Power Electronics IAT1

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1. To make a signal diode suitable for high current & high voltage carrying   1 point
applications with minimum losses, _____ [CO1,L2] *

- ◉ a) a lightly doped n layer is grown between the two p & n layers
- ○ b) a heavily doped n layer is grown between the two p & n layers
- ○ c) a lightly doped p layer is grown between the two p & n layers
- ○ d) a heavily doped p layer is grown between the two p & n layers

2. A diode is said to be reversed biased when the [CO1,L2] *   1 point

- ● a) cathode is positive with respect to the anode
- ○ b) anode is positive with respect to the cathode
- ○ c) cathode is negative with respect to the anode
- ○ d) both cathode & anode are negative

3. The peak inverse current IRR for a power diode is given by the expression   1 point
[CO1,L2] *

- ○ a) IRR =t + di/dt
- ○ b) IRR=t * log i
- ● c) IRR=t * di/dt
- ○ d) IRR=t * ∫ t*i dt

4. A p-type semiconductor material is doped with _____ impurities   1 point
whereas a n-type semiconductor material is doped with _____
impurities [CO1,L2] *

- ● a) acceptor, donor
- ○ b) acceptor, acceptor
- ○ c) donor, donor
- ○ d) donor, acceptor

5. When a physical contact between a p-region & n-region is established   1 point
which of the following is most likely to take place? [CO1,L2] *

- ○ a) Electrons from N-region diffuse to P-region
- ○ b) Holes from P-region diffuse to N-region
- ● c) Both of the above mentioned statements are true
- ○ d) Nothing will happen

6. Even after the forward current reduces to zero value, a practical diode   1 point
continues to conduct in the reverse direction for a while due to the
[CO1,L2] *

○ a) resistance of the diode

○ b) high junction temperature

◉ c) stored charges in the depletion region

○ d) none of the mentioned

7. For a p-n junction diode, the peak inverse current & the reverse recovery   1 point
time are dependent on [CO1,L2] *

○ a) inverse voltage

○ b) forward Voltage

◉ c) di/dt

○ d) all of the above mentioned

8. When the p-n junction diode is forward biased, the width of the   1 point
depletion region _____ [CO1,L2] *

○ a) increases

◉ b) decreases

○ c) remains Constant

○ d) increases than Decreases

9. In the equilibrium state, the barrier potential across a unbiased silicon diode is _____ [CO1,L2] *

1 point

- ○ a) 0.3 V
- ◉ b) 0.7 V
- ○ c) 1.3 V
- ○ d) 0 V

10. Chopper is device which is used to convert [CO1,L2] *

1 point

- ○ a) variable DC to fixed DC
- ○ b) fixed DC to AC
- ◉ c) Fixed DC to variable DC
- ○ d) AC to AC

11. AC Voltage controller is device which converts _____ [CO1,L2] *

1 point

- ○ a) dc power to dc power
- ○ b) dc power to ac power
- ◉ c) ac power to ac power
- ○ d) ac power to dc power

12. The reverse recovery time of a diode is trr = 3 microseconds, the rate of fall of diode current is di/dt is 30A/microseconds. Determine storage charge QRR. [CO1,L3] *

2 points

- ◉ 135 micro coulomb
- ○ 145 micro coulomb
- ○ 125 micro coulomb
- ○ 115 micro coulomb

13. The reverse recovery time of a diode is trr = 5 microseconds, the rate of fall of diode current is di/dt is 50A/microseconds. determine peak reverse current IRR in Ampere. [CO1,L3] *   2 points

○ 150

◉ 250

○ 350

○ 200

14. In which type of diode metal-semiconductor junction is formed [CO1,L2] *   1 point

○ General purpose diode

○ Fast recovery diode

◉ Schottky diode

○ Silicon carbide diode

15. Which diode has Ultrafast switching behaviour [CO1,L2] *   1 point

○ General purpose diode

○ Fast recovery diode

○ Schottky diode

◉ Silicon carbide diode

16. A _____ is basically a diode connected across the inductive load   1 point
terminals to prevent the development of high voltage across the switch.
[CO1,L2] *

- ● freewheeling diode

- ○ Fast Recovery diode

- ○ General purpose diode

- ○ SiC diode

17. The forward voltage drop of a power diode is VD = 1.2V, Is = 0.0217   2 points
micro ampere. Assuming that n=2 and VT = 25.7mv, find the diode current
ID [CO1,L3] *

