

NEET SEMICONDUCTOR ELECTRONICS — CLASSIFICATION OF METALS, CONDUCTORS AND SEMICONDUCTORS (ENERGY BANDS) — PYQS

Max. Marks: 20
Questions: 5

Section A (MCQ) — 5 questions

Q.1 C and Si both have same lattice structure; having 4 bonding electrons in each. However, C is insulator whereas Si is intrinsic semiconductor. This is because [AIPMT 2012 (Prelims)]

- (1) In case of C the valence band is not completely filled at absolute zero temperature.
- (2) In case of C the conduction band is partly filled even at absolute zero temperature.
- (3) The four bonding electrons in the case of C lie in the second orbit, whereas in the case of Si they lie in the third.
- (4) The four bonding electrons in the case of C lie in the third orbit, whereas for Si they lie in the fourth orbit.

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Q.2 Which one of the following bonds produces a solid that reflects light in the visible region and whose electrical conductivity decreases with temperature and has high melting point? [AIPMT 2010 (Prelims)]

- (1) metallic bonding
- (2) van der Waals' bonding
- (3) ionic bonding
- (4) covalent bonding

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Q.3 Choose the only false statement from the following. [AIPMT 2005]

- (1) In conductors the valence and conduction bands overlap.
- (2) Substances with energy gap of the order of 10 eV are insulators.
- (3) The resistivity of a semiconductor increases with increase in temperature.
- (4) The conductivity of a semiconductor increases with increase in temperature.

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Q.4 Carbon, silicon and germanium atoms have four valence electrons each. Their valence and conduction bands are separated by energy band gaps represented by $(E_g)_C$, $(E_g)_{Si}$ and $(E_g)_{Ge}$ respectively. Which one of the following relationships is true in their case? [AIPMT 2005]

- (1) $(E_g)_C > (E_g)_{Si}$
- (2) $(E_g)_C < (E_g)_{Si}$
- (3) $(E_g)_C = (E_g)_{Si}$
- (4) $(E_g)_C < (E_g)_{Ge}$

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Q.5 In semiconductors at room temperature [AIPMT 2004]

- (1) the valence band is partially empty and the conduction band is partially filled
- (2) the valence band is completely filled and the conduction band is partially filled
- (3) the valence band is completely filled
- (4) the conduction band is completely empty

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ANSWER KEY

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