

PYQSide

JEE MAIN SEMICONDUCTOR ELECTRONICS — SPECIAL PURPOSE DIODES: ZENER DIODE, LED, PHOTODIODE, SOLAR CELL — PYQS

Max. Marks: 28

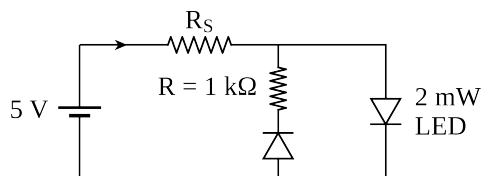
Questions: 7

Section A (MCQ)

Q.1 The maximum rated power of the LED is 2 mW and it is used in the circuit with input voltage of 5 V as shown in the figure below. The current through resistance R_S is 0.5 mA.

The minimum value of the resistance of R_S , to ensure that the LED is not damaged is _____ k Ω .

[JEE Main 2026 (Online) 6th April Morning Shift]



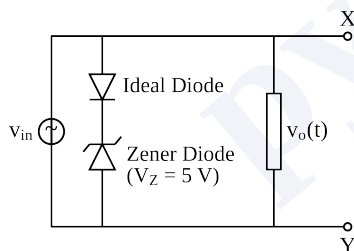
- (1) 6 (2) 2 (3) 4 (4) 5

Scan or tap for the full solution

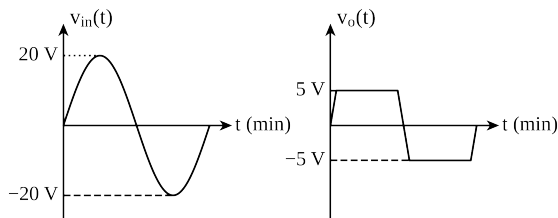


Q.2 For the given circuit (shown in part (A)) the time dependent input voltage $v_{in}(t)$ and corresponding output $v_o(t)$ are shown in part (B) and part (C), respectively. Identify the components that are used in the circuit between points X and Y.

[JEE Main 2026 (Online) 2nd April Morning Shift]



Part (A): Circuit Used



Part (B): Input Voltage

Part (C): Output Voltage

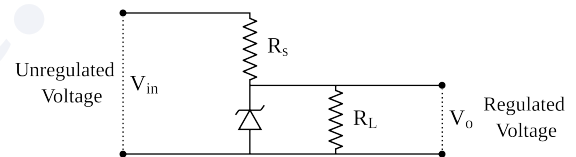
- (1) X Y
 (2) X Y
 (3) X Y
 (4) X Y

Scan or tap for the full solution



Q.3 The following diagram shows a Zener diode as a voltage regulator. The Zener diode is rated at $V_Z = 5$ V and the desired current in load is 5 mA. The unregulated voltage source can supply up to 25 V. Considering the Zener diode can withstand four times the load current, the value of resistor R_S (shown in circuit) should be _____ Ω .

[JEE Main 2026 (Online) 23rd January Morning Shift]



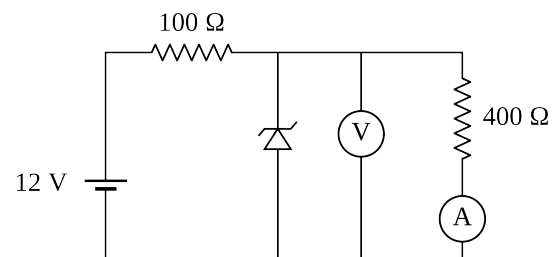
- (1) 100 (2) 10 (3) 1000 (4) 4000

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Q.4 In the following circuit, the reading of the ammeter will be
(Take Zener breakdown voltage = 4 V)

[JEE Main 2025 (Online) 7th April Morning Shift]



- (1) 60 mA (2) 80 mA (3) 10 mA (4) 24 mA

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Q.5 A zener diode with 5 V zener voltage is used to regulate an unregulated dc voltage input of 25 V. For a 400 Ω resistor connected in series, the zener current is found to be 4 times load current. The load current (I_L) and load resistance (R_L) are :

[JEE Main 2025 (Online) 2nd April Morning Shift]

(1) $I_L = 0.02 \text{ mA}$; $R_L = 250 \Omega$

(2) $I_L = 10 \text{ A}$; $R_L = 0.5 \Omega$

(3) $I_L = 10 \text{ mA}$; $R_L = 500 \Omega$

(4) $I_L = 20 \text{ mA}$; $R_L = 250 \Omega$

Scan or tap for the
full solution**Section B (Numerical)**

- Q.6** A diode has Zener voltage of 10 V and maximum power dissipation of 0.5 W, then the minimum resistance to be used in series with this diode for safety when it is connected to a 25 V power supply is _____ Ω .

[JEE Main 2026 (Online) 4th April Evening Shift]

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full solution

- Q.7** A voltage regulating circuit consisting of Zener diode, having breakdown voltage of 10 V and maximum power dissipation of 0.4 W, is operated at 15 V. The approximate value of protective resistance in this circuit is _____ Ω .

[JEE Main 2026 (Online) 24th January Morning Shift]

Scan or tap for the
full solution**ANSWER KEY****Section A (MCQ)**

Ques.	1	2	3	4	5						
Ans.	2	2	3	3	3						

Section B (Numerical)

Ques.	6	7						
Ans.	300	125						