

ECIL Previous Paper - Electronics and Electrical

1. When a inductive coil connected to a 200 V, 50Hz ac supply with 10A current flowing through it dissipates 1000 watts then which of the following will have least value in ohms-

- a.) Resistance
- b.) Reactance
- c.) Impedance
- d.) None

2. Oscillator crystal are made of ?

- a.) Silicon
- b.) Germanium
- c.) Quartz
- d.) None

3. For small size, high frequency coils, the most common core material is-

- a.) Air
- b.) Ferrite
- c.) Powdered iron
- d.) Steel

4. If we have a parallel plate capacitor of plate area A and plate separation t and having a capacity C and a metallic plate r of area A and of negligible thickness is introduced in the capacitor at a distance from either of the two plates as shown in the given figure then the capacity of the capacitor will become ?

- a.)
- b.) C
- c.) $2C$
- d.) $4C$

5. A superconductor is a ?

- a.) A material showing perfect conductivity and Meissner effect below a critical temperature
- b.) A conductor having zero resistance
- c.) A perfect conductor with highest diamagnetic susceptibility
- d.) A perfect conductor which becomes resistance when the current density through it exceeds a critical value

6. When an inductor tunes at 200 KHz with 624 pF capacitor and at 600 KHz with 60.4 pF capacitor then the self capacitance of the inductor would be ?

- a.) 8.05 pF
- b.) 10.05 pF
- c.) 16.01 pF
- d.) 20.01 pF

7. Sparking occur when a load is switched off because the circuit has high ?

- a.) Inductance
- b.) Capacitance
- c.) Resistance
- d.) None

8. Sparking between contacts can be reduced by inserting a ?

- a.) Resistance in the line
- b.) Capacitor in series with contacts
- c.) Capacitor in parallel with contacts
- d.) None

9. RF amplifier of an A.M. receiver is normally biased in ?

- a.) Class A
- b.) Class B
- c.) Class C

d.) None

10. The value of gate voltage for the operation of enhancement of only N channel MOSFET has to be ?

- a.) High positive
- b.) High negative
- c.) Low positive
- d.) Zero

11. The input gate current of a FET is ?

- a.) a few microamperes
- b.) negligibly small
- c.) a few milliamperes
- d.) a few amperes

12. In the following fig. with $R = 30k$, the value of current through 2 K resistor is ?

- a.) 25 mA
- b.) 40 mA
- c.) 25/16 mA
- d.) 10 mA

13. A step recovery diode ?

- a.) has an extremely short recovery time
- b.) conducts equally well in both directions
- c.) is mainly used as a harmonic generator
- d.) is an ideal rectifier of high frequency signals

14. In order to get maximum undistorted output signal from CE amplifier with $V_{CC} = 10V$, the value of $V_{CE(Q)}$ should be approximately-

- a.) 0.1V
- b.) 5V
- c.) 10V
- d.) V

15. In a FET the electrode, which corresponds to collector in bipolar transistor, is ?

- a.) source
- b.) drain
- c.) gate
- d.) none

16. The device which acts like an NPN and a PNP transistor connected base to base and emitter to collector is ?

- a.) Triac
- b.) UJT
- c.) Diac
- d.) SCR

17. A typical optical fibre has ?

- a.) High refractive index core and low refractive index cladding
- b.) Low refractive index core and high refractive index cladding
- c.) Both a and b
- d.) None

18. In the following figure circuit diagram of an op-amp based is shown. The ratio is equal to ?

- a.) 9
- b.) 11
- c.) 10
- d.) 21

19. When a loud speaker is connected across the terminals A and B of the network shown in the fig. then its

impedance to obtain maximum power dissipation in it will be ?

