SRI JAGADGURU MURUGHARAJENDRA UNIVERSITY

(Established under SJM University Act 2020)

Part – A

Subject Specific (Engineering Discipline)

Electronics & Communication Engineering

Model Question Paper-50Marks

1. The steady-state error of a feedback control system with an acceleration input becomes finite in a

   a) Type0 system b) Type1 system

   c) Type2 system d) Type3 system

2. Considering the unity feedback system of Fig., the settling time of the resulting second order system for 2% tolerance band will be _____

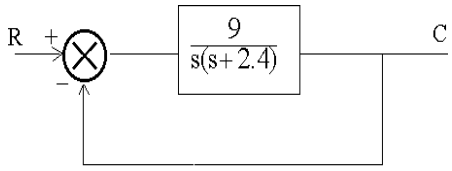


Fig. 2

   a) 3.33 b) 4.5

   c) 2.25 d) 2.84

3. The impulse response of a LTI system is a unit step function, then the corresponding transfer function is

   a) 1/S b) $1/S^2$

   c) 1 d) S

4. The equation $2s^4+ s^3+ 3s^2+ 5s+10=0$ has

   a) One b) Two

   c) Three d) Four roots in the left half of s–plane.

5. The LVDT is primarily used for the measurement of

a) Displacement b) Velocity

c) Acceleration d) Humidity

6. A system with gain margin close to unity or a phase margin close to zero is

a) Highly stable b) Oscillatory

c) Relatively stable d) Unstable

7. Network virtual terminal is a service of_____ layer.

a) Application b) Network

c) Physical d) Data link

8. The process of transferring files from a computer on the Internet to your computer is called

a) Uploading b) Sending

c) Downloading d) Sharing

9. VoIP stands for_____

a) Voice over IP b) Voice I pad

c) Voice pad d) Voice input processing

10. _____ is an error reporting protocol

a) IGMP b) ICMP

c) Mail slot d) TCP

11. Which of the following systems is stable?

a) $y(t)=\log(x(t))$ b) $y(t)=\sin(x(t))$

c) $y(t)=\exp(x(t))$ d) $y(t) = tx(t) +1$

12. The system characterized by the equation $y(t) = ax(t)+ b$ is

a) Linear for any value of b b) Linear if $b > 0$

c) Linear if $b < 0$ d) Non-linear

13. What is the convolution of $x[n]=e^{-n2}$ and $h[n]= n^2$?

a) $5.318n^2 +0 .123$

b) $6.318n^2 + 0.123$

c) $5.318n+0.88$

d) $5.318n^2+0.8846$

14. A discrete time signal is given as X [n] = cos(πn9) + sin (πn7+12). The period of the signal X [n] is _____

a) 126

b) 32

c) 252

d) Non-periodic

15.The Fourier transform of signal e^{-2t} u(t-3) is _____

a) e−3(2−jω)2−jω

b) e−3(2+jω)2+jω

c) e3(2−jω)2−jω

d) e3(2+jω)2+jω

16.The inverse Laplace transform of F(s) = e−3ss(s2+3s+2) is _____

a) $\{0.5 + 0.5e^{-2(t+3)}-e^{-(t+3)}\}$ u (t+3)

b) $\{0.5 + 0.5e^{-2(t-3)}-e^{-(t-3)}\}$ u (t-3)

c) $\{0.5 – 0.5e^{-2(t-3)}-e^{-(t-3)}\}$ u (t-3)

d) $0.5 + 0.5e^{-2t}-e^{-t}$)

17. For the signal, x(t) = log(cos(a*pi*t+d)) for a = 50 Hz, what is the time period of the signal, if periodic?

a) 0.16s

b) 0.08s

c) 0.12s

d) 0.04s

18. A discrete time signal is as given as X[n]= cos(n8) cos(πn8)

The period of the signal X [n] is _____

a) 16 π
b) 16(π+1)
c) 8
d) Non-periodic

19.Determine the product of two signals: x_1 (n) = {2,1,1.5,3}; x_2 (n) = { 1,1.5,0,2}.

