Total No. of Printed Pages : 06 **Roll No. .....**

Ph.D. Entrance Examination
November - 2022
Part - C
(Electrical and Electronics Engineering)
Time : 50 Minutes
Maximum Marks : 50

Note :

(i) This question booklet comprises of 50 questions.

(ii) All questions are compulsory.

(iii) The question booklet along with answer sheet is to be handed over by the candidate to the Invigilator at the end of the examination.

(iv) There is no negative marking.

(v) Each question carries one mark.

Multiple Choice Questions -

1. Which of the following is a correct representation of peak value in an AC Circuit?
   (a) RMS value/Avarage factor (b) RMS value/Peak factor
   (c) RMS value/Form factor (d) RMS value*Peak factor
2. What is constant for a charged spherical shell according to basic electrical energy?
   (a) Electrical potential outside the spherical shell
   (b) Electrical potential inside the spherical shell
   (c) Electrical field outside the spherical shell
   (d) Electrical field inside the spherical shell
3. Which of the following according to fundaments of electrical energy is correct about alternating current?
   (a) Frequency is zero
   (b) Magnitude changes with time
   (c) Can be transported to larger distances with less loss in power
   (d) Flows in both directions
4. Which of the following is a correct statement
   (a) PD controllers improves transient response
   (b) PI controllers improves steady state response
   (c) PI controllers improves steady state response and PD controllers improves transient response
   (d) All of the above

5. For open control system which of the following statements is incorrect ?
   (a) Less expensive
   (b) Recalibration is not required for maintaining the required quality of the output
   (c) Construction is simple and maintenance easy
   (d) Errors are caused by disturbances

6. In closed loop control system, with positive value of feedback gain the overall gain of the system will
   (a) Decrease (b) Increase
   (c) Unaffected (d) None of the above

7. Which of the following is an open loop control system ?
   (a) Field controlled D.C. motor (b) Ward leonard control
   (c) Metadyne (d) Stroboscope

8. A car is running at a constant speed of 50 km/h, which of the following is the feedback element for the driver ?
   (a) Clutch (b) Eyes
   (c) Needle of the speedometer (d) None of the above

9. Which of the following devices are commonly used as error detectors in instruments ?
   (a) Vernistats (b) Microsyns
   (c) Resolvers (d) Any of the above

10. A.C. servomotor resembles
   (a) Two phase induction motor (b) Three phase induction motor
   (c) Direct current series motor (d) Universal motor

11. What is the actuating quantity for the relays?
   (a) Phase angle (b) Magnitude
   (c) Frequency (d) All of the above

12. Which among the following methods is used for improving the system stability?
   (a) Increasing the system voltage (b) Reducing the transfer reactance
   (c) Using high speed circuit breaker (d) All of these

13. The pure inductive circuit takes power (reactive) from the AC line when
   (a) Both applied voltage and the current rise
   (b) Applied voltage decreases but current Increases
   (c) Both applied voltage and current decrease
   (d) None of these

14. The synchronous generator is connected to an infinite bus. If its excitation is increased
   (a) Supply reactive power (b) Absorb Reactive
   (c) Both A and B (d) None of them

15. What is the value of transient stability limit?

(a) Higher than steady state stability limit (b) Lower than steady state stability limit

(c) Depending upon the severity of load (d) All of these

16. By using which component can the transient stability limit of a power system be improved

(a) Series resistance (b) Series Inductance

(c) Series Capacitance (d) Shunt resistance

17. What is transient stability limit?

(a) The maximum flow of power through a particular point in the power system without loss of stability when small disturbances occur.

(b) The maximum power flow possible through a particular component connected in the power system

(c) The maximum flow of power through a particular point in the power system without loss of stability when large and sudden disturbances occur

(d) All of these

18. What is the advantage of HRC fuses over Rewirable fuses?

(a) High speed operation (b) High rupturing capacity

(c) No ageing effect (d) All of the above

19. What is steady state stability limit?

(a) The maximum flow of power through a particular point in the power system without loss of stability when small disturbances occur

(b) The maximum flow of power through a particular point in the power system without loss of stability when sudden disturbances occur

