MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA
Ph.D. Entrance Examination of ELECTRICAL ENGINEERING

Q1. Which of the following function (z), of the complex variable z, is not analytic at all the points of the complex plane?
a) (z) = z 2
b) (z) = *e* z
c) (z) = sin z
d) (z) = log z

Q2. A function which is analytic everywhere in a complex plane is known as
a) Harmonic function
b) differentiable function
c) regular function
d) entire function

Q3 The number of arbitrary constants in the particular solution of a differential equation of third order is:
a) 3
b) 2
c) 1
d) 0

Q4 An electromagnetic wave consists of:
a) Electric fields only
b) Magnetic fields only
c) Both electric and magnetic fields
d) Gravitational fields

Q5 The law that the induced e.m.f. and current always oppose the cause producing them is due to
a) Faraday
b) Lenz
c) Newton
d) Coulomb

Q6. Which of the following cannot be computed using the Biot Savart law?
a) Magnetic field intensity
b) Magnetic flux density
c) Electric field intensity
d) Permeability

Q7. Find the Lorentz force of a charge 2.5C having an electric field of 5 units and magnetic field of 7.25 units with a velocity 1.5m/s.
a) 39.68
b) 68.39
c) 86.93
d) 93.68

Q8. What is the time-domain representation of a Laplace domain signal?
a) Magnitude and phase
b) Frequency and amplitude
c) Time and amplitude
d) Time and Laplace domain

Q9.Which type/s of discrete-time system do/does not exhibit the necessity of any feedback?

a) Recursive Systems

b) Non-recursive Systems

c) Both a & b

d) None of the above

Q10.What is/are the crucial purposes of using the Fourier Transform while analyzing any elementary signals at different frequencies?

a) Transformation from time domain to frequency domain

b) Plotting of amplitude & phase spectrum

c) Both a & b

d) None of the above

Q 11. A salient –pole alternator develops a maximum power of 1.5 pu under steady state conditions. The amplitude of power developed under transient conditions and the corresponding load angle are, respectively

a) 1.5 pu, $\delta = 90^{o}$

b) 2.0pu, $\delta > 90^{o}$

c) 3.8, $\delta > 90^{o}$

d) 3.8, $\delta < 90^{o}$.

Q12.In asynchronous machine connected to an infinite bus, if rotor speed departs from synchronous speed, then

a) Damping power comes into play

b) Synchronizing power comes into play

c) Both (a) and (b)

d) None of these.

Q13 Two alternators A and B , running in parallel , supply power P to a resistive load. The two alternators share equal powers. For the same load power P, driving torque of alternator A is increased while that of B is suitably adjusted. With this,

a) A supplies reactive power to load

b) B absorbs reactive power from load

c) B delivers reactive power to A

d) As load is resistive , no reactive power flow exists.

Q14 For successful parallel operation of two single-phase transformers, the essential condition is that their

a) percentage impedances should be equal

b) turns ratios should be exactly equal

c) polarities must be properly connected

d) kVA ratings should be equal.

Q15. Transformer zero voltage regulation occurs at

a) unity p.f.

b) leading p.f.

c) lagging p.f.

d) zero p.f. leading.

Q16. One transformer has leakage impedance of $1+j\,4\Omega$ and $3+j\,11\Omega$ for its primary and secondary windings respectively. This transformer has

a) h.v. primary

b) medium voltage primary

c) l.v. primary

d) none of these.

Q17. In d.c. machines, the space waveform of the air- gap flux distribution affects
a) torque but not the voltage
b) voltage but not the torque
c) neither the voltage nor the torque
d) both the torque and voltage

Q18. A d.c. shunt motor is started at no load and its rated speed is noted as 1000 rpm. After 5 hours of continuous no load running, its speed would
(a) become more than 1000 rpm
(b) become less than 1000 rpm
(c) remain 1000 rpm
(d) reduce to 800 rpm.

Q19. A 3-phase synchronous motor is operating at zero p.f. lagging with respect to the excitation voltage. The armature reaction mmf produced by the armature currents is
(a) magnetizing in nature
(b) demagnetizing in nature
(c) cross-magnetizing in nature
(d) partly demagnetizing and partly cross-magnetizing in nature.