a) {2,1.5,0,6}
b) {2,1.5,6,0}
c) {2,0,1.5,6}
d) {2,1.5,0,3}

20.Given signal given, y(t)=2sin(23t)+4sin(14t–π4)+6sin(13t–π5)+8sin(12t–π7). The period of y(t) is _____

a)12 π
b) 24 π
c) 8 π
d) 16 π

21. Which of the following is the fastest switching device?

a) JFET
b) BJT
c) MOSFET
d) Triode

22. Power dissipation is negligibly small in

a) SCR
b) BJT
c) MOSFET
d) CMOS

23. Photodiode is used in the detection of

a) Visible light
b) Invisible light
c) No light
d) both visible and invisible light

24. When a diode is forward biased, the recombination of free electrons and holes produce

a) Heat
b) Light
c) Radiation
d) All the above

25. The width of the depletion region is

a) Directly proportional to the doping

b) Inversely proportional to the doping

c) Independent of doping

d) None of the above

26. IGBT possess

a) Low input impedance

b) High input impedance

c) High on-state resistance

d) Second breakdown problems

27. IGBT & BJT both posses ___

a) Low on-state power losses

b) High on-state power losses

c) Low switching losses

d) High input impedance

28. In IGBT, the p^+ layer connected to the collector terminal is called as the

a) Drift layer

b) Injection layer

c) Body layer

d) Collector Layer

29.The structure of the IGBT is a

a) P-N-P structure connected by a MOS gate

b) N-N-P-P structure connected by a MOS gate

c) P-N-P-N structure connected by a MOS gate

d) N-P-N-P structure connected by a MOS gate

30. Which metal is used for making solar cell?

a) Gold b) Aluminum

c) Silicon d) Iron

31. Which type of signal is represented by discrete values?

a) Noisy signal
b) Non linear
c) Analog
d) Digital

32. Which of the following characterizes an analog quantity?

a) Discrete levels represent changes in a quantity.
b) Its values follow a logarithmic response curve.
c) It can be described with a finite number of steps.
d) It has a continuous set of values over a given range.

33. Which of the following is a type of digital logic circuit?

a) Combinational logic circuits
b) Sequential logic circuits
c) Both A & B
d) None of the above

34. Which of the following options comes under the non – saturated logic family in Digital Electronics?

a) Emitter – coupled Logic
b) High-Threshold Logic
c) Integrated – injection Logic
d) Diode – Transistor Logic

35. When can one logic gate drive many other logic gates in Digital Electronics?

a) When its output impedance is low and the input impedance is low
b) When its output impedance is high and the input impedance is high
c) When its output impedance is high and the input impedance is low
d) When its output impedance is low and the input impedance is high

36. Which of the following majorly determines the number of emitters in a TTL digital circuit?

a) Fan – in
b) Fan – out
c) Propagation delay
d) Noise immunity

37. What will be the output from a D flip-flop if D = 1 and the clock is low?

a) No change
b) Toggle between 0 and 1
c) 0
d) 1

38. What will be the frequency of the output from a JK flip–flop, when J = 1, K = 1, and a clock with pulse waveform is given?

a) Half the frequency of clock input
b) Equal to the frequency of clock input
c) Twice the frequency of clock input
d) Independent of the frequency of clock input

39. Which of these code pairs correctly represent Digital Electronics reflective codes?

a) 2421 and 5211
b) 2421 and 8421
c) 5211 and 8421
d) 5421 and 2421

40. Which of the following points is not correct regarding an Ex – NOR gate in Digital Electronics?

a) It is a one – bit comparator
b) It is a buffer
c) It is a one – bit inverter
d) It is a universal gate

41. Type of communication Possible by Modem duplex is.....

a) Half duplex
b) Simplex
c) Double Duplex
d) Full duplex

42. _____is used as a medium an space communication

a) Two wire line
b) Space
c) Amplifier
d) Optical fiber

43. The bandwidth of Audio signal is

a) $20H^Z$ b) $20KH^Z$

c) $20\ MH^Z$ d) $20GH^Z$

44. In radio and television broadcast the information signal is in the form of

a) Analog signal b) Digital signal

c) Both analog and digit signals d) Neither a) nor b)

