2008-2-10 