GATE
Electrical Engineering
Multiple Choice Questions
With Answers
1-The steady-state error of a feedback control system with an acceleration input becomes finite in a
   a. Type 0 system.
   b. Type I system.
   c. Type 2 system.
   d. Type 3 system.
   (Ans: c)

2-A good control system has all the following features except
   a. Good stability
   b. Slow response
   c. Good accuracy
   d. Sufficient power handling capacity
   (Ans: b)

3-Which of the following is the best method for determining the stability and transient response?
   a. Root locus
   b. Bode Plot
   c. Nyquist plot
   d. None of the above
   (Ans: a)

4-Addition of zeros in transfer function causes which of the following?
   a. Lead-compensation
   b. Lag-compensation
   c. Lead-lag compensation
   d. None of the above
   (Ans: b)

5-The control system design specification for a chemical process is described as short settling time, improved damping and zero steady state error. What control do we choose?
   a. P
   b. PI
   c. ID
   d. PID
   (Ans: d)

6-Maxwell’s equations involve _______.
   a. Charge density
   b. Current density
7-Which of the following is a low-gain antenna?
   a. Dish antenna on a space craft
   b. Wi-Fi antenna
   c. Both a. and b.
   d. None of the above

   (Ans: b)

8-Gold and silver are
   a. Dielectric materials
   b. Low resistivity conducting materials
   c. Magnetic materials
   d. Insulating materials

   (Ans: b)

9-Hall effect may be used for which of the following
   a. Determining whether the semiconductor is p or n type
   b. Determining the carrier concentration
   c. Calculating the mobility
   d. All of the above

   (Ans: a)

10-The property due to which the resistance of some metal or compound vanishes under certain conditions is known as
   a. Semi conductivity.
   b. Magnetostriiction.
   c. Curie point.
   d. Super conductivity.

   (Ans: d)

11-A 32 to 1 multiplexer has the following features.
   a. 32 inputs, one output and 5 control signals
   b. 32 outputs, one input and 5 control signals
   c. 5 inputs, one control signal and 32 outputs
   d. 5 inputs 32 control signals and one output

   (Ans: a)

12-How many comparators would a 12-bit flash ADC require?
13-In a sample and hold circuit the following statement is false:

- a. Sample time is much smaller than hold time.
- b. Aperture time is the delay between the time that the pulse is applied to the switch and the actual time the switch closes.
- c. Acquisition time is the time it takes for the capacitor to charge from one voltage to another voltage.
- d. The voltage across the hold capacitor changes by 50% during hold time.

(Ans: a)

14-The fastest switching logic family is

- a. CMOS
- b. TTL
- c. DTL
- d. ECL

(Ans: d)

15-A bridge rectifier provides 50mA current at 150V, the average current and PIV rating of each diode, respectively are:

- a. 79mA, 167V
- b. 25mA, 236V
- c. 12.5mA, 167V
- d. 25mA, 120V

(Ans: b)

16-Compared to bipolar transistor, a JFET has

- a. Lower input impedance
- b. Higher voltage gain
- c. Higher input impedance and high voltage gain
- d. Higher input impedance and low voltage gain

(Ans: d)

17-Input impedance of MOSFET is

- a. less than of FET but more than BJT
- b. More than that of FET and BJT
- c. more than that of FET but less than BJT
- d. less than that of FET and BJT

(Ans: b)
18-A 3 x 8 decoder with two enable inputs is to be used to address 8 blocks of memory. What will be the size of each memory block when addressed from a sixteen bit bus with two MSBs used to enable the decoder?

a. 2K
b. 4K
c. 16K
d. 64K

(Ans: c)

19-The decimal value for the BCD coded number 00010010 is

a. 6
b. 10
c. 12
d. 18

(Ans: c)

20-In a DMA write operation the data is transferred

a. From I/O to memory.
b. From memory to I/O.
c. from memory to memory.
d. from I/O to I/O.

