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I have attended Scientist Entry Test on 7th Sep. Hereby I am submitting paper for Electronics and
Communication branch…….. Hope it helps future aspirants……..
Section- A
1.The current I in the given network.
a) 1A b) 3A c) 5A d) 7A

2.For the Delta- Wye transformation in given figure, the value of the resistance R is.
a) 1/3 ohms b) 2/3 ohms c) 3/2 ohms d) 3 ohms

3.In the given network, the Thevenin's equivalent as seen by the load resistance Rl is
a) V=10 V, R= 2ohms b) V=10V, R=3 ohms c) V=15V, R= 2ohms d) V=15V, R=3 ohms

4.The current I in a series R-L circuit with R=10 ohms and L=20mH is given by i=2sin500t A. If v is
the voltage across the R-L combination then i
a) lags v by 45 degree b) is in-phase with v c) leads v by 45 d) lags v by 90

5.In thr given network, the mesh current I and the input impedance seen by the 50 V source,
respectively, are
a) 125/13 A and 11/8 ohms b) 150/13 A and 13/8 ohms c) 150/13 A and 11/8 ohms d) 125/13 A
and 13/8 ohms

6.A voltage sourcehaving a source impedance Z = R + jX can deliver maximum Average power to a load impedance Z, when a) Z = R + jX b) Z = R c) Z = jX d) Z = R –jX

7.In the given circuit, the switch S is closed at t=0. Assuming that there is no initial Charge in the capacitor, the current i(t) for t>0 is a) V/R e^ (-2t/RC) b) V/R e^ (-t/RC) c) V/2R e^ (-2t/RC) d) V/2R e^ (-t/RC)

8.For the circuit in given figure, if e(t) is a ramp signal, the steady state value of the Output voltage v(t) is a) 0 b) LC c) R/L d) RC

9.For the series RLC circuit in given figure, if w=1000 rad/sec, then the current I (in Amperes) is a) 2 ∟-15 b) 2 ∟15 c) √2∟-15 d) √2∟15

10.The Y-parameter matrix (mA/V) of the two-port given network is a) [2 -1 -1 2] b) [2 1 -1 2] c) [1 -2 -1 2] d) [2 1 1 2]

11.The maximum number of trees of the given graph is a) 16 b) 25 c) 100 d) 125

12.Given figure shows a graph and one of its trees. Corresponding to the tree, the group of branches that CAN NOT constitute a fundamental cut set is a) 1,2,3 b) 1,4,6,8,3 c) 5,6,8,3 d) 4,6,7,3 13.The Y-parameter matrix of a network is given by Y=[1 1 -1 1] A/V. The Z11 parameter of the same network is a) ½ ohms b) 1/√2 ohms c) 1 ohms d) 2 ohms

14.For the given circuit, the switch was kept closed for a long time before opening it at t=0. The voltage v(0+) is a) -10 V b) -1 V c) 0V d) 10 V

15.The input impedance of a series RLC circuit operating at frequency W=√2w, w being the resonant frequency, is a) R-j(wL/√2) ohms b) R+j(wL/√2) ohms c) R-j√2wL ohms d) R-j√2wL ohms

16.The threshold voltage V is negative for a) an n-channel enhancement MOSFET b) an n-channel depletion MOSFET c) an p-channel depletion MOSFET d) an p-channel JFET

17.At a given temperature, a semiconductor with intrinsic carrier concentration ni= 10 ^ 16 / m^3 is doped with a donor dopant of concentration Nd = 10 ^ 26 /m^3. Temperature remaining the same, the hole concentration in the doped semiconductor

is a) 10 ^ 26 /m^3 b) 10 ^ 16 /m^3 c) 10 ^ 14 /m^3 d) 10 ^ 6 /m^3}

18.At room temperature, the diffusion and drift constants for holes in a P-type semiconductor were measured to be Dp = 10 cm^2/s and μp = 1200 cm^2/V-s, respectively. If the diffusion constant of electrons in an N-type semiconductor at the same temperature is Dn = 20 cm^2/s, the drift constant for electrons in it is a) μn = 2400 cm^2/V-s b) μn = 1200 cm^2/V-s c) μn = 1000 cm^2/V-s d) μn = 600 cm^2/V-s

19.A common LED is made up of a) intrinsic semiconductor b) direct semiconductor c) degenerate semiconductor d) indirect semiconductor

20.When operating as a voltage regulator, the breakdown in a Zener diode occurs due to the a) tunneling effect b) avalanche breakdown c) impact ionization d) excess heating of the junction.

21.If the common base DC current gain of a BJT is 0.98, its common emitter DC current gain is a) 51 b) 49 c) 1 d) 0.02

22.Negative resistance characteristics is exhibited by a a) Zener diode b) Schottky diode c) photo diode d) Tunnel diode

23.Let En and Ep, respectively, represent the effective Fermi levels for electrons and holes during current conduction in a semiconductor. For lasing to occur in a P-N junction of band-gap energy 1.2 eV, (En – Ep) should be a) greater than 1.2eV b) less than 1.2eV c) equal to 1.1eV d) equal to 0.7eV

24.In a P-well fabrication process, the substrate is a) N-type semiconductor and is used to build P-channel MOSFET b) P-type semiconductor and is used to build P-channel MOSFET c) N-type semiconductor and is used to build N-channel MOSFET

d) P-type semiconductor and is used to build N-channel MOSFET

25.In a MOS capacitor with n-type silicon substrate, the Fermi potential ¢ = -0.41 V and the flat-band
voltage Vfb = 0V. The value of the threshold voltage Vt is
a) -0.82 V b) -0.41 V c) 0.41 V d) 0.82

Refer given figure for question 26 and 27. Assume D1 and D2 to be ideal diodes.
26.Which one of the following statements is true?
a) Both D1 and D2 are ON.
b) Both D1 and D2 are OFF.
c) D1 is ON and D2 is OFF.
d) D2 is ON and D1 is OFF.

27.Values of Vo and I, respectively, are
a) 2V and 1.1 mA b) 0V and 0 mA c) -2V and 0.7 mA d) 4V and 1.3 mA

28.In a BJT CASCODE pair, a
a) common emitter follows a common base
b) common base follows a common collector
c) common collector follows a common base
d) common base follows a common emitter

29.Inside a 741 op-amp, the last functional block is a
a) differential amplifier b) level shifter c) class-A power amplifier d) class-AB power amplifier

30.For the MOSFET in the given circuit, the threshold voltage Vt = 0.5V, the process parameter KP =
150 μA/V^2 and W/L = 10. The values of Vd and Id, respectively, are
a) Vd = 4.5 V and Id = 1 mA
b) Vd = 4.5 V and Id = 0.5 mA
c) Vd = 4.8 V and Id = 0.4 mA
d) Vd = 6 V and Id = 0 mA

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