- a.) $3 + j1$
- b.) $3 + j9$
- c.) $7.5 + j 2.5$
- d.) $7.5 + j 2.5$

20. In the lattice network, the value of R for the maximum power transfer to the load ?

- a.) 5
- b.) 6.5
- c.) 8
- d.) 9

21. For a lossy transmission line short circuited at the receiving end, the input impedance is given by (Z_0 is the characteristic impedance, γ is the propagation constant and l is the length of the line-

- a.) $Z_0 \cot \gamma l$
- b.) $Z_0 \cot \gamma$
- c.) $Z_0 \tan \gamma l$
- d.) $Z_0 \tan \gamma$

22. The approximate thickness of the radome wall should be ?

- a.) l
- b.) $l/4$
- c.) $l/2$
- d.) $l/8$

23. A relatively permanent information is stored in

- a.) ROM
- b.) RAM
- c.) PROM
- d.) Volatile memory

24. The rise time of the RC network shown in the given figure is approximately equal to ?

- a.) RC
- b.) $2RC$
- c.) $4RC$
- d.) $4RC$

25. If in the network shown in the fig. initially a steady state is attained by closing the switch 's' and then if the switch is opened at $t = 0$, then the current $i(t)$ through the inductor will be ?

- a.) $\cos 50t$ A
- b.) 2 A
- c.) $2\cos 100t$ A
- d.) $2\sin 50t$ A

26. When the π network of figure I and T-network of figure II are equivalent then the values of R_1 , R_2 and R_3 will be respectively ?

- a.) 9W, 6W and 6W
- b.) 6W, 6W and 9W
- c.) 9W, 6W and 9W
- d.) 6W, 9W and 6W

27. When the impedance matrices of a two port networks are given by Z_{11} and Z_{22} , then if these two networks are connected in series then the impedance matrix of the resulting two-port network will be ?

28. Joule/coulomb is the unit of -

- a.) Electric field potential
- b.) Potential
- c.) Charge
- d.) None of the above

29. The electric field line and equipotential lines-

- a.) Are parallel to each other

- b.) Are one and same
- c.) Cut each other orthogonally
- d.) Can be inclined to each other at any angle

30. For a lossy transmission line short circuited at the receiving end, the input impedance is given by (When Z_0 is the characteristic impedance γ is the propagation constant and L is the length of the line)

31. When two equal positive point charges are placed along X-axis at X_1 and $-X_1$ respectively then the electric field vector at a point P on the positive Y-axis will be directed-
- a.) In the +x direction
 - b.) In the -x direction
 - c.) In the +y direction
 - d.) In the -y direction

32. The directions of \vec{E} and \vec{H} in TEM mode transmission line with respect to the direction of propagation are-

- a.) Both \vec{E} and \vec{H} are transverse to the direction of propagation
- b.) \vec{E} is and \vec{H} are transverse and \vec{H} has a component in the direction of propagation
- c.) \vec{E} is entirely transverse and \vec{H} has a component in the direction of propagation
- d.) \vec{E} is entirely transverse and \vec{H} has a component in the direction of propagation

33. The lowest TM mode in a rectangular waveguide of cross section $a \times b$ with $a > b$ will be-

- a.) TM₀₁
- b.) TE₁₀
- c.) TM₁₁₂
- d.) TE₁₁

34. When a transmitter in a free space radiates a mean power of P watts uniformly in all directions then at a distance d sufficiently far from the source in plane the electric field E should be related to P and d as ?

35. When a dipole antenna was radiating with some excitation in free space radiating a certain amount of the power P if then this antenna is immersed in a lake where water is non-dissipative but has a dielectric constant of 81, then the radiated power with the same excitation will be

- a.) Decrease to finite non-zero value
- b.) Remain the same
- c.) Increase
- d.) Decrease to zero

36. When a $(75 - j40)\Omega$ load is connected to a coaxial line of $Z_0 = 75 \Omega$ at 6MHz then the load matching on the line can be accomplished by connecting-

- a.) A short circuited stub at the load
- b.) An inductance at the load
- c.) A short circuited stub at a specific distance from the load
- d.) none of the above

37. As compared to analog multimeters, digital multimeters are ?

- a.) less accurate
- b.) more accurate
- c.) equally accurate
- d.) none.