45. In light modulation, which characteristic of the carrier light wave is varied?

a) Amplitude b) Frequency

c) Phase d) Intensity

46. Which range of Frequencies is Suitable for sky wave Propagation?

a) $1KH_Z$ to$500KH_Z$ b) $1MH_Z$to$2MH_Z$

c) $2MH_Z$to$20MH_Z$ d) Above$30MH_Z$

47. The energy attenuation in optical fiber is mainly due to

a) Absorption b) Scattering

c) Both A and B d) Neither absorption nor scattering

48. Modulation is used to.....

a) Reduce the bandwidth used

b) Separate the transmission of different areas

c) Ensure that information may be transmitted to long distance

d) Allow the use of practical antennas

49. An antenna can transmit_____radiation with more efficiency.

a) Low frequency b) High frequency

c) Long wavelength d) None of these

50. For an amplitude modulated wave, the maximum amplitude is found to be 9V while the minimum amplitude is found to be 3V. The modulation index is

a) 100% b) 75%

c) 50% d) 25%

Part –B

General Aptitude Entrance Test Question paper for Ph.D- 30 marks
Common to all branches

1) In how many different ways can the letters of the word 'LEADING' be arranged in such a way that the vowels always come together?

(A) 720 (B) 520

(C) 420 (D) 630

2) There are 7 non-collinear points. How many triangles can be drawn by joining these points?

(A) 45 (B) 85

(C) 35 (D) 25

3) A is 3 years older to B and 3 years younger to C, while B and D are twins. How many years older is C and D?

(A) 7 (B) 5

(C) 6 (D) 8

4) The ratio between the speeds of two trains is 7 : 8. If the second train runs 400 kms in 4 hours, then the speed of the first train is:

(A) 78.5 km/hr (B) 52 km/hr

(C) 60 km/hr (D) 87.5 km/hr

5) Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:

(A) 4:5 (B) 5:4

(C) 6:5 (D) 2:5

6) Three unbiased coins are tossed. What is the probability of getting at most two heads?

(A) 5/7 (B) 5/4

(C) 7/8 (D) 3/6

7) If an angle is its own complementary angle, then its measure is

(A) 45^0 (B) 55^0

(C) 60^0 (D) 70^0

8) The digit in unit's place of the product

(A) 2 (B) 1

(C) 0 (D) 4

9) When he

P : did not know

Q : he was nervous and

R : heard the hue and cry at midnight

S : what to do

The Proper sequence should be:

(A) RQPS (B) PQRS

(C) SPQR (D) QPRS

10) Correct the sentence "He was very tired as he is working since 6'0 clock in the morning".

(A) he was working (B) he had been working

(C) he has been working (D) he will be working

11) Pain: sedative

(A) Day: Night (B) Dengue: Mosquito

(C) Malaria: Water (D) Grief: Consolation

12) Find the missing term of the given expression: 18.834 + 818.34 -? = 618.43

(A) 217.644 (B) 218.744

(C) 217.744 (D) 217.844

13) The amount of uncertainty in a system of the symbol is called.

(A) bandwidth (B) Entropy

(C) loss (D) quantum

14) Buffering is….

(A) The process of temporarily storing the data to allow for small variation in device speeds.

(B) A method to reduce cross-talks

(C) Storage of data within the transmitting medium until the receiver is ready to receive

(D) A method to reduce the routing overhead

15) What is the name of the virus that fool a user into downloading and executing them by pretending to be useful applications?

(A) Trojan Horses (B) keylogger

(C) worm (D) ransomware

16) Which among the following is NOT a web browser?

(A) SpaceTim

(B) NeoPlanet

(C) Sputnik

(D) MeeGo

17) Which of the following comprise the software components of a computer?