Q20. A 3-phase induction motor runs at 980 r.p.m. at no load. If its squirrel-cage rotor is replaced by iron cylinder, then its no-load speed would be
a) zero
b) 900 rpm
c) below 980 rpm
d) 490 rpm

Q21. A 3-phase induction motor should have small air-gap length so that it has
a) more starting torque
b) more pull-out torque
c) better p.f.
d) improved efficiency.

Q22 Transmission efficiency increases as
a) voltage and power factor both increase
b) voltage and power factor both decrease
c) voltage increases but power factor decreases
d) voltage decreases but power factor increases

Q23 We can control the P and/or Q transfers in the transmission line varying
a) sending end voltage
b) receiving end voltage
c) load angle
d) all of these

Q24 Choose the most feasible method for raising the power to be delivered at the reactive end.
(i)Reducing the line reactance (ii)Raising the voltage level
a) (i)
b) (ii)
c) (i), (ii)
d) None of the methods

Q25. Which of the following statements is correct about Per unit system:

a) Transformer connections affect the per unit values

b) Referring electrical quantities from one side of the transformer to the other side can be avoided

c) Very often per unit impedances expand to very narrow range

d) None of these

Q26 Which among the following is / are used for the solution of load flow using FDLF method?

a) $[(\Delta P) / E] = [B'] [\Delta \delta]$

b) $[(\Delta Q) / E] = [B''] [\Delta E]$

c) $[(\Delta P) / E] = [B''] [\Delta \delta]$

d) Both (a) and (b)

e) All of these

Q27 Phase shift of symmetrical components happens in which among the following?

a) Delta - delta

b) Star – delta

c) Delta – star

d) Both (b) and (c)

e) All of these

Q28 Which among the following buses constitute the maximum number in a power system?

a) Slack bus

b) PV bus

c) PQ bus

d) None of these

Q29 In a load flow study a PV bus is treated as a PQ bus when

a) Voltage limit is violated

b) Active power limit is violated

c) Phase angle is high

d) Reactive power limit is violated

Q30 Transfer function of a system is used to calculate which of the following ?

a) The order of the system

b) The time constant

c) The output for any given input

d) The steady state gain

Q 31 Which of the following is exhibited by Root locus diagrams ?

a) The poles of the transfer function for a set of parameter values

b) The bandwidth of the system

c) The response of a system to a step input

d) The frequency response of a system

e) None of the above

Q 32 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) Either (b) or (c)

33.Nyquist plot is a frequency domain stability analysis of the linear control systems. If it passes through the critical point, the system will be

a) stable
b) Marginally Stable
c) Unstable
d) None of these

Q 34What is the effect of capacitance on wattmeter reading?

a) opposite to that of resistance
b) aiding the capacitance
c) aiding the inductance
d) opposite to that of inductance

Q 35 Which of the following oscilloscope is used in a digital storage oscilloscope?

a) dual trace
b) conventional
c) multi trace
d) modern

Q 36Which oscillator comes under harmonic oscillator?

a) Crystal oscillator
b) RC and LC oscillator
c) Both a and b
d) None of the above

Q37 In which one of the following clippers will have a voltage source?

a) Positive clipper
b) Unbiased clipper
c) Biased clipper
d) None of the above

Q 38. If the doping levels of the semiconductor is increased, then the width of the depletion layer

a) increases
b) decreases
c) is unchanged
d) keeps oscillating

Q 39Which among the following devices is the most suited for high frequency applications?

a) BJT
b) IGBT
c) MOSFET
d) SCR

Q 40 A 3-phase full converter feeds power to an R load of 10 Ω. For a firing angle delay of 30° the load takes 5 kW. An inductor of large value is also connected to the load to make the current ripple free. Find the value of per phase input voltage.

a) 133 V
b) $230/\sqrt{3}$ V
c) $191/\sqrt{3}$ V
d) $298/\sqrt{3}$ V

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Question No	Answer	Question No	Answer
1	d	21	c
2	d	22	a
3	d	23	d
4	c	24	a
5	b	25	b
6	c	26	d
7	a	27	d
8	c	28	c
9	b	29	d
10	c	30	c
11	c	31	a
12	c	32	a
13	c	33	b
14	c	34	d
15	b	35	b
16	c	36	c
17	c	37	c
18	a	38	b
19	a	39	c
20	c	40	c