NTPC Executive Trainee Test Previous Year Exam Paper

Technical Paper

1. Given four unit-circle plots identify the one corresponding to a bandpass filter.

2. A 4 kHz signal is sampled at thrice the Nyquist rate and sent through a channel with error ? 1%. Calc the bandwidth of the channel.

3. Given a two port network in the form of a T find o/p admittance in terms of y-parameters.

4. Connect two 1? resistors in series, then connect two 1H inductors across one of the resistors such that the ckt looks like a 1? resistor in series with a ?-section of a resistor and two inductors. With the series resistance on the i/p side, calc the transfer function of this ckt

5. Inverse laplace transform of 1/s2[d/ds(e-3s/s)]

6. Lower useful input limit of a transducer is determined by?

7. Air-cored inductors are used for low frequency/high frequency/equal frequency operations.

8. Given 4 pole-zero plots identify which one corresponds to the driving point impedance of a series resonant ckt.

9. Expression for ?(n): u(n)-u(n-1)/ u(n-1)-u(n+1)/ u(n)+u(n+1)/?

10. The sequence (2,3,4,3) is circularly even/circularly odd/circularly zero/both circularly even and odd.

11. Z-transform of 3n u(n).

12. Match the following with their characteristics: LED/LCD/nixie tube/optical fibre.

13. Numerical on a photodiode: to calculate the responsivity/sensitivity when a specified no of incident photons cause a specified no of electron generation.

14. Given an op-amp ckt obtain an expression for o/p voltage.

15. No. of encirclements made about the origin of the nyquist plot of the open loop TF:1/[(s-1)(s+2)(s+3)].

16. For a radioactive sample which decays to 12.5% of its initial value in x days, the half life is given by____

17. For a repeater in a PCM cable identify the correct sequence of actions amongst threshold/equalization/etc.

18. O/P of a delta modulator when a ramp input is fed to it.

19. Steady state error with ramp i/p for a type-0 system.

20. Creeping occurs in energy meters bcoz?

21. Ultrasonic method of flow measurement cannot be used in liquids with air bubbles/has less attenuation in air compared to liquid-identify the false statement (if any) among these.

22. Major cause of losses in a fibre optic cable: dispersion/total internal refraction/presence of core and cladding/?

23. Which layer in the OSI model is concerned with printer buffering,etc: network/session/transport/?

24. Given some function F(j?) calc its inverse CTFT.

25. Relation between laplace and z-transform: s=z/ s=ln z/ s=(ln z/T) /?

26. Maxm and minm probability error among ASK,PSK,FSK,DPSK etc

27. Which of the following is a non linear modulation scheme: PAM/QAM/PCM/?

28. Match the following functions: e-t , e-t + et, sin(?t) with causal and stable system, causal and unstable system, etc.

29. Given a ckt with a 50 ? resistor in series between two voltage sources of 10 V and 5 V magnitude calc power delivered by 5 V source.

30. Laplace transform of e-3tu(t)+e2tu(-t).

31. Which photodetector has output affected by own intrinsic noise: PN/APD/PIN/all.

32. AC signal conditioning is used for inductive and capacitive/resistive/piezoelectric transducers/all of the above.

33. When I mode is added to proportional control system stability increases/ decreases/ steady state performance deteriorates/damping increases.

34. Reset control is another name for integral/derivative/proportional/? Control.

35. Time response of system having transfer function 625/(s2+25) will be of the form?

36. Given some transfer function calc the peak response time.

37. The nyquist sampling rate of the function [sin(at)/t]2 will be?

38. The feedback topology that results in increased i/p and o/p impedance is current series/voltage series/current shunt voltage shunt.

39. Numerical on cardiac output calculation given heart rate and volume per beat.

40. In an ECG instrumentation amplifier the differential gain is provided by 1st stage/2nd stage/mismatched resistors/output stage.

41. Repeat ques 40 above for the classic 3-op amp instrum amplifier.

42. EMG signals are of the order of mV/V/?V/?

43. Computer assisted tomography is used for?

44. Numerical on electrostatic instrument, to calculate deflection given spring constant, torque etc.

45. To prevent loading of a ckt i/p impedance of a CRO should bee high/low/inductive/capacitive.

46. Addition of a zero to a 2nd order underdamped system results in increase/decrease of rise time and increase/decrease of peak overshoot.

47. For PI ctrl we obtain improved bandwidth/improved steady state performance/ worsened steady state performance/?

48. SNR of normal AM system is comparable/3 dB lower/3 dB higher/6 dB lower over DSB-SC and SSB system.

49. Which is an effective measure of the noise related performance of an amplifier: SNR/noise ratio/thermal noise/shot noise.

