 20% and another for Rs.960 at a loss of 4%. His total loss or gain percent is
A) 5 15/17 % loss B) 5 15/17 % gain C) 6 2/3 % gain D) 6 2/3 % loss

97. A boatman goes 2Km against the current of the stream in 1 hour and goes 1Km along the current in 10min. How long will it take to go 5Km in stationary water ?
A) 40 Minutes B) 1 hour C) 1 hr 15 min D) 1 hr 30 min

98. In how many ways can the letters of the word LEADER can be arranged ?
A) 72 B) 144 C) 360 D) 720

99. One pipe can fill a tank three times as fast as another pipe. If together, the two pipes can fill the tank in 36 minutes, then the slower pipe alone will be able to fill the tank in
A) 81 min B) 144 min C) 108 min D) 192 min

100. If log 27 = 1.431, then the value of log 9 is
A) 0.934 B) 0.954 C) 0.945 D) 0.958

Answers:-

1) D 2) B 3)D 4) C 5) A 6) C 7) A 8) C 9) C 10) A 11) B 12) A 13) B 14) C 15) C 16) C 17) C 18) D 19) A 20) B 21) D 22) C 23) A 24) D 25) C 26) C 27) B 28) D 29) B 30) C 31) D 32) B 33) C 34) B 35) D 36) D 37) B 38) B 39) D 40) C 41) A 42) B 43) B 44) C 45) C 46)Data insufficient 47) B 48) D 49) C 50) B 51) B 52) D 53) A 54) C 55) A 56) A 57) B 58) D 59) C 60) B 61) A 62) A 63) B 64) D 65) D 66) A 67) A 68) A 69) D 70) C 71) A 72) C 73) C 74) B 75) A 76) B 77) C 78) D 79) B 80) D 81) D 82) C 83) A 84) A 85) B 86) C 87) C 88) C 89) A 90) C 91) D 92) A 93) A 94) B 95) D 96) B 97) C 98) D 99) B 100) B