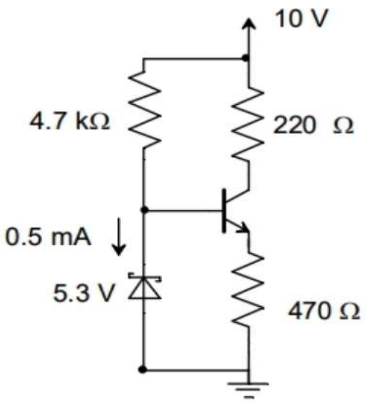
SNS COLLEGE OF TECHNOLOGY

COIMBATORE-35

DEPARTMENT OF EEE

ANALOG ELECTRONICS
GATE QUESTIONS

1. A transistor circuit is given below. The Zener diode breakdown voltage is 5.3 V as shown. Take base to emitter voltage drop to be 0.6 V. The value of the current gain β is _____.



a) 1.

b) 0.

c) 11.

d) 19.

(answer: d)

2.When a bipolar junction transistor is operating in the saturation mode, which one of the following statements is TRUE about the state of its collector-base (CB) and the base-emitter (BE) junctions ?

a) The CB junction is forward biased , and the BE junction is reverse biased.

b) The CB junction is reverse biased , and the BE junction is forward biased.

c) Both CB and BE junctions are forward biased.

d) Both CB and BE junctions are reverse biased.

(answer: c)

3.The maximum efficiency of a half-wave rectifier is _____.

a) 33.3%.

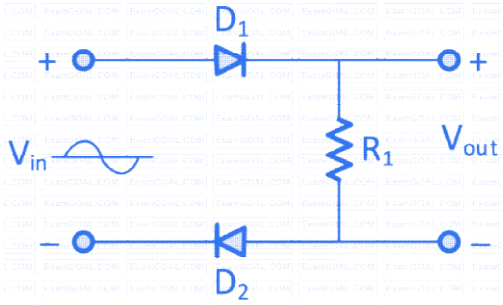
b) 40.6%.

c) 66.6%.

d) 72.9%.

(answer: b)

4. For the circuit shown below with ideal diodes, the output will be _____?



a) $V_{out} = V_{in}$ for $V_{in} > 0$.

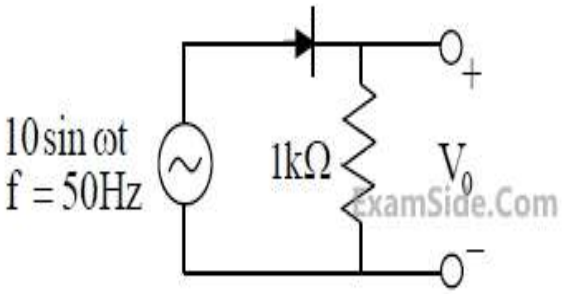
b) $V_{out} = V_{in}$ for $V_{in} < 0$.

c) $V_{out} = -V_{in}$ for $V_{in} > 0$.

d) $V_{out} = -V_{in}$ for $V_{in} < 0$.

(answer: a)

5.The output V_0 of the diode circuit shown in the figure is connected to an averaging DC voltmeter. The reading on the DC voltmeter in Volts, neglecting the voltage drop across the diode, is _____.



a) 3.18

b) 2.72

c) 3.89

d) 2.18

(answer: a)

6.The depletion region (or) space charge region (or) transition region in a semiconductor p–n junction diode has _____.

a) Electrons and holes.

b) Positive ions and electrons.

c) Positive and negative ions.

d) Negative ions and holes.

(answer: c)

7.The diode in the circuit given below has VON = 0.7V but is ideal otherwise. The current (in mA) in the 4kΩ resistor is _____.

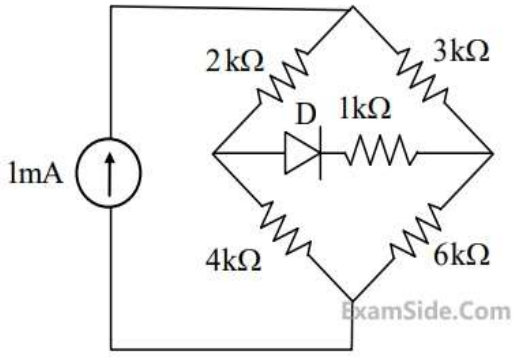
a) 0.2

b) 0.7

c) 0.1

d) 0.6

(answer: d)



8. Which circuit has been represented in the associated circuit diagram?

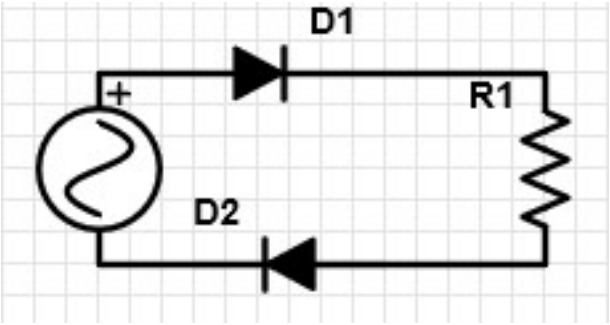
a) Half-wave rectifier.

