Question Booklet Series: **A** *Question Booklet Serial No.* 110049

CET (PG) – 2017

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

Roll No. ***In Figure*** ***In Words***

O.M.R. Answer Sheet Serial No.

Signature of Candidate: _____ *Signature of Invigilator:* _____

Subject: M.E. Electrical Engineering (Power System)

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 Questions Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Question Booklet Serial No. 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. Please check that this Question Booklet contains 75 Questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of Test.
5. Each question has four alternative answer (A,B,C,D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point/Black Gel Pen. There shall be negative marking for wrong answer, ¼ of the marks of the question will be deducted for every wrong answer.**
6. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Booklet. No marks will be deducted in such cases.
7. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the question given in the Question Booklet.
8. If you want to change an already marked answer, erase the shade in the darkened bubble completely.
9. For rough work only the blank sheet at the end of the Question Booklet be used.
10. The University will provide Logarithmic table. Borrowing of log table or other material is not allowed.
11. 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.**
12. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
13. 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.
14. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistant or found giving or receiving assistant 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.
15. **Communication equipment such as mobile phones, pager, wireless set, scanner, camera or any electronic/digital gadget etc., is not permitted inside the examination hall. Use of calculators is not allowed.**
16. The candidates will not be allowed to leave the Examination Hall/Room before the expiry of the allotted time.

1. Each strand, in 19-strand conductor is of equal diameter and has an inductance of L H/m. The total inductance of stranded conductor is

   A) 19L B) L/19 C) L/36 I D) L/36

2. The effect of earth on capacitance of a line can be neglected when

   A) Conductor diameter is small compared to its height above ground
   B) Bundled conductors are used
   C) Height of conductor above ground is large as compared to spacing between conductors
   D) Spacing between conductors is more than Height of conductor above ground

3. The stipulated voltage regulation of a transmission line is

   A) ±5 % B) ± 10% C) ± 7.5 % D) ±4.5 %

4. A 110 kV, three phase transmission line has a per unit capacitance 0.015 μF and inductance of 3.0 mH. The magnitude of characteristics impedance of line is

   A) 350 Ω B) 400 Ω C) 500 Ω D) 450 Ω

5. Which of the following represents B parameter for a long line?

   A) Cosh (γl) B) Z_c sinh (γl) C) sinh (γl)/Z_c D) Z_c cosh (γl)

6. The control error of tie line bias control in a two-area system is

   A) $ACE_1 = \Delta P_{1\text{-}2}$ B) $ACE_1 = B_1 \Delta f_1$

   C) $ACE_1 = B_1 \Delta f_1 + \Delta P_{1\text{-}2}$ D) $ACE_1 = B_1 \Delta f_1 - \Delta P_{1\text{-}2}$

7. The zero sequence network of a generator can be given as

   A) $3Z_n - Z_0$ B) $3Z_n + Z_0$ C) $Z_n - 3Z_0$ D) $Z_n + 3Z_0$

8. What is the type of fault when the boundary conditions for a fault on phase 'a' of power system are $I_b = -I_c$, $I_a = 0$ and $V_b - V_c = 0$?

   A) 3-Φ B) L-G C) L-L D) L-L-G

9. Transient stability analysis is performed for

   A) 3-Φ B) L-G C) L-L D) L-L-G

10. The percentage bias setting of differential relay used for transformer protection should be

   A) Below 10% B) Between 10% and 15 %
   C) Above 50% D) Between 30% and 50%

11. A line-to-ground fault occurs on star side of a feeder transformer, the same fault appears on delta side as

A) A line to ground fault
B) A line-line ground
C) A double line to ground fault
D) A three phase fault

12. The digital/numerical bus protection scheme operates within

A) 1-3 cycles
B) 10-20 cycles
C) 30-40 cycles
D) 8-15 cycles

13. The effect of CT saturation can be reduced by

A) Decreasing cross section of CT core
B) Increasing cross section of CT core
C) Changing CT ratio
D) Using identical CT's

