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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						