38. When a signal of 10 mV at 75 MHz is to be measured then which of the following instruments can be used ?

- a.) VTVM
- b.) Cathode ray oscilloscope
- c.) Moving iron voltmeter
- d.) Digital multimeter

39. Which of the following statement is true about two wattmeter method for power measurement in three phase current ?

- a.) power can be measured using two wattmeter method only for star connected three phase circuits.
- b.) when two meter show identical readings, in the power factor is 0.5.
- c.) when power factor is unit, one of the wattmeter reads zero
- d.) when the reading of the two wattmeters are equal but of opposite sign, then the power factor is zero ?

40. When a capacitance transducer has two plates of area 5cm^2 each, separated by an air gap of 2mm then the displacement sensitivity in pf/cm due to gap change would be ?

- a.) 11.1
- b.) 44.2
- c.) 52.3
- d.) 66.3

41. The Q of a radio coil ?

- a.) is independent of frequency
- b.) increases monotonically as frequency increases
- c.) decreases monotonically as frequency increases
- d.) increases upto a certain frequency and then decreases beyond that frequency

42. When a generator of internal impedance and operating at 1GHz feeds a load via a coaxial line of characteristic impedance $50\ \Omega$ then the voltage wave ratio on the feed line is ?

- a.) 0.5
- b.) 1.5
- c.) 2.5
- d.) 1.75

43. The coding system typically used in digital telemetry is ?

- a.) PPM (pulse position modulation)
- b.) PAM (pulse amplitude modulation)
- c.) PCM (pulse code modulation)
- d.) PDM (pulse duration modulation)

44. Radiation pyrometers are used for the measurement of temperature in the range of ?

- a.) -2000C to 5000C
- b.) 00C to 5000C
- c.) 5000C to 12000C
- d.) 12000C to 25000C

45. In the given figure band structure is shown. It is of ?

- a.) Gallium Arsenide (GaAs)
- b.) Silicon (Si)
- c.) Copper (Cu)
- d.) Germanium (Ge)

46. When anode is positive with respect to cathode in an SCR, the numbers of blocked p-n junction is ?

- a.) 1
- b.) 2
- c.) 3
- d.) 4

47. The circuit symbol for a GTO is

48. The transfer function of an amplifier is given by The high 3-dB frequency of the amplifier will approximately

- a.) $5850\ \text{KHz}$
- b.) $585\ \text{KHz}$
- c.) $5850\ \text{Hz}$
- d.) $585\ \text{Hz}$

49. In comparison to full wave rectifier with two diodes the four diode bridge rectifier has the dominant advantage

of -

- a.) Higher current carrying
- b.) Lower ripple factor
- c.) Higher efficiency
- d.) Lower peak increase voltage require

50 Power output increase in a class-c amplifier-

- a.) If the conduction angle decrease
- b.) If the conduction angle increase
- c.) Are not governed by the conduction angle
- d.) None of the above

51 A transistor with $h_{ie} = 1.5 \text{ k}$ and $h_{fe} = 75$ is used in an emitter follower circuit where R_1 and R_2 are used for normal biasing . Approximate value of its current amplification is-

- a.) 75
- b.) 76
- c.) $75/76$
- d.) -75

52 Amplifier of class B has high theoretical efficiency of 78.5 percent because-

- a.) It is biased almost to saturation
- b.) Its quiescent current is low
- c.) Its output is an exact replica of its input
- d.) It is biased well below cut off

53 The coupling that produces minimum interference with frequency response is-

- a.) Direct coupling
- b.) Impedance coupling
- c.) R C coupling
- d.) Transformer coupling

54 In the circuit shown in the given figure R_f provides

- a.) Current series feedback
- b.) Current shunt feedback
- c.) Voltage series feedback
- d.) Voltage shunt feedback

55 Data in the serial form can be converted into parallel form by using ?

- a.) PISO shift register
- b.) SOIP shift register
- c.) SIPO shift register
- d.) POIS shift register