b) Full-wave rectifier.

c) NOT Gate.

d) AND Gate

(answer: a)



9. In the given circuit, what will be the nature of the output waveform?

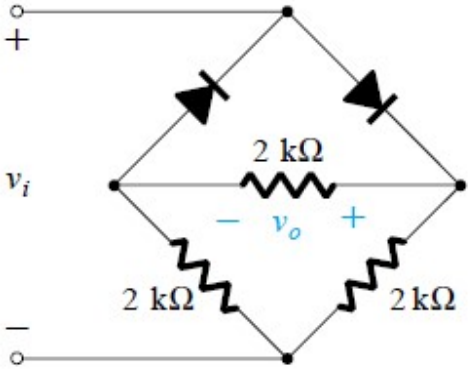
a) Half-wave Rectified.

b) Full-wave Rectified.

c) Sinusoidal.

d) DC.

(answer: b)



10.The figure shows a half-wave rectifier with a 475 μF filter capacitor. The load draws a constant current I0= 1 A from the rectifier. The figure also shows the input voltage Vi , the output voltage VC and the peak-to-peak voltage ripple on VC.The input voltage Vi is a triangle-wave with an amplitude of 10 V and a period of 1 ms.

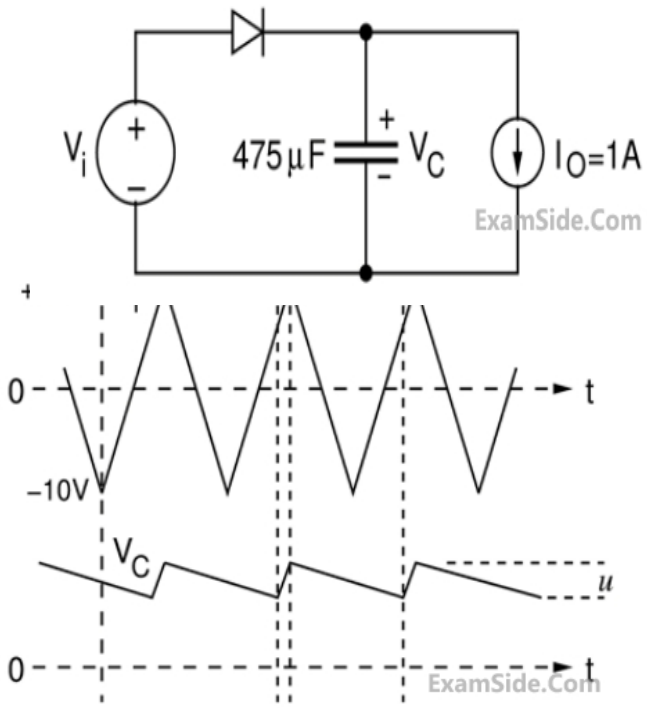
a) 3.5

b) 2.1

c) 1.8

d) 3.2

(answer: b)



IGBT

1.What does IGBT stand for?

a) Insulated Grounded Bipolar Transistor

b) Integrated Gate Bipolar Transistor

c) Isolated Gate Bridge Transistor

d) Inductive Gate Blocking Transistor

Answer: b) Integrated Gate Bipolar Transistor

2.Which of the following is not a key advantage of IGBTs?

a) High voltage capability

b) High switching speed

c) Low conduction losses

d) Low gate drive power

Answer:

b) High switching speed

3.IGBTs are commonly used in which type of applications?

a) Low-power digital circuits

b) Audio amplifiers

c) High-power switching applications

d) RF communication devices

Answer:

c) High-power switching applications

4.What is the primary function of the gate terminal in an IGBT?

a) To provide electrical isolation

b) To control the IGBT's switching action

c) To carry the main current

d) To dissipate heat

Answer:

b) To control the IGBT's switching action

5.Which semiconductor devices are combined to create an IGBT?

a) Diode and MOSFET

b) Diode and BJT

c) MOSFET and BJT

d) Diode and JFET

Answer:

c) MOSFET and BJT

6.What is the typical voltage rating of IGBTs used in high-power applications?

a) 5 volts

b) 12 volts

c) 48 volts

d) Hundreds of volts to several kV

Answer:

d) Hundreds of volts to several kV

7.Which region of operation does an IGBT primarily operate in during the "ON" state?

a) Cutoff

b) Saturation

c) Linear

d) Active

Answer: b) Saturation

8.What is the primary reason for using IGBTs over traditional BJTs (Bipolar Junction Transistors) in many applications?

a) Lower cost

b) Faster switching speed

c) Higher current-carrying capacity

d) Reduced conduction losses

Answer:

d) Reduced conduction losses

9.In which layer of the IGBT structure does most of the current flow during conduction?

a) P-type collector

b) N-type drift region

c) P-type gate region

d) N-type emitter

Answer:

b) N-type drift region

10.What is the most common voltage rating for the gate-source voltage in IGBTs?

a) 5V

b) 12V

c) 15V

d) 20V

Answer:

c) 15V