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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree Regular and Supplementary Examination July 2021

Course Code: IC352

Course name: COMPREHENSIVE EXAM (IC)

Max. Marks: 50 Duration: 1Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
(2) Total number of questions: 50
(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
(4) If more than one option is chosen, it will not be considered for valuation.
(5) Calculators are not permitted

PART A- COMMON COURSES

1. Unit normal to the surface $z = y$ in the positive direction is .....

a) $\hat{j} + \hat{k}$ b) $-\hat{j} - \hat{k}$ c) $\hat{j} - \hat{k}$ d) $-\hat{j} + \hat{k}$

2. Particular integral of the differential equation $y'' + 2y' + y = e^x$ is .....

a) $\frac{e^x}{2}$ b) $\frac{e^x}{3}$ c) $\frac{e^x}{4}$ d) $\frac{e^x}{6}$

3. The straight lines which are drawn from various points on the contour of an object to meet a plane are called as _____

a) connecting lines (b) projectors c) perpendicular lines (d) hidden lines.

4. Where do the projection lines converge in a perspective sketch?

a) The horizon line (b) The ground line c) The vanishing point (d) The eye point

5. The principle of transmissibility of force states that when a force acts upon a body its effect is

a) Same at every point in its line of action (b) Same at every point of the body along any direction c) Different at different point in its line of action (d) Nullified by the internal forces present in the body already

6. A free body diagram should contain all the external forces, support reactions and the _____ of the body under consideration.

a) Internal forces (b) Internal moments c) Self weight of the body (d) None of these

7. What makes the best practice available to everyone, thereby ensuring efficiency and safety

a) Drawings (b) Standards and Codes c) Tolerance Limit (d) Material Cost

8. Which of the following components in a "House of Quality" drives the entire QFD process?

a) Roof matrix (b) Product characteristics c) Relationship matrix (d) Customer requirements

9. Biodiversity cannot be conserved by

a) Seed bank (b) Deforestation c) Botanical Garden (d) cryopreservation

10. Which of the ISO 14000 series of standards focuses on Life Cycle Assessment

a) 14010 (b) 14020 c) 14030 (d) 14040

PART B- CORE COURSES

11. LVDT used for displacement measurement is a

a) Active transducer b) Passive transducer c) Capacitive transducer d) Digital transducer

12. Optical pyrometer is used to measure

a) High temperature b) Low temperature c) Level d) High pressure

13. Compared to iron cored transducers air cored transducers are

a) Small b) Big c) Equal in size d) None

14. Which of the following characteristics of a measurement system is a non desirable one?

a) Fast response b) Fidelity c) Measurement lag d) None of these

15. Match the following

1. LVDT	a. Resistive transducer
2. Strain gauge	b. Temperature measurement
3. Capacitive transducer	c. Direct method
4. Sight glass	d. Level transmitter
5. Thermistor	e. Series opposition

a) 1-e,2-a,3-d,4-c,5-b b) 1-a,2-b,3-c,4-d,5-e c) 1-b,2-a,3-d,4-c,5-e d) 1-e,2-b,3-c,4-d,5-a

16. Dummy gauge is used for ----------

a) Temperature compensation b) Cold junction compensation c) Current compensation d) Resistance compensation

17. Closeness with which an instrument reading approaches the true value of the quantity is

a) Accuracy b) Sensitivity c) Drift d) Hysteresis

18. Desirable property of a conductor material used in RTD is/are

a) Change in resistance per unit change in temperature should be as b) Change of resistance with temperature should be a linear function c) Resistance of the material should have continuous and stable d) All the above

large as possible

relationship with temperature

19. Convert $(22)_8$ into its corresponding decimal number.

a) 28 b) 18 c) 81 d) 82

20. What is the minimum number of two input NAND gates used to perform the function of two input OR gates?

a) One b) Two c) Three d) Four

21. Why a demultiplexer is called a data distributor?

a) The input will be distributed to one of the outputs b) The output will be distributed to one of the inputs c) One of the inputs will be selected for the output d) Single input gives single output

22. In a J-K flip-flop, if J=K the resulting flip-flop is referred to as _____

a) T flip-flop b) D flip-flop c) S-R flip-flop d) S-K flip-flop

23. A 3-bit binary counter has a maximum modulus of

a) 3 b) 6 c) 8 d) 12

24. The main advantage of TTL with totem-pole output as compared to other TTL types are

a) Higher fan in and higher fan out b) Fast switching and low power dissipation c) Higher noise margin and low cost d) None of these