(A) Programs

(B) Keyboard

(C) BIOS

(D) Memory

18) Which of the following are the features of a Spreadsheet?

(A) Layers an Lines (B) Rows and Columns

(C) Layers and Planes (D) Height and Width

19) Which of these IEEE standards represent wireless local area network?

(A) 802.11 (B) 802.3

(C) 802.12 (D) 802.1

20) Which of these protocols is used by TFTP for data transport?

(A) TCP (B) UDP

(C) Both A&B (D) None of the Above

21) The last Sunday of March, 2006 fell on which date?

Statements:

I. The first Sunday of that month fell on 5th.

II. The last day of that month was Friday.

(A) I alone is sufficient while II alone is not sufficient

(B) II alone is sufficient while I alone is not sufficient

(C) Either I or II is sufficient

(D) Neither I nor II is sufficient

22) Five persons - A, B, C, D and E are sitting in a row. Who is sitting in the middle?

Statements:

I. B is between E and C.

II. B is to the right of E

III. D is between A and E.

(A) Only I and II

(B) Only II and III

(C) Only I and III

(D) All I, II and III

23) All the trees in the park are flowering trees. Some of the trees in the park are dogwoods. All dogwoods in the park are flowering trees. If the first two statements are true, the third statement is

(A) True

(B) False

(C) Uncertain

(D) None of the above

24) 5 : 150 :: 8 : __

(A) 576 (B) 567

(C) 512 (D) 520

25) Find the number of parallelograms.

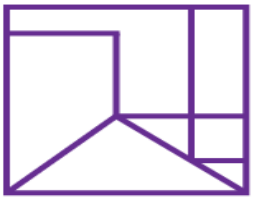
(A) 8

(B) 10

(C) 15

(D) None of These

26) How many triangles are there in the following figure?



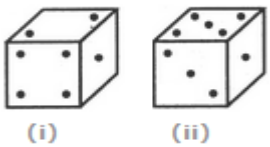
(A) 2

(B) 3

(C) 4

(D) More than 4

27) Two positions of a cube are shown below. When the number 4 will be at the bottom, then which number will be at the top?



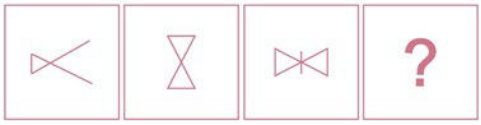
(A) 3

(B) 5

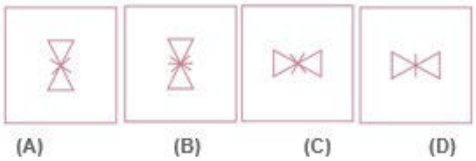
(C) 6

(D) None of these

28) Questions Figures



Answer figures



(A) A

(B) C

(C) D

(D) B

29) A man is facing west. He turns 45 degrees in the clockwise direction and then another 180 degrees in the same direction and then 270 degrees in the anticlockwise direction. Find which direction he is facing now?

(A) South

(B) West

(C) South West

(D) East

30) Statement 1: Pens cost more than pencils. Statement 2: Pens cost less than erasers. Statement 3: Erasers cost more than pencils and pens. If the first two statements are true, the third Statement is

(A) True

(B) False

(C) Uncertain

(D) Cannot be determined

Part –C

Mathematics Entrance Test Question paper for Ph.D- 20 Marks
Common to all branches

