CET (PG)-2015

Sr. No. : 200088

Question Booklet Series : A

Important : Please consult your Admit Card / Roll No. Slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No. *In Figures* *In Words*

O.M.R. Answer Sheet Serial No.

Paper : I Signature of the Candidate :

Subject : M.E. (Electrical Engg. and Instrumentation and Control)

Time : 90 minutes **Number of Questions : 75** **Maximum Marks : 75**

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO

INSTRUCTIONS

1. Write your Roll No. on the Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and Series Code of Question Booklet on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point / Black Gel pen.**
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. To open the Question Booklet remove the paper seal gently when asked to do so.
5. Please check that this Question Booklet contains **75** questions. In case of any discrepancy, inform Assistant Superintendent within 10 minutes of the start of test.
6. Each question has four alternative answers (A, B, C, D) of which only one is correct. For each ques darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer S with **Black Ball Point / Black Gel pen.**
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank i Answer Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions given in the Question Booklet.
9. Negative marking will be adopted for evaluation i.e., 1/4th of the marks of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the sheets marked "Rough Work" at the end of the Question Booklet be used.
12. The Answer Sheet is designed for **computer evaluation**. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e., not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so, would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculator is not allowed.**

SEAL

1. **In motor circuit static frequency changers are used for :**

   (A) Power factor improvement (B) Improved cooling

   (C) Reversal of direction (D) Speed regulation

2. **In closed loop control system, with positive value of feedback gain the overall gain of the system will :**

   (A) Decrease (B) Increase

   (C) Be unaffected (D) Any of the above

3. **The initial response when the output is not equal to input is called :**

   (A) Transient response (B) Error response

   (C) Dynamic response (D) Either of the above

4. **As a result of introduction of negative feedback which of the following will not decrease ?**

   (A) Band width (B) Overall gain

   (C) Distortion (D) Instability

5. **A control system with excessive noise, is likely to suffer from :**

   (A) Saturation in amplifying stages (B) Loss of gain

   (C) Vibrations (D) Oscillations

6. **In order to increase the damping of a badly underdamped system which of following compensators may be used ?**

   (A) Phase-lag (B) Phase-lead

   (C) Both (A) and (B) (D) Either (A) or (B)

7. **The effect of error damping is to :**

   (A) Provide larger settling lime (B) Delay the response

   (C) Reduce steady state error (D) Any of the above

8. **A phase lag lead network introduces in the output :**

   (A) Lag at all frequencies

   (B) Lag at high frequencies and lead at low frequencies

   (C) Lag at low frequencies and lead at high frequencies

   (D) None of the above

9. **Which of the following is the output of a thermocouple ?**

(A) Alternating current (B) Direct current

(C) A.C. voltage (D) D.C. voltage

10. **The first order control system, which is well designed, has a :**

(A) Small bandwidth (B) Negative time constant

(C) Large negative transfer function pole (D) None of the above

11. **A set of readings has a wide range and therefore it has :**

(A) Low precision (B) High precision

(C) Low accuracy (D) High accuracy

12. **Bandwidth, a frequency domain concept is indicative of :**

(A) Rise time in time domain (B) Setting time in time domain

(C) Steady state error in time domain (D) All of the above

13. **The material of wires used for making resistance standards is usually :**

(A) Manganin (B) Nichrome

(C) Copper (D) Phosphor bronze

14. **The relative damping in a galvanometer is 0.8.Its logarithmic decrement is approximately :**

(A) 0.48 (B) 1.25

(C) 4.19 (D) –4.19

15. **Which meter has the highest accuracy in the prescribed limit of frequency range :**

(A) PMMC (B) Moving iron

(C) Electrodynamometer (D) Rectifier

16. **In an induction type of meter the maximum torque is produced when phase angle between two fluxes is :**

(A) 0° (B) 90°

(C) 45° (D) 60°

17. **The pulse rise time is defined as the time taken by the pulse :**

(A) to go from 10% to 90% of its amplitude (B) to go from 0% to 100% of its amplitude

(C) to go from 0% to 90% of its amplitude (D) to go from 10% to 100% of its amplitude

SEAL

18. **In a Q-meter, the value of shunt resistance connected across the oscillator is typically of the order of :**

(A) Ω (B) mΩ

(C) μΩ (D) kΩ

19. **The resistance of a circuit is found by measuring current flowing and the power fed into circuit. Find the limiting error in the measurement of resistance when the limiting errors in the measurement of power and current are respectively ±1.5% and ±1.0% :**

(A) ±3.5% (B) ±4.5%

(C) ±1.5% (D) ±2.5%

20. **An 0-10 A ammeter has a guaranteed accuracy of 1% of full scale deflection. The limiting error while reading 2.5 A is :**