(c) Both A and B

(d) None of them

20. Which among these is a classification of power system stability?

(a) Frequency stability (b) Voltage stability

(c) Rotor angle stability (d) All the above

21. Electrical power output in a d.c. generator is equal to

(a) Electrical power developed in armature – copper losses

(b) Mechanical power input – iron and friction losses

(c) Electrical power developed in armature – iron and copper losses

(d) Mechanical power input – iron and friction losses – copper losses

22. The switching function of semiconductor devices can be characterized with

(a) Duty ratio only (b) Frequency only

(c) Duty ratio and frequency (d) Duty ratio, frequency and time delay

23. A lightning transient belongs to which class of transients

(a) Impulsive transient (b) Oscillatory transient

(c) Both A and B (d) None of them

24. Transient voltages typically last for

(a) 10 seconds to 1 minute (b) 1 to 10 seconds

(c) Few milliseconds to seconds (d) A microsecond to several milliseconds

25. Which of the following can be a potential transient source

(a) Capacitor Switching (b) Electrostatic discharge

(c) Faulty wiring or circuit breaker operation (d) All of these

26. AC power in a load can be controlled by using

(a) Two SCR's in parallel opposition (b) Three SCRr

(c) Four SCRs (d) One SCRs

27. The frequency of the power system control the

(a) Active power (b) Reactive power

(c) (a) and (b) both (d) None of Them

28. The output power of the cascaded amplifier / attenuator system can be determined using

(a) Actual gain of amplifier (b) Actual gain of amplifier and attenuator

(c) Gain in dB of amplifier and attenuator (d) Both (B) and (C)

29. In T-T connection, the ratio of actual capacity to the available capacity is

(a) 1 (b) 0.928

(c) 1.928 (d) 0.5

30. Filters are used to convert

(a) Pulsating dc signal into a pure dc signal

(b) Pure dc signal into a pulsating dc signal

(c) Pulsating dc signal into a pure ac signal

(d) Pulsating ac signal into a pure dc signal

31. The P - type semiconductor impurities are also called as

(a) Acceptor impurities (b) Donor impurities

(c) Either (a) or (b) (d) None of these

32. In DOL fuses are provided to protect against

(a) Hot circuit protection (b) Over voltage

(c) Over current (d) Over load

33. 3 - point starter is used to start the

(a) Series motor (b) Shunt motor

(c) Compound motor (d) Only B and C

Cont...5

34. Which of the following circuit breakers has the lowest operating voltage?

(a) SF_6 circuit breaker (b) Air break

(c) Air blast (d) Minimum oil circuit breaker

35. The power factors of an alternator is determined by its

(a) Speed (b) Load

(c) Excitation (d) Prime mover

36. Protective relays can be designed to respond to _____.

(a) Light intensity, impedance (b) Temperature, resistance, reactance

(c) Voltage and current (d) All of these

37. In double delta transformation, a double delta refers to the case where there are two delta transformations in

(a) Parallel (b) Series

(c) Both series and parallel (d) Neither series nor parallel

38. The frequency and time domain are related through which of the following?

(a) Laplace Transform and Fourier Integral

(b) Laplace Transform

(c) Fourier Integral

(d) Both (B) and (C)

39. If the gain of the critical damped system is increased it will behave as

(a) Oscillatory (b) Critically damped

(c) Overdamped (d) Underdamped

40. A differential relay comparator used for the protection of three phase transformers has

(a) One comparator (b) Two comparator

(c) Three comparator (d) Four comparator

41. Most familiar application of zig - zag transformer is as

(a) Ground reference on an ungrounded system

(b) Converting single phase to two phase

(c) Reducing harmonics

(d) All of these

42. In Scott connection, the voltage across the teaser leads the mains by

(a) 30 degree (b) 40 degree

(c) 90 degree (d) 120 degree

43. For successful parallel operation of two alternators, it is necessary that

(a) They are synchronized using synchroscope and dark and bright lamp method of synchronization

(b) Their phase sequence, voltage, frequency and polarity be the same

(c) Both (a) and (b)

(d) None of these

44. LISN is a device used to measure conducted emissions. LISN stands for

(a) Line impedance stabilization network (b) Line integrated stored network

(c) Laser integrated stabilization networking (d) Laser integrated stabilization networking

45. Which among the following applications uses Ward Leonard method of speed control?

(a) Rolling mills (a) Colliery winding motor

(c) Lifts and elevators (d) All of these

46. Which among these is the application of universal motors?

(a) Vacuum cleaners (b) Fans

(c) Hair dryers (d) Washing machines

47. What is the use of current transformers?

(a) Stepping up AC current (b) Measuring and protection

(c) Stepping down AC current (d) Both (b) and (c)

48. Which among these is related to the critical clearing time of a fault in a power system?

(a) Transient stability limit (b) Steady state stability limit

(c) Frequency limit (d) All of these

49. What is the source of heat generation in cables?

(a) Copper loss in conductor

(b) Dielectric losses in cable insulation

(c) Losses in metallic sheathings and armouring

(d) All of these

50. What will be the insulation thickness for a conductor of diameter 2 cm, with maximum and minimum stress 40 kV / cm rms and 10 kV / cm rms respectively?

(a) 5 cm (b) 3 cm

(c) 2 cm (d) 4 cm

****