50. Given baseband signal freq and carrier freq calc which of the freq given will not be present for conventional AM.

51. Distinction between FM and PM at high frequencies.

52. Which of these has the least propagation delay RTL/ECL/I2L/CMOS.

53 Switching speed of CMOS is affected/unaffected by changes in supply voltage.

54. Which of these provides a measure of heart rate P/QRS complex/T/none of these.

55. Given a ckt of a logarithmic amplifier you had to identify what ckt was it.

56. JFET can operate in depletion/enhancement/both/none of the above modes.

57. When a BJT operates in saturation the junctions are fwd biased/reverse biased/?

58. BIBO stability criterion implies that poles are within/outside/on the unit circle.

59. For faithful amplification of low amplitude signals the cut-off/active/saturation regions of a transistor is used.

60. Lissajous pattern of a signal rotates 36 times per minute. if the oscillator frequency is 560 kHz then the unknown freq is?

61. % resolution of a 10 bit ADC.

62. To obtain 10 mV resolution on 5 V range how many bit DAC is to be used..

63. Why is LCD preferred to LED.

64. How will 0.6973 be displayed on 10 V range of a 4 ½ digit multimeter.

65. Which of the following cannot be used for an automatic feedback temp ctrl system thermocouple/thermometer/thermistor/IC sensor.

66. Y(n)=X(-n+3) is an example of a linear/non linear and shift variant/invariant system.

67. The falling body method is used to determine viscosity/humidity/?

68. Which of these methods of viscosity measurement gives greatest accuracy falling body method/rotating cylinder method/both/?

69. Some question on gas chromatography

70. A device having a rotor with 3 Y-connected coils and a stator is likely to be a synchro/RVDT/control transformer/?

71. In a twisted ring counter the initial count is 1000. after the 4th clock pulse its state will be?

72. A 240 kHz signal is given into a 3 bit binary ripple counter. The lowest o/p freq obtainable is?

73. For parity bit checking which of the following gates can be used XOR/NAND/OR/XNOR.

74. Why is a BJT called so..

75. Identify the expression for gauge factor of a strain gauge among the given options.

76. In a semiconductor strain gauge as tensile strain is applied what changes take place in the n and p areas..

77. How does a radioactive level gauging system work?

78. A capacitive transducer measuring level works on the principle of change in distance between plates/change in dielectric strength/?

79. For maximum power transfer in an AC circuit the condition to be satisfied is ZL+ZS=0/XL+XS=0/none of these/?where l and s refers to load and source respectively.

80. Find the transfer function from a block diagram.

81. Synchronous ctrs are preferred to asynchronous ctrs bcoz they are faster/glitches at the output can be avoided/both/none of these.

82. The lissajous figure formed on an oscilloscope looks like the English figure of 8. if the vertical channel input is 1 kHz the horizontal input freq is?

83. IE=IC for a transistor in saturation/cutoff/active/both saturation and active regions.

84. Reproducibility of measurements is called accuracy/precision/linearity/none of these.

85. Which of these is not strictly a static characteristic accuracy/precision/tolerance/linearity.

86. The shunt coil in a Q meter has resistance of the order of m?/?/k?/..

87. For measuring inductance of high Q coils the bridge used is Maxwell-wien/Schering/?

88. Which of these measures inductance in terms of capacitance Maxwell and hay/Maxwell and Schering/hay and Schering/?

89. In a flip-flop with preset and clear inputs both are applied simultaneously/clear is cleared when preset is applied/preset is cleared when clear is applied/?

90. What happens when the RET instruction is encountered by 8085

91. A 1024*8 memory chip needs how many address lines?

92. What happens when the PUSH instruction is encountered by 8051.

93. In FM relation between no of sidebands w.r.t. modulating freq

94. Numerical on DPSK.

95. A multiplexer accepts input data and provides one output all the time/one output at a time/many outputs at a time/many outputs all the time.

96. Pulse modulation is essentially a process of multiplexing/?

97. Wave shape is altered by clipper/clamper/voltage doubler/amplifier.

98. 4 signals of frequencies 100,100,200 and 400 Hz are sampled at nyquist rate and sent through TDM on a channel.the bandwidth of the channel is?

99. Superposition can be applied to a ckt with initial conditions/non-linear ckt/?

100. Kelvin's double bridge is used for the measurement of?

101. Which of these is not an active transducer thermocouple/solar cell/RTD/none of these.

102. Oscillator using positive feedback has gain of 0/?/undefined value/?

103. Wien bridge oscillator should initially have closed loop gain >3/<3/=3/?

104. Some question on gain margin and phase shift of a system.

105. Fourier series expansion of even function has sine terms only/cosine terms only/no odd harmonics/?

106. Full wave rectifier gives clean dc o/p/dc o/p with small ripple/positive half and inverted negative half of i/p as o/p.

107. Which of these values of ? gives damped oscillations: 0/1/1.6/0.6

108. For a transformer of ratio 1:a and excited by a source V with impedances Z1 and Z2 on the primary and secondary side value of a for maxm power transfer should be..

109. Fourier transform of cos(?0t) is?

110. At t=0 the step response of a 1st order system is?

111. 555 can be used as a monostable/astable/freq dividing ckt/all of these.

112. In a PT when the secondary is open ckted with the primary excited what will happen.

113. If a system is marginally stable then the nature of oscillations will be?

114. Linear encoders mostly use straight binary/BCD/gray code.

115. For an accelerometer working in displacement mode the ratio of forcing freq to natural freq should be?