F **502B4** **Total pages: 5**

Register No: …… Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R,S), MAY 2024

Electrical and Electronics Engineering

(2020 SCHEME)

Course Code : 20EET308

Course Name : Comprehensive Course work

Max. Marks : 50 **Duration:75 Minutes**

(Scientific calculator is allowed inside the examination hall)

PART A

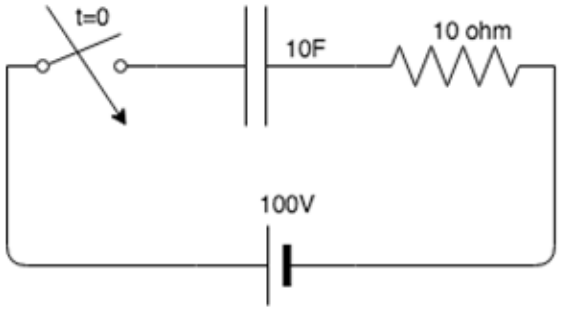
(Answer all questions. Each question carries 1 mark)

1. In case of ideal current sources, they have _____
   (A) zero internal resistance (B) low value of voltage
   (C) large value of currrent (D) infinite internal resistance

2. For a polyphase system, the number of Wattmeter required to measure power is equal to _____ ?
   (A) Number of wires (B) 2.One less than number of wires
   (C) 3.Number of phases (D) 4.None of the above

3. _____ the resonant frequency, the current in the capacitor leads the voltage in a series RLC circuit.
   (A) Above (B) Below
   (C) Equal to (D) Depends on the circuit

4. If the switch is closed at t=0, what is the current in the circuit?



   (A) 0A (B) 10A
   (C) 20A (D) Infinity

5. In a three phase AC circuit, the sum of all three generated voltages is _____
   (A) Infinite (B)Zero
   (C)One (D) None of the above

6. For a voltage source to be neglected, the terminals across the source should be _____
   (A)replaced by inductor (B)short circuited
   (C)replaced by some resistance (D)open circuited

7. Which of the following will not happen if one of the phases to the induction motor is not available?
   (A) Motor will start but operate at lower speed (B) It will hum but not start

(C) It will continue to operate below 57.7% of rated load
(D) External means are needed to make it run at rated speed

8. In a calculation, the actual voltage regulation is 33.1% while the calculated value of the voltage regulation is 56.8%. This infers that the chosen method has been _____
(A) EMF (B) MMF
(C) ZPF (D) ASA

9. Which of the following parts helps the commutation process?
(A) compensating winding
(B) pole shoes
(C) interpoles
(D) all of these

10. Why transformers connected in parallel should have same voltage ratio?
(A) To avoid full load circulating current
(B) To avoid no-load circulating current
(C) To avoid other losses
(D) To avoid all type of currents

11. Carbon brushes are used in electric motors to
(A) Prevent sparking during commutation
(B) Provide a path for flow of current
(C) Brush off carbon deposits on the commutator
(D) None of these

12. For performing back to back test on 3-phase transformer, transformers should be
(A) non-identical
(B) identical
(C) They can be identical or non-identical
(D) They should not be identical nor non-identical

13. The circuit which converts parallel data to serial data is
(A) Demultiplexer
(B) Multiplexer
(C) Both multiplexer and demultiplexer
(D) None of these

14. If 1001 is a binary number, the XS-3 equivalent is
(A) 1100
(B) 0110
(C) 1001
(D) None of these

15. Which type of shift register would shift a complete binary number in, one bit at a time and shift all the stored bits out, one bit at a time?
(A) PIPO
(B) PISO
(C) SIPO
(D) SISO

16. Which of the following circuit uses resistace of relation $R_2 = 2R_1$, $R_3 = 2R_2$ and $R_4 = 2R_3$?
(A) Flash ADC
(B) Binary weighted resistor DAC
(C) R-2R ladder network DAC
(D) None of these

17. Which of the following cicuit uses resistance of relation $R_2 = 2R_1$
(A) Weighted resistor DAC
(B) R-2R ladder network DAC
(C) Both of these
(D) None of these

18. In a JK flip-flop, if K = NOT(J), the JK flip-flop behaves as a
(A) D flip-flop
(B) T flip-flop
(C) SR flip-flop
(D) None of these

19. When the sag exceeds 10% of the span length, the shape made by the conductor is similar to which of the following shape?
(A)Hyperbola
(B)Parabola
(C)Catenary
(D)Straight line

20. Sag is independent of
(A) Length of span
(B) Line voltage
(C) Tension in the conductor
(D) None of these

21. Which of the parameters of a long transmission line and medium transmission lines are same
(A) A and D (B) B, C
(C) Only A (D) Only D

22. Load factor of a power plant
(A) greater than unity (B) less than unity
(C) always more than unity (D) Normally more than unity

23. Breaking capacity of a circuit breaker is usually expressed in terms of
(A) Volts (B) Amperes
(C) MVA (D) MW

24. For an ABCD parameter of a transmission line,which of the following is correct?
(A) AB-CD=1 (B) BD-AC=1
(C) AD-BC=1 (D) AD-BC=0

25. The ROC of Z transform of discrete time sequence $x(n) = (\frac{1}{3})^n u(n) - (\frac{1}{2})^n u(-n-1)$ is
(A) $\frac{1}{3} < |z| < \frac{1}{2}$ (B) $|z| > \frac{1}{2}$
(C) $|z| < \frac{1}{3}$ (D) $2 < |z| < 3$

26. What should be the minimum frequency of sampling to avoid aliasing? Here, F is the analogue signal frequency
(A) F/2 (B) F
(C) 2F (D) 4F