(Ans: a)
1-The following magnet is used in large machines to create magnetic flux
   a. Permanent magnet  
   b. Electro magnet  
   c. Temporary magnet  
   d. Any of the above  
   (Ans: b)

2-The special device which converts AC into DC and vice versa is known as  
   a. Armature  
   b. Slip rings  
   c. Split rings  
   d. Field magnets  
   (Ans: c)

3-The following is (are) the part(s) of a field magnet.  
   a. Yoke  
   b. Pole cores  
   c. Pole shoes  
   d. All of the above  
   (Ans: d)

4-Function of ____ is to collect current from the commutator and supply it to the external load.  
   a. Field magnet  
   b. Armature  
   c. Brushes  
   d. Yoke  
   (Ans: c)

5-The brushes are ____ in shape.  
   a. Triangular  
   b. Rectangular  
   c. Cylindrical  
   d. Square  
   (Ans: b)

6-For larger machines  
   a. Ball bearings are used at both driving and non driving ends.  
   b. Ball bearings are used at driving end and roller bearings are used at non driving end.  
   c. Roller bearings are used at driving end and ball bearings are used at non driving end.
d. Roller bearings are used at both driving and non driving ends.

(Ans: c)

7-The following is (are) keyed to the shaft

a. Armature core
b. Commutator
c. Cooling fan
d. All of the above

(Ans: d)

8-Which of the following generators have two field windings?

a. Series wound generator
b. Shunt wound generator
c. Compound wound generator
d. All of the above

(Ans: c)

9-A motor converts

a. Mechanical energy into electrical energy
b. Chemical energy into electrical energy
c. Electrical energy into Mechanical energy
d. Electrical energy into chemical energy

(Ans: c)

10-To produce dynamically induced emf, the following is (are) necessary

a. A magnetic field
b. A conductor
c. Motion of conductor with respect to the field
d. All of the above

(Ans: d)

11-Which of the following is also called ‘motor rule’?

a. Fleming’s right hand rule
b. Fleming’s left hand rule
c. All of the above

(Ans: b)

12-Shaft torque equals to
a. Net torque
b. Friction torque
c. Net torque + Friction torque + Torque lost
d. Net torque – (Friction torque + Torque lost)

(Ans: d)

13-Iron or magnetic losses are also called

a. Core losses
b. Field losses
c. Copper losses
d. Armature losses

(Ans: a)

14-The mechanical losses are about _____ % of full load losses.

a. 0 to 10
b. 10 to 20
c. 20 to 30
d. 30 to 40

(Ans: b)
1-The nucleus of an atom consists of
   a. Protons
   b. Neutrons
   c. Protons and Neutrons
   d. Electrons and Protons
   (Ans: c)

2-A body contains electrons more than its normal number has
   a. +ve charge
   b. –ve charge
   c. No charge
   d. None of the above
   (Ans: b)

3-The SI unit for measurement of electric charge is
   a. volt
   b. c.olumb
   c. ohm
   d. farad
   (Ans: b)

4-One c.olumb is approximately equal to
   a. 624 x 10^12
   b. 624 x 10^14
   c. 624 x 10^16
   d. 624 x 10^18
   (Ans: c)

5-The ____ is responsible for the current to flow in a closed circuit.
   a. Electric charge
   b. Potential difference
   c. Resistance
   d. All of the above
   (Ans: b)

6-Any charged conductor, which receives electricity from the earth, when connected to it, is said to be
   a. Zero potential
   b. –ve potential
   c. +ve potential
7- Resistance of a wire is directly proportional to its 

a. Length  
b. Diameter  
c. Area of cross section  
d. All of the above  

(Ans: a)

8- Reciprocal of resistance is called  

a. Resistivity  
b. Conductance  
c. Resonance  
d. None of the above  

(Ans: b)

9- A coil consists of 8 turns of copper wire have cross section area of 1mm$^2$. The resistance of the coil, when mean length per turn is 0.02$\mu\Omega$m, is  

a. 0.96 ohm  
b. 0.48 ohm  
c. 1.82 ohm  
d. 1.44 ohm  

(Ans: a)

10- The following is (are) the semiconductor(s)  

a. Silicon  
b. Germanium  
c. Carbon  
d. All of the above  

(Ans: d)

11- The resistance of pure metallic conductor ____ with the ______ in temperature.  

a. increases, increase  
b. increases, decrease  
c. remains same, increase  
d. remains same, decrease  

(Ans: a)
12-One kilowatt equals to ____ horse power.

a. 1.26  
b. 1.36  
c. 1.46  
d. 1.56

(Ans: b)

13-The output of motor in watts when it takes a power of 3kw and its efficiency is 75%, is

a. 2000  
b. 2250  
c. 2500  
d. 2750

(Ans: b)

14-If three resistance (R1, R2 & R3) are connected in series then

a. \( V = IR_1 + IR_2 + IR_3 \)  
b. \( V = \frac{I}{R_1} + \frac{I}{R_2} + \frac{I}{R_3} \)  
c. \( I = VR_1 + VR_2 + VR_3 \)  
d. \( I = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3} \)