14. CVT's are preferred for voltages

A) Below 11 kV
B) Between 11 kV and 66 kV
C) Beyond 132 kV
D) None of above

15. The maximum current value of lightning stroke is

A) 10 A
B) 100 A
C) 10 kA to 100 kA
D) 1000 kA

16. The tendency of mal operation of distance relay during power swing condition is less in case of

A) Reactance relay
B) Quadrilateral relay
C) Mho relay
D) Plain impedance relay

17. The wave length of a wave with propagation constant $(0.1\pi + j0.2\pi)\,m^{-1}$ is

A) 5 m
B) 15 m
C) 20 m
D) 10 m

18. A 100 KVA, 400/200 V single phase transformer with 10% impedance draws a steady state short circuit line current of

A) 50 A
B) 150 A
C) 250 A
D) 350 A

19. A surge voltage rising at 100 kV/μsec travels along a loss-less open circuited transmission line. It takes 10 μ sec to reach the open end. The reflected wave from the open end, will be rising at

A) 100 kV/μs
B) 200 kV/μs
C) 1000 kV/μs
D) 2000 kV/μs

20. An electric motor develops a mechanical power of 20 hp with 88% efficiency. The electric input power for this is

A) 17.89 kW
B) 16.95 kW
C) 18 kW
D) 15.5 kW

21. A load is connected to a network . at the terminals to which load is connected , R_{TH}=10 ohm and V_{TH}=40 V. The maximum power supplied to load is

A) 160 W B) 80 W C) 40 W D) 1 W

22. The capacitance between any two conductors of a 3-core cable with sheath earthed is 3 μF. The capacitance per phase will be

A) 1.5 μF B) 6 μF C) 1 μF D) 2 μF

23. 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) ∞ D) 1.0

24. The gain margin of the transfer function $G(s)=\frac{0.75s}{(1+s)(2+s)}$ is

A) 4 dB B) 8 dB C) 12 dB D) 16 dB

25. The voltage rise from sending end to receiving end for a 50 Hz, 300 km long line if receiving end voltage is 220 kV is

A) Voltage rise= 5346 V /phase B) Voltage rise= 7654 V /phase

C) Voltage rise= 5689 V /phase D) Voltage rise= 6268 V /phase

26. The propagation constant of a 3-phase , 200 km long H.V. line has Z=14.1+j 51.48 ohm and y=(0+j 1.194)* 10^{-3} Siemens is

A) (0.16826+j 1.25) * 10^{-3} B) (0.124+j 1.67)* 10^{-4}

C) (0.165+j 1.75)* 10^{-4} D) (0.134+j 1.87)* 10^{-4}

27. A distribution station has a peak load of 3000 kW and total annual energy of 10^7 kWh. The peak power loss is 220 kW. The loss factor is:

A) 0.215 B) 0.285 C) 0.325 D) 0.356

28. In the wave winding of DC machine, which of the following relation is correct where Y_f=front pitch; Y_b Back pitch; Y_c-comuutator pitch.

A) $Y_b + Y_a = Y_c$ B) $Y_b + Y_a = 2Y_c$

C) $Y_b - Y_a = Y_c$ D) $Y_b - Y_a = Y_c$

29. For a three phase induction motor operating at full load slip, if slip is to be doubled for a constant torque, the voltage must be reduced by a factor

A) $\frac{1}{\sqrt{2}}$ B) $\sqrt{2}$ C) $\frac{1}{4}$ D) $\frac{1}{6}$

30. In a 3-phase semiconverter , the frequency of ripple in the output may be

A) 3 times the supply frequency for firing angle $\alpha < 60^0$
B) 3 times the supply frequency for firing angle $\alpha > 60^0$
C) 6 times the supply frequency for firing angle $\alpha = 60^0$
D) 6 times the supply frequency for firing angle $\alpha > 60^0$

31. A step-up chopper has V_s as source voltage and α as duty cycle. The output voltage of the chopper is given by

A) $V_s(1+\alpha)$ B) $V_s/(1+\alpha)$ C) $V_s(1-\alpha)$ D) $V_s/(1+\alpha)$

32. In a single-pulse modulation of PWM inverters, the pulse width is 120^0. For an input voltage of 220 V dc, the rms value of output voltage is

A) 179.63 V B) 254.04 V C) 127.02 V D) 185.04 V

33. The intrinsic impedance of copper at high frequencies is

A) Purely resistive
B) Purely inductive
C) Complex with capacitive component
D) Complex with inductive component

34. A 200/100 V, 50 Hz transformer is to be excited at 40 Hz from 100 V side. For the exciting current to remain the same, the applied voltage should be