(A) 1% (B) 2%

(C) 4% (D) none of the above

21. **An electrodynamometer type instruments find major use as :**

(A) Standard instruments only (B) Transfer instrument only

(C) Both as standard and transfer instruments (D) A indicator type of instrument

22. **In a single phase induction type energy meter, the lag adjustment is done :**

(A) To make current coil flux to lag behind the applied voltage

(B) To make pressure coil flux to lag behind the applied voltage

(C) To make pressure coil flux in phase with applied voltage

(D) None of the above

23. **Which of the following is preferred for automatic drives ?**

(A) Synchronous motors (B) Squirrel cage induction motor

(C) Ward Leonard controlled dc motors (D) Any of the above

24. **In a parallel RC circuit, there is 100 mA through the resistive branch and 100 mA through the capacitive branch. The total rms current is :**

(A) 141 mA (B) 249 mA

(C) 140 mA (D) 145 mA

25. **When quick speed reversal is a consideration, the motor preferred is :**

(A) Synchronous motor (B) Squirrel cage induction motor

(C) Wound rotor induction motor (D) DC motor

26. **Stator voltage control for speed control of induction motors is suitable for :**

(A) Fan and pump drives
(B) Drive of a crane
(C) Running it as generator
(D) Constant load drive

27. **A 4-digit DVM(digital voltmeter) with a 100-mV lowest full scale range would have a sensitivity of how much value while resolution of this DVM is 0.0001 :**

(A) 0.1 mV
(B) 0.01 mV
(C) 1.0 mV
(D) 10 mV

28. **A moving coil instrument gives full scale deflection with 25 mA. The resistance of the coil is 5 ohms. It is required to convert this meter into an ammeter to read up to 5A. Find the resistance of the shunt to be connected in parallel with the meter :**

(A) 4.23 A
(B) 4.56 A
(C) 4.975 A
(D) 4.035 A

29. **An alternating voltage e = 200 sin 314t is applied to a device which offers an ohmic resistance of 20 Q to the flow of current in one direction while preventing the flow of current in opposite direction. The form factor for the current over one cycle is :**

(A) 1.43
(B) 1.47
(C) 1.57
(D) 1.61

30. **In a system if poles lie off the real axis, then the system is :**

(A) Overdamped
(B) Critically damped
(C) Under damped
(D) Not affecting the damping

31. **The position and velocity errors of a type-2 system are :**

(A) Constant, infinity
(B) Zero, constant
(C) Zero, zero
(D) Constant, constant

32. **The transfer function $H(s)=\frac{s^2-5s+100}{s^2+5s+100}$ represents :**

(A) A high pass filter
(B) A band elimination filter
(C) A resonator
(D) As all pass filter

33. **Best protection is provided by HRC fuses in case of :**

(A) Open circuits
(B) Short circuits
(C) Overloads
(D) None of the above

34. The Z-transform of signal is given by $\frac{z^{-1}(1-z^{-4})}{4(1-z^{-1})^2}$. Its final value is :

(A) ¼ (B) 0

(C) 1.0 (D) ∞

35. In a 4-bit weighted resistor D/A converter, the resistor value corresponding to LSB is 32 kΩ .The resistor value corresponding to MSB will be :

(A) 32 Ω (B) 16 Ω

(C) 8 Ω (D) 4 Ω

36. Each diode of a 3-phase , 6-pulse bridge diode rectifier conducts for :

(A) 60° (B) 120°

(C) 180° (D) 90°

37. An electrodynamometer type instrument finds major use as :

(A) Standard instruments only (B) Transfer instrument only

(C) Both as standard and transfer instruments (D) A indicator type of instrument

38. A random noise generator produces a signal :

(A) Whose amplitude varies randomly (B) Which has no periodic frequency

(C) Has an unpredictable power spectrum (D) All of the above

39. For a 5 kW DC motor the number of slots per pole should be :

(A) 4 (B) 8

(C) 12 (D) 16

40. In a synchronous generator in order to eliminate the fifth harmonic the chording angle should be :

(A) 9° (B) 18°

(C) 27° (D) 36°

41. Inter poles in DC machines are provided to reduce :

(A) Sparking (B) Armature reaction

(C) Iron loss (D) Efficiency

42. When a resistance element of a heater gets fused, we remove a portion of it and reconnect it to the same supply, the power drawn by the heater will :

(A) Increase (B) Decrease

(C) Remain unchanged (D) None of the above

43. **A star arrangement of resistances has branch resistance of 3 Ω. The equivalent delta arrangement will have resistance of values :**

(A) 9 Ω
(B) 6 Ω
(C) 3 Ω
(D) 1 Ω

44. **The most appropriate operating speeds in rpm of generators used in thermal, nuclear and hydro power plants would respectively be :**

(A) 3000, 3000 and 1500
(B) 3000, 3000 and 300
(C) 1500, 1500 and 500
(D) 1000, 900 and 750

45. **The main function of economizer of a boiler in a plant is :**

(A) Increase steam production
(B) Reduce fuel consumption
(C) Increase stem pressure
(D) Increase life of the boiler