1. For the linear transformation, $X = \begin{bmatrix} 2 & 1 & 1 \\ 1 & 1 & 2 \\ 1 & 0 & -2 \end{bmatrix}$Y, find the Y co-ordinates for (1, 2, -1) in X.
   a) (0, -2, 0)
   b) (-1, 3, 1)
   c) (-1, -2, 0)
   d) (-1, 3, 0)
2. Which of the following statements is true about the regression line?
   a) A regression line is also known as the line of the average relationship
   b) A regression line is also known as the estimating equation
   c) A regression line is also known as the prediction equation
   d) All of the above
3. If the values of two variables move in the same direction, _____
   a) The correlation is said to be non-linear
   b) The correlation is said to be linear
   c) The correlation is said to be negative
   d) The correlation is said to be positive
4. Which of the following are types of correlation?
   a) Positive and Negative
   b) Simple, Partial and Multiple
   c) Linear and Nonlinear
   d) All of the above
5. A is 5×5 matrix, all of whose entries are 1, then
   a) A is not diagonalizable
   b) A is idempotent
   c) A is nilpotent
   d) The minimal polynomial and the characteristics polynomial of A are not equal.
6. $T : R^3 \to R^3$ such that $T(a, b, c) = (0, a, b)$, for $(a, b, c) \in R^3$. Then $T + I$ is a zero of the polynomial:
   a) t
   b) t^2
   c) t^3
   d) None of above

7. $T : P_2(R) \to P_3(R)$ such that $T(f(x)) = 2f'(x) + 3\int_0^x f(t)dt$. Then rank of T is

a) 1 b) 2 c) 3 d) 4

8. The minimal polynomial of $\begin{pmatrix} 2 & 1 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 2 & 0 \\ 0 & 0 & 0 & 5 \end{pmatrix}$ is

a) $(x-2)$

b) $(x-2)(x-5)$

c) $(x-2)^2(x-5)$

d) $(x-2)^3(x-5)$

9. Number of linearly independent Eigen vectors of $\begin{pmatrix} 2 & 2 & 0 & 0 \\ 2 & 1 & 0 & 0 \\ 0 & 0 & 3 & 0 \\ 0 & 0 & 1 & 4 \end{pmatrix}$ is

a) 1 b) 2 c) 3 d) 4

10. A is a 4-square matrix and $A^5 = 0$. Then

a) $A^4 = I$ b) $A^4 = A$ c) $A^4 = 0$ d) $A^4 = -I$

11. Solve the following equations by Gauss Elimination Method.

x+4y-z = -5, x+y-6z = -12, 3x-y-z = 4

a) x = 1.64791, y = 1.14085, z = 2.08451

b) x = 1.65791, y = 1.14185, z = 2.08441

c) x = 1.64691, y = 1.14095, z = 2.08461

d) x = 1.64491, y = 1.15085, z = 2.09451

12. Find the values of x, y, z in the following system of equations by gauss Elimination Method. 2x + y – 3z = -10, -2y + z = -2, z = 6

a) 2, 4, 6

b) 2, 7, 6

c) 3, 4, 6

d) 2, 4, 5

13. In Gauss Jordan method which of the following transformations are allowed?

a) Diagonal transformation

b) Column transformation

c) Row transformation

d) Square transformation

14. Solve the equations using Gauss Jordan method.

x + 2y + 6z = 15, 3x + 4y + z = 16, 6x - y - z = 20

a) $x = 3.735, y = 0.795, z = 1.612$

b) $x = 3.735, y = 3.735, z = 1.612$

c) $x = 3.735, y = 1.612, z = 3.735$

d) $x = 1.612, y = 0.795, z = 3.735$

15. Gauss Seidal method is also termed as a method of _____

a) Successive displacement

b) Eliminations

c) False positions

d) Iterations

16. Which of the following is not Dirichlet's condition for the Fourier series expansion?

a) f(x) is periodic, single valued, finite

b) f(x) has finite number of discontinuities in only one period

c) f(x) has finite number of maxima and minima

d) f(x) is a periodic, single valued, finite

17. If the function f(x) is odd, then which of the only coefficient is present?

a) a_n

b) b_n

c) a_0

d) Everything is present

18. Find b_n if the function $f(x) = x^2$.

a) finite value

b) infinite value

c) zero

d) can't be found

19. What is the coefficient of x^{101729} in the series expansion of cos(sin(x))?

a) 0 b) $1/101729!$ c) $-1/101729!$ d) 1

20. The angle between Radius vector r=a(1-cosθ)and tangent to the curve is ∅ given by _____

a) ∅=π/ 2 b) ∅=π c) ∅=−π/2 d) ∅=0