A) 150 V B) 125 V C) 100 V D) 80 V

35. f dimension of all the parts of a synchronous generator, and the number of field and armature turns are doubled, then generated voltage will change by a factor of

A) 1 B) 2 C) 8 D) 4

36. An autotransformer having a transformation ratio of 0.8 supplies a load of 10 kW. The power transferred inductively from the primary to the secondary is

A) 10 Kw B) 8 kW C) 2 kW D) Zero

37. The transistors are

A) High voltage devices
B) Low current device
C) Low voltage devices
D) Low voltage and low current devices

38. A 50 Hz bar primary CT has a secondary with 500 turns. The secondary supplies 5 A current into purely resistive burden of 1 ohm. The magnetizing ampere turns is 200. The core flux in CT under the given operating condition is

A) 0 B) 45 μ Wb C) 22.5 mW D) 100 mWb

39. A 100 mV at 75 MHz is to be measured. Which of the following instrument can be used?

A) VTVM
B) Cathode ray oscilloscope
C) Moving iron voltmeter
D) Digital multimeter

40. Shering bridge measures

A) Capacitance, dielectric loss
B) Inductance
C) Resistance
D) Mutual inductance

41. The incremental fuel cost for two generating units given by

$IC_1=25+0.2\ PG_1$
$IC_2=32+0.2\ PG_2$

The economic allocation for a total load of 250 MW, neglecting transmission losses is given by:

A) $PG_1=140.25$ MW; $PG_2=109.75$ MW
B) $PG_1=109.75$ MW; $PG_2=140.25$ MW
C) $PG_1=125$ MW; $PG_2=125$ MW
D) $PG_1=100$ MW; $PG_2=150$ MW

42. The spectral density of a real valued random process has

A) An even symmetry
B) An odd symmetry
C) A conjugate symmetry
D) No symmetry

43. The probability density function of the envelope of narrow Gaussian noise in

A) Poisson
B) Gaussian
C) Rayleigh
D) Rician

44. The Nyquist sampling frequency in Hz of a signal given by $6*10^4 \sin c^2(400\ t)* 10^6 \sin c^3(100t)$ is

A) 200
B) 300
C) 500
D) 1000

45. The region of convergence of Z-transform of a unit step function is

A) $|Z|>1$
B) $|Z|<1$
C) (Real part of z)>0
D) (Real part of z)<0

46. The number of hardware interrupts (which require an external signal to interrupt) present in an 8085 microprocessor is

A) 1
B) 4
C) 5
D) 13

47. The 2's complement representation of -17 is

A) 01110
B) 01111
C) 11110
D) 10001

48. The number of comparators required in a 3-bit comparator type ADC is

A) 2
B) 3
C) 7
D) 8

49. A 0 to 6 counter consists of 3-flip flops and a combination circuit of 2 input gate (s). The combination circuit consists of

A) One AND gate
B) One OR gate
C) One AND gate and OR gate
D) Two AND gates

50. An 8-bit successive approximation analog to digital converter has a full scale reading of 2.55 V and its conversion time for an analog input of 1V is 20 μsec. The conversion time for a 2 V input will be

A) 10 μsec
B) 20 μsec
C) 40 μsec
D) 50 μsec

51. The transfer function $H(s) = \frac{V_0(s)}{V_i(s)}$ of an RLC circuit is given by $H(s) = \frac{10^6}{s^2 + 20s + 10^6}$. The quality factor of circuit is

A) 25
B) 100
C) 5000
D) 50

52. The unit impulse response of a system is given as c (t)= $-4e^{-t}+ 6e^{-2t}$. The step response of the same system for $t \geq 0$ is equal to

A) $-3e^{-2t}-4e^{-t}$
B) $-3e^{-2t}+4e^{-t}+1$
C) $3e^{-2t}-4e^{-t}+1$
D) $3e^{-2t}+ 4e^{-t}-1$

53. An ideal voltage source will charge an ideal capacitor

A) Infinite time
B) Exponentially
C) Instantaneously
D) None of the above

54. A transmission line is distortion less if

A) RL=(1/GC)
B) RL=GC
C) LG=RC
D) RG=LC

55. The Maxwell equation $\nabla \times \vec{H} = \vec{J} + \frac{\partial \vec{D}}{\partial t}$ is based on

A) Ampere's law
B) Gauss 's law
C) Faraday's law
D) Coulomb's

56. In a uniform electric field, fields, lines, lines and equipotentials

A) Are parallel to one another
B) Intersect at 45^0
C) Intersect at 30^0
D) Are orthogonal

