MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA

Entrance Exam. For Ph. D. (ECE)

Q1. A Linear equation in three variables represents a
- A. Flat objects
- B. Line
- C. Planes
- D. Both A and C

Q2. The probability that cannot exist among the following:
- A. 2/3
- B. -1.5
- C. 15%
- D. 0.7

Q3. For exact differential equation of the form

$$Mdx + Ndy = 0$$

$$A.\ \frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$$

$$B.\ \frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x}$$

$$C.\ \frac{\partial M}{\partial y} + \frac{\partial N}{\partial x} = 0$$

$$D.\ \frac{\partial M}{\partial y} \leq \frac{\partial N}{\partial x}$$

Q4. What is the median of following data sample
- A. 8
- B. 9
- C. 10
- D. 12

Q5. A band limited signal with a maximum frequency of 5 Khz is to be sampled. According to sampling theorem ,the sampling frequency which is not valid is
- A. 5Khz
- B. 12Khz
- C. 15Khz
- D. 20Khz

Q6. The property of Fourier Transform which states that the compression in time domain is equivalent to the expansion in the frequency domain is _____
- A. Duality
- B. Scaling
- C. Time scaling
- D. Frequency shifting

Q7. A non-linear network does not satisfy

A. Superposition condition
B. Homogeneity condition
C. Both Superposition and Homogeneity condition
D. Superposition, Homogeneity and associative condition

Q8. The signal

$$Y(t) = T\{X(t)\} = \sin(2\pi t) * X(t) + U(t-2)$$ is

A. Linear, time variant, non-causal
B. Non-Linear, time variant, non-causal
C. Linear, time in variant, causal
D. Non-Linear, time in-variant, non-causal

Q9. Non-linear network does not satisfy

A. Superposition condition
B. Homogeneity condition
C. Both homogeneity and superposition condition
D. Homogeneity, superposition and associative condition

Q10. The value of α_{ac} for all practical purposes, for commercial transistors range from__

A. 0.5-0.6
B. 0.7-0.77
C. 0.8-0.88
D. 0.9-0.99

Q11. The voltage gain of transistor connected in common collector arrangement is----

A. Equal to 1
B. More than 10
C. More than 100
D. Less than 1

Q12. A 555 timer in monostable application mode can be used for

A. Pulse position modulation
B. Frequency shift keying
C. Speed control and measurement
D. Digital phase detector

Q13. Which Oscillator is characterized by a split capacitor in its tank circuit?

A. RC phase shift oscillator
B. Colpitts oscillator
C. Wein bridge oscillator
D. None of above

Q14. What is the diffusion length for holes when $D_p = 25\ cm^2/s$ and $\tau_p = 25s$?

A. 25cm
B. 1cm
C. 0.04cm
D. 50cm

Q15. What are the basic components required for a clipping circuit?

A. Diode and resistor
B. Transistor and diode
C. Diode and capacitor
D. Capacitor and resistor

Q16. FET act as constant current source in

A. Ohmic region
B. Breakdown region
C. Pinch off region
D. Cut off region

Q17. In a flash ADC, the priority encoder is used to

A. Select the first input
B. Select the highest value input
C. Select the lowest value input
D. Select the last input

Q18. A Schmitt trigger is

A. a comparator with only one trigger point
B. a comparator with hysteresis
C. a comparator with three trigger points
D. None of above

Q19. How can parallel data be taken out of a shift register simultaneously?

A. Use the Q output of the first FF
B. Use the Q output of the last FF
C. Tie all of the Q outputs together
D. Use the Q output of each FF

Q20. Hexadecimal addition of numbers $(B2CE5)_{16}$ and $(AB2C3)_{16}$ is

A. $(15FA8)_{16}$
B. $(16FB8)_{16}$
C. $(14EA8)_{16}$
D. $(15FB8)_{16}$

Q21. Use Boolean algebra to find the most simplified SOP expression for

F=ABD+CD+ACD+ABC+ABCD is

A. $F = ABD + ABC + CD$

B. $F = CD + AD$

C. $F = BC + AB$

D. $F = AC + AD$

Q22. If a 90 GB memory has to be connected to a microprocessor, minimum how many address lines are required?