- ● 300 A

- ○ 200 A

- ○ 400 A

- ○ 600 A

18. In ON state, when the ideal switch is on, it must have [CO1,L2] *   1 point

- ○ Low on state forward voltage drop

- ○ High voltage drop

- ○ Low Resistance

- ● Both a and c

19. The dv/dt of a device is limited by connecting_____ across the device   1 point
[CO1,L2] *

- ○ Series snubber

- ● Shunt snubber

20. Power converters introduce harmonics, because of [CO1,L2] *   1 point

○ Turn on

○ Turn off

◉ Frequent switching

○ Reverse bias

21. Diode is a [CO1,L2] *   1 point

○ Controlled device

◉ Uncontrolled device

○ Semi controlled device

22. The peak inverse voltage (PIV) is applied across a diode when it is [CO1,L2] *   1 point

○ Forward-biased

◉ Reversed-biased

○ On

○ OFF

23. For the single - phase, full-wave, uncontrolled rectifier with R load, the supply voltage is 230V, 50Hz, the load resistor is 25Ω.calculate: (a)The average value of the output voltage and current. [CO1,L3] *   2 points

○ 250V, 10 A

◉ 207V, 8.28A

○ 200V, 7A

○ 210V, 9A

24. Use Question No. 23 data and find (b)The rms value of the output voltage and current. [CO1,L3] *

2 points

- ⦿ 230V, 9.2A
- ◯ 210V, 8A
- ◯ 200V, 9A
- ◯ 230V, 7A

25. Use Question No. 23 data and find (c) The dc power consumed by the load (Pdc) and the average value of the ac power delivered to the load (Pac). [CO1,L3] *

2 points

- ◯ 2.116KW, 1.714KW
- ◯ 2KW, 3KW
- ⦿ 1.714KW, 2.116KW
- ◯ 2.434KW, 3.122KW

26. For single phase supply frequency of 50 Hz, ripple frequency in full wave rectifier is [CO1,L3] *

1 point

- ◯ 50Hz
- ◯ 25Hz
- ◯ 75Hz
- ⦿ 100Hz

27. For full-wave rectified sine wave, form factor is [CO1,L3] *   1 point

◉ 1.11

○ 2.22

○ 1

○ 2

28. For full-wave rectified sine wave, average value of output voltage is   1 point
[CO1,L3] *

○ 0.707Vm

◉ 0.6366Vm

○ 0.833Vm

○ 0.913Vm

29. For full-wave rectified sine wave, rms value of output current is   1 point
[CO1,L2] *

◉ 0.707Im

○ 0.6366Im

○ 0.833Im

○ 0.913Im

30. What is the ripple actor of Full wave Rectifier with center tapped   2 points
transformer? [CO1,L2] *

○ 40.5%

○ 50%

○ 55%

◉ 48.2%

31. Give the PIV of Full wave rectifier with center tapped transformer and   2 points
bridge rectifier. [CO1,L2] *

○ Vm, 2Vm

◉ 2Vm, Vm

○ Vm, Vm

○ 2Vm, 2Vm

32. Displacement factor is given by [CO1,L3] *   1 point

○ sinφ

◉ cosφ

○ tanφ

○ 1

33. In a DC source connected RL load through a switch, the values of R=10   2 points
ohm, L= 220µH and the load current is 100A. Find the energy stored
across the inductor. [CO1,L3] *

◉ 1.1J

○ 2.2J

○ 3.3J

○ 0

34. For the single - phase, full-wave center tapped transformer   2 points
uncontrolled rectifier with R load, the supply voltage is 220V, 50Hz, the
load resistor is 50Ω.calculate: (a)The average value of the output.
[CO1,L3]. *

○ 2.56A

○ 4.32A

◉ 3.96A

○ 5.12A

35. For the single - phase, full-wave bridge uncontrolled rectifier with R   2 points
load, the supply voltage is 220V, 50Hz, the load resistor is 50Ω.calculate:
(a)The rms value of the output voltage. [CO1,L3] *

◉ 220V

○ 110V

○ 440V

○ 230V

36. For the single - phase, full-wave bridge uncontrolled rectifier with R   2 points
load, the supply voltage is 220V, 50Hz, the load resistor is 50Ω.calculate
PIV. [CO1,L3] *

◉ 311V

○ 622V

○ 220V

○ 440V

36. For the single - phase, full-wave uncontrolled rectifier with center tapped transformer with R load, the supply voltage is 220V, 50Hz, the load resistor is 50Ω.calculate PIV. [CO1,L3] *

    2 points

- ○ 311V
- ● 622V
- ○ 220V
- ○ 440V

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