25. Convert the $3A7_{16}$ to Gray Code

a) 111111111 b) 1001110100 c) 1001100110 d) 1110111000

26. Which of the following is not preferred for input stage of Op-amp?

(a) Dual Input Balanced Output (b) Differential Input Single ended Output (c) Cascaded DC amplifier (d) Single Input Differential Output

27. A buffer amplifier has gain of

a) Zero b) Infinity c) Unity d) Dependent upon the circuit parameters

28. Amplifier in which input voltage is amplified by scaling factor is called

(a) Summing amplifier (b) Average amplifier (c) Weighted amplifier (d) Differential amplifier

29. Which among the following type of ADC require shortest conversion time

(a) Flash type (b) Successive approximation (c) Dual slope (d) All of the above

30. An RC coupling circuit is an example of what type of filter?

(a) Low pass filter (b) High pass filter (c) Band pass filter (d) All pass filters

31. The range of frequencies over which the PLL can acquire lock with an input signal is called _____

(a) Lock-in Range (b) Capture Range (c) Input Range (d) None of the above

32. Two loops are said to be non-touching only if no common _____ exists between them.

a) Loop b) Feedback path c) Branch d) Node

33. Let c(t) be the unit step response of a system with transfer function K(s+a)/(s+K). If c(0+) = 2 and c(∞) = 10, then the values of a and K are respectively.

a) 2 and 10 b) -2 and 10 c) 10 and 2 d) 2 and -10

34. A system with transfer function 1/Ts+1, subjected to a step input takes to seconds to reach 50% of step height. The value of t is :

a) 6.9s b) 10s c) 14.4s d) 20s

35. The open loop transfer function of a feedback control system is $G(s) = \frac{1}{(s+1)^3}$

The gain margin of the system is:

a) 16 b) 8 c) 4 d) 2

36. The transfer function of a compensator is given as $G_c(s) = \frac{(s+a)}{(s+b)}$

$G_c(s)$ is a lead compensator if:

a) a = 1, b = 2 b) a = 3, b = 2 c) a = -3, b = -1 d) a = 3, b = 1

37. The first two rows of Routh array of a third order characteristic equation are:

s^3: 3 3

s^2: 4 4

It can be inferred that the given system has:

a) One real pole in the right half of s-plane

b) A pair of complex conjugate poles in the right half of s-plane

c) A pair of real poles symmetrically placed around s = 0

d) A pair of complex conjugate poles on the imaginary axis of the s-plane

38. Which among the following assertions represents a necessary condition for the existence of Fourier Transform of discrete time signal (DTFT)?

a) Discrete Time Signal should be absolutely summable

b) Discrete Time Signal should be absolutely multipliable

c) Discrete Time Signal should be absolutely integrable

d) Discrete Time Signal should be absolutely differentiable

39. The system, $y(t) = x(t)\cos(t+1)$ is:

a) Noncausal and memory less

b) Causal and with memory

c) Noncausal and with memory

d) Causal and memory less

40. The Z transform of $\delta(n-m)$ is _____

a) z^{-n} b) z^{-m} c) $1/z^{-n}$ d) $1/z^{-m}$

41. A discrete signal is said to be even or symmetric if x(-n) is equal to

a) x(n) b) 0 c) -x(n) d) -x(-n)

42. The trigonometric Fourier series of an even function of time does not have _____

a) The dc term b) The cosine terms c) The sine terms d) The odd harmonic terms

43. Find the Laplace transform of $u(t)$ and its ROC.

a) $\frac{1}{s}$; $\sigma < 0$ b) $\frac{1}{s}$; $\sigma > 0$ c) $\frac{1}{s-1}$; $\sigma = 0$ d) $\frac{1}{1-s}$; $\sigma = 0$

44. T-type thermocouple is made of

a) Chromel-alumel b) Copper-constantan c) Iron-constantan d) None of these

45. A Pirani gauge sensor is used to measure pressures of the order of

a) 10 MPa b) 1 MPa c) 100 Pa d) 1 Pa

46. One of the disadvantages of filled system Thermometer

a) High Maintenance b) Need for electrical Measurement c) Need a bulb for accuracy d) High Cost

47. A U- tube manometer is used to measure the pressure of a

a) Gas b) Liquid c) Gas as well as liquid d) None of these

48. One of the disadvantages of bellows is

a) High Cost b) It needs ambient temperature compensation c) It cannot measure absolute and differential pressure d) Inability to deliver high force

49. Conductivity is defined as the ability to carry

a) Voltage b) Resistance c) Current d) All of the mentioned

50. Capacitive devices are used for the level measurement of

a) Only liquid b) Solid in powdered form c) Both (a) and (b) d) None of these

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