27. If x(t) and its derivative are transformable, then $\lim_{t\to 0} x(t) = \lim_{s\to\infty} sX(s)$ is the statement of
(A) Initial value theorem (B) Final value theorem
(C) Parsevals theorem (D) Convolution theorem

28. What is Fourier series?
(A) The representation of periodic signals in a mathematical manner is called a Fourier series
(B) The representation of non periodic signals in a mathematical manner is called a Fourier series
(C) The representation of non periodic signals in terms of complex exponentials or sinusoids is called a Fourier series
(D) The representation of periodic signals in terms of complex exponentials or sinusoids is called a Fourier series

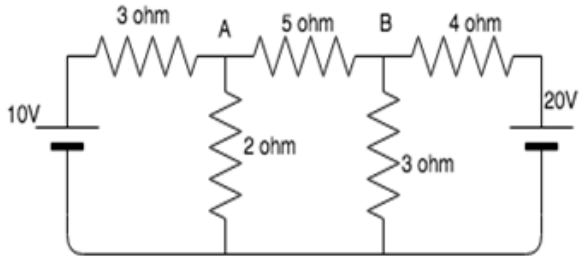
29. The input and output of a continuous time system are respectively denoted by x(t) and y(t). Which of the following descriptions corresponds to a causal system?
(A) y(t)=x(t-2)x(t+4) (B) y(t)=(t-4)x(t+1)
(C) y(t)=(t+4)x(t-1) (D) y(t)=(t+5)x(t+5)

30. How is the exponential Fourier series represented?
(A) $X(t) = \sum X_n e^{jnwt} + wt$ (B) $X(t) = 1/T \sum X n e^{jnwt}$
(C) $X(t) = \sum X_n e^{jnwt}$ (D) $X(t) = T^* \sum X_n e^{jnwt}$

PART B

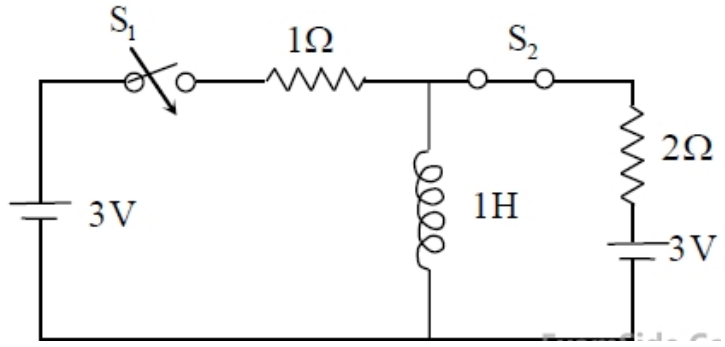
(Answer all questions. Each question carries 2 marks)

31. Calculate the maximum power transferred.



(A) 1.79W (B) 4.55W
(C) 5.67W (D) 3.78W

32. In the circuit shown, switch S2 has been closed for a long time. A time t = 0 switch S1 is closed. At t=0+ , the rate of change of current through the inductor, in amperes per second, is _____.



(A) 2 (B) 3
(C) 1 (D) 0

33. A 250 KVA,400V,delta - connected, three-phase, cylindrical rotor synchronous generator requires a field current of 5A to maintain the rated armature current under short-circuit conditions. For the same field current, the open-circuit voltage is 360V. Neglecting the armature resistance and magnetic saturation, its voltage regulation (in % with respect to terminal voltage), when the generator delivers the rated load at 0.8 PF leading, at rated terminal voltage is
(A) -14.56% (B) -20%
(C) +14.56% (D) +20%

34. The power input to a 415 V, 50 Hz, 6 pole 3- phase induction motor running at 975 rpm is 40kW. The stator losses are 1 kW and friction and windage losses total 2 kW. What is the efficiency of the motor is
(A) 92.5% (B) 90%
(C) 91% (D) 88%

35. In a 4 bit weighted resistor DAC, if smallest value of resistor is 625 Ohms and reference voltage is +5V, resolution of the DAC is
(A) 0.50 V (B) 1.00 V
(C) 2.50 V (D) None of these

36. Which of the following circuit is the most complex circuit?
(A) Serial In Serial Out (B) Serial In Parallel Out
(C) Parallel In Serial Out (D) Parallel In Parallel Out

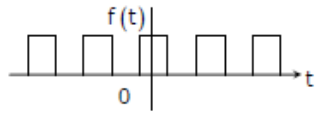
37. If a string of suspension insulator has three units, each can withstand a maximum 11 KV and total string can withstand 25.76 KV. What is the string efficiency?
(A) 234.1% (B) 46.3%
(C) 68.75% (D) 78%

38. The leakage resistance of a 50 km long cable is 1 MΩ.For a 100km long cable ,it will be
(A) 0.5MΩ (B) 2MΩ
(C) 1.6 MΩ (D) 2.5MΩ

39. A discrete-time signal x(n)=δ(n-3)+2δ(n-5) has z-transform x(z). If Y (z)=X (-z) is the z-transform of another signal y[n], then

(A) x(n)
(B) x(-n)
(C) -x(n)
(D) -x(-n)

40. The fourier series expansion $f(t) = a_0 + \sum_{n=1}^{\infty} a_n \cos n\omega t + b_n \sin n\omega t$ of the periodic signal shown below will contain the following nonzero terms



(A)
a_0 and b_n, $n = 1, 3, 5, \ldots\infty$

(B)
a_0 and a_n, $n = 1, 2, 3, \ldots\infty$

(C)
a_0 a_n and b_n, $n = 1, 2, 3, \ldots\infty$

(D)
a_0 and a_n $n = 1, 3, 5, \ldots\infty$

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