Where \( V \)=Potential difference, \( I \)=Current

(Ans: a)

15-When the resistances are connected in parallel circuit then

a. branch currents are additive  
b. conductances are additive  
c. powers are additive  
d. All of the above

(Ans: d)
In superconductivity the conductivity of a material becomes

a. Zero  
b. Finite  
c. Infinite  
d. None of the above

(Ans:c)

In superconductivity, the electrical resistance of material becomes

a. Zero  
b. Infinite  
c. Finite  
d. All of the above

(Ans:a)

The temperature at which conductivity of a material becomes infinite is called

a. Critical temperature  
b. Absolute temperature  
c. Mean temperature  
d. Crystallization temperature

(Ans:a)

In superconductors, the Fermi energy level is

a. Below the ground state  
b. Midway between the ground state and first excited state  
c. Above first excited state  
d. At first excited state

(Ans:b)

The superconducting state is perfectly _____ in nature.

a. Diamagnetic  
b. Paramagnetic  
c. Ferromagnetic  
d. Ferromagnetic

(Ans:a)

Which of the following are the properties of superconductors?

a. They are diamagnetic in nature  
b. They have zero resistivity  
c. They have infinite conductivity
The minimum amount of current passed through the body of superconductor in order to destroy the superconductivity is called

a. Induced current  
b. Critical current  
c. Eddy current  
d. Hall current  

(Ans: b)

The energy required to break a cooper pair is ___ of the energy gap of superconductor.

a. One half  
b. Equal to  
c. Twice  
d. Thrice  

(Ans: b)

The copper pair has

i. Equal and opposite momenta  
ii. Equal and opposite spin  
iii. Unequal and same spin

Which of the above are true?

a. Only i  
b. Only ii  
c. i & ii  
d. i & iii  

The binding energy for a cooper pair is

a. $10^{-2}$ eV  
b. $10^{-4}$ eV  
c. $10^{-6}$ eV  
d. $10^{-8}$ eV  

(Ans: b)

There are three important lengths which enter the theory of superconductivity except

a. London penetration length  
b. Intrinsic coherence length  
c. Normal electron mean free length  
d. Mean path length
The magnetic lines of force cannot penetrate the body of a superconductor, a phenomenon is known as 

a. Isotopic effect 
b. BCS theory 
c. Meissner effect 
d. London theory 

(Ans: c)

Which of the following conductor has highest critical temperature?

a. Aluminium 
b. Zinc 
c. Molybdenium 
d. Tin 

(Ans: d)
1. A charge of 240 C is transferred in 2 minutes. The current flowing is:
   a. 120 A  b. 480 A  c. 2 A  d. 8 A

2. One kWh of electrical energy equals
   a. 3600 J  b. 860 kcal  c. 3600 W  d. 4186 J

3. A 10Ω resistor is connected in parallel with a 15Ω resistor and the combination in series with a 12Ω resistor. The equivalent resistance of the circuit is
   a. 37Ω  b. 18Ω  c. 27Ω  d. 4Ω

4. The total flux in the core of an electrical machine is 20mWb and its flux density is 1T. The cross-sectional area of the core is:
   a. 0.05 m²  b. 50 m²  c. 20 m²  d. 0.02 m²

5. The root mean square value of resultant current in a wire carries simultaneously a direct current of 10A, and a sinusoidal alternating current of peak value of 10 A.
   a. 14.4  b. 7.07  c. 11.4  d. 12.2

6. One 200 V, 100 W bulb is connected in series with primary of a 200 V, 10 kVA transformer. If its secondary is left 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

7. A network with b branches, n nodes, and l independent loops will satisfy which of the following equations
   a. b=l+n+1  b. b=n-l+1  c. b=l+n-1  d. b=l-n-1

8. The losses occurring in a transformer when it is operating at its maximum efficiency are 2000 W. The total copper losses at this load are
   a. 2000 W  b. 1000 W  c. 1500 W  d. 800 W

9. A salient pole machine is used for
   a. Low speed applications in Hydro plants  b. High speed applications in Hydro plants
   c. Low speed applications in thermal plants  d. High speed applications in thermal plants

10. If a three phase, 8-pole, 50 Hz induction motor runs at a speed of 735 rpm then the slip is
    a. 0.02  b. 0.03  c. 0.04  d. 0.05