46. **In case of a power transformer, the no load current in terms of rated current is :**

(A) 10-20%
(B) 15-30%
(C) 2-6%
(D) 30-50%

47. **Transformer zero voltage regulation occurs at :**

(A) Unity power factor
(B) Leading power factor
(C) Lagging power factor
(D) Zero power factor leading

48. **One 200 V, 100 W bulb is connected in series with primary of a 200 V, 10 kVA transformer. If its secondary is kept open circuited, then the bulb would have :**

(A) Full brightness
(B) Poor brightness
(C) A little less than full brightness
(D) More than full brightness

49. **The efficiency of a transformer at full load 0.8 p.f lagging is 90%. Its efficiency at full load 0.8 p.f leading will be :**

(A) Less than 90%
(B) More than 90%
(C) 90%
(D) None of these

50. **A series R-L circuit is suddenly connected to d.c. voltage source of V volts. The current in this series circuit, just after the switch is closed, is equal to :**

(A) Zero
(B) V/L
(C) V/C
(D) V.L/C

51. **How many flip-flops are required to build a binary counter circuit to count from 0 to 1023 ?**

(A) 1 (B) 6

(C) 10 (D) 24

52. **The number of comparators in parallel conversion type 8-bit A/D converter is :**

(A) 8 (B) 16

(C) 255 (D) 256

53. **When a d.c. ammeter is connected with polarities reversed ?**

(A) The pointer deflects down scale (B) The pointer remains stationary

(C) The pointer deflects up scale (D) None of the above

54. **The capacitance of a parallel plate condenser does not depend upon :**

(A) Metal of the plates (B) Area of the plates

(C) The distance between the plates (D) Permittivity of the medium

55. **For achieving good power factor of an induction motor, the average flux density in air gap should be :**

(A) Small (B) Large

(C) Infinity (D) None of the above

56. **The most commonly used method of damping in the measuring instruments is :**

(A) Eddy current damping (B) Fluid friction damping

(C) Air friction damping (D) None of the above

57. **In d.c. motor the torque developed depends on :**

(A) Magnetic field (B) Armature current

(C) Magnetic field and armature current (D) Voltage applied

58. **Ash content of Indian coal is :**

(A) 40% (B) 50%

(C) 35% (D) 45%

59. **Pumped storage plant is suitable for :**

(A) Peak loads (B) Off peak loads

(C) Average load (D) Medium load

60. **The role of surge tank is a hydroelectric plant is to :**

(A) Supply peak load

(B) Prevent water hammer

(C) Prevent vacuum

(D) Prevent water hammer and vacuum

61. **Pelton turbine is a :**

(A) Low head turbine

(B) Medium head turbine

(C) High head turbine

(D) Low and medium head turbine

62. **The coolants used in Nuclear power stations are :**

(A) Hydrogen

(B) CO_2

(C) Lithium

(D) Neon

63. **The most commonly used moderator material is :**

(A) Carbon

(B) Water

(C) CO_2

(D) Liquid metal

64. **The role of moderator is to :**

(A) Speed up of neutrons

(B) Slow down the fast neutrons

(C) To start fission reaction

(D) To control the fusion

65. **The changes in real bus power affect mainly :**

(A) the bus voltage phase angles

(B) bus voltage magnitude

(C) reactive line flows

(D) none of the above

66. **Proportional band of a controller is expressed as :**

(A) Ratio

(B) Gain

(C) Percentage

(D) Range of control variable

67. **The frequency of normal sound wave determines :**

(A) Its pitch

(B) Its quality

(C) Its loudness

(D) Its echo

68. **If it is desired to have low output impedance, the proper amplifies circuit is :**

(A) Common cathode circuit

(B) Common grid circuit

(C) Common plate circuit

(D) Common emitter circuit

69. **A transistor amplifier has a midband power gain of 50 dB. At half power frequencies the gain is :**

(A) 25 dB
(B) 47 dB
(C) 35.35 dB
(D) 44 dB

70. **Which of the following has invariably high cut-off frequency ?**

(A) Common emitter
(B) Common-base
(C) Common-collector
(D) All of these

71. **The selectivity of a single tuned circuit depends namely on circuit :**

(A) Impedance
(B) Inductance
(C) Capacitance
(D) Resistance

72. **A Schmitt trigger can be used as :**

(A) Comparator
(B) Square-wave generator
(C) Flip-flop
(D) For all of these

73. **How many 7490 ICs are to be cascaded to count for 999 ?**

(A) 1
(B) 2
(C) 3
(D) 4

74. **Which of the following circuit can be used as parallel to serial converter ?**

(A) Digital Counter
(B) Decoder
(C) De-multiplexer
(D) Multiplexer

75. **In a PCM, the number of quantizing level is 16. The number of pulses in a code group will be :**

(A) 16
(B) 8
(C) 4
(D) 3