A. 36
B. 39
C. 32
D. 37

Q23. A memory connected to a microprocessor has 20 address lines and 16 data lines. What will be the memory capacity?

A. 8KB
B. 2 MB
C. 16 MB
D. 64 KB

Q24. How many flip-flops are there in a flag register of 8085 microprocessor?

A. 4
B. 5
C. 7
D. 6

Q25. Which of the following technology was used by Intel to design its first 8-bit microprocessor?

A. NMOS
B. HMOS
C. PMOS
D. TTL

Q26. Conventional control theory is applicable to _____ systems

A. SISO
B. MIMO
C. Varying time
D. Non-linear

Q27. On which of the following factors does the sensitivity of a closed loop system to gain changes and load disturbances depend?

A. Frequency
B. Loop gain
C. Forward gain
D. All of the above

Q28. The image frequency of a super-heterodyne receiver _____

A. Is created within the receiver itself
B. Is due to insufficient adjacent channel rejection
C. Is not rejected by the IF tuned circuits
D. Is independent of the frequency to which the receiver is tuned

Q29. The filter which is used to recover the pulse with less ISI is called as
A. Matched filter
B. Co-relator
C. Matched filter & Co-relator
D. None of the mentioned

Q30. Autocorrelation is a function which matches
A. Two same signals
B. One signal with its delayed version
C. Two different signal
D. None of the mentioned

Q31. For hamming distance d_{min} and t errors in the received word, the condition to be able to correct the errors is

A. $2t + 1 <= d_{min}$
B. $2t + 2 <= d_{min}$
C. $2t + 1 <= 2\, d_{min}$
D. Both A and B

Q32. The modulation techniques employed in for telephone modems is

A. QAM
B. GMSK
C. QPSK
D. GFSK

Q33. In Coherent demodulation technique of FSK signal can be affected using

A. Correlation receiver
B. Band pass filters and envelope detector
C. Matched filter
D. Discriminator detection

Q34. The spectrum of BFSK may be viewed as the sum of
A. Two PSK spectra
B. Two ASK spectra
C. Two FSK spectra
D. None of the above

Q35. The maximum bandwidth is occupied by
A. ASK
B. PSK
C. FSK
D. None of the above

Q36. Which material has highest dielectric constant?
A. Glass
B. Vacuum
C. Ceramics
D. Oil

Q37. Radiation intensity of a dipole depends strongly on frequency. If at a frequency *f*, the intensity of radiation is 'I'. Then at afrequenc

"I". Then at a frequency of f/2,the intensity will be

A. $\frac{1}{2}$
B. $\frac{1}{4}$
C. $\frac{1}{8}$
D. $\frac{1}{16}$

Q38. A plane electromagnetic wave travels in dielectric medium of relative permittivity 9. Relative to free space, the velocity of propagation in the dielectric is
A. Increased by a factor of 9
B. Increased by a factor of 3
C. Unchanged
D. reduced by a factor of 1/3

Q39. The velocity of electromagnetic wave in a good conductor is
A. 3×10^8 m/s
B. More than 3×10^8 m/s
C. Very low
D. High

Q40. The electric and magnetic fields in a field theory are _____
A. Scalar
B. Vector
C. Electric is scalar and magnetic is the vector
D. Magnetic is vector and electric is scalar

Course: ECE

Answer Key

Question	Answer	Question	Answer
1	C	21	A
2	B	22	D
3	A	23	B
4	A	24	B
5	A	25	C
6	C	26	A
7	C	27	D
8	B	28	C
9	C	29	B
10	D	30	B
11	D	31	D
12	C	32	A
13	B	33	A
14	A	34	B
15	A	35	C
16	A	36	C
17	B	37	A
18	B	38	D
19	D	39	C
20	A	40	B