57. Negative feedback is an amplifier

A) Reduce gain
B) Increase frequency and phase distortion
C) Reduce bandwidth
D) Increases noise

58. N-type silicon is obtained by doping silicon with

A) Germanium
B) Aluminium
C) Boron
D) Phosphorous

59. The Z-matrix of a 2-port network as given by $\begin{bmatrix} 0.9 & 0.2 \\ 0.2 & 0.6 \end{bmatrix}$ .The element Y_{22} of the corresponding Y matrix of the same network is given by

A) 1.2 B) 0.4 C) -0.4 D) 1.8

60. The characteristics equation of a feedback control system is

$2s^4 + s^3 + 3s^2 + 5s + 10 = 0$

The number of roots in the right half s plane are

A) Zero B) 1 C) 2 D) 3

61. Maximum phase-lead of the compensator $D(s) = \frac{(0.5s + 1)}{(0.05s + 1)}$ is

A) 52^0 at 4 rad/sec B) 52^0 at 10 rad/sec

C) 55^0 at 5.76 rad/sec D) 55^0 at 6.32 rad/sec

62. A 300 kVA transformer has 95% efficiency at full load 0.8 pf lagging and 96% efficiency at half load, unity pf .The iron loss (P_i) and copper (P_c) loss in kW under full load conditions are

A) P_i=8.51 , P_c=4.12 B) P_i=6.59 , P_c=9.21
C) P_i=4.21 , P_c=8.51 D) P_i=3.07 , P_c=12.72

63. In a transformer, zero voltage regulation at full load is

A) Not possible B) Possible at unity power factor load
C) Possible at leading power factor load D) Possible at lagging power factor

64. A 400 V, 15 kW, 4 pole, 50 Hz, Star connected induction motor has full load slip of 4%. The output torque of the machine at full load is

A) 1.66 Nm B) 99.47 Nm C) 95.50 Nm D) 624. 73 Nm

65. The rms value the resultant current in a wire which carries a dc current of 10 A and sinusoidal alternating current of peak value 20 A is

A) 14.1 A B) 22.4 A C) 17.3 A D) 30 A

66. The maximum prcentage quantization error for a 12-bit analog to digital converter is

A) ±0.00076% B) ±0.012207% C) ±3.125% D) ±4.17%

67. A 100/5A bar primary current transformer supplies an overcurrent relay set at 25%pick up and it has burden at 5 VA. The secondary voltage is

A) 1 V B) 1.25 V C) 2.5 V D) 4 V

68. The gain bandwidth product of two stage CE amplifier is

A) Same as that of one stage
B) Greater than one stage
C) Less than one stage
D) Product of two gain bandwidth products of each stage

69. When electromagnetic waves are propagated in a waveguide

A) They are reflected from the walls but do not travel along them
B) They travel along broader walls of guide
C) They travel through the dielectric without touching the walls
D) They travel along all four walls of the waveguide

70. The wave length of a wave with propagation constant $(0.1\pi + j0.2\pi)\,m^{-1}$ is

A) 5 m B) 10 m C) 15 m D) 20 m

71. A 1000 ohms/V meter is used to measure a resistance on 150 V scale. The meter resistance is

A) 150 kΩ B) 1 kΩ C) 6.67 Ω D) 0.001 Ω

72. One single phase wattmeter operating on 230 V and 5A for 5 hours makes 1940 revolutions. Meter constant in revolutions is 400. The power factor of load is

A) 1 B) 0.8 C) 0.7 D) 0.6

73. Which of the following can be used to change data from special code for temporal code?

A) Shift registers B) Counters
C) A/D converters D) Combinational circuits

74. In time division multiplexing

A) Time is doubled between bits of a byte
B) Time slicing at CPU level takes place
C) Total time available in channel is divided between several users and each users is allotted a time slice
D) None of these

75. If the penalty factor of a plant is unity, its incremental transmission loss is

A) 1.0 B) -1.0 C) Zero D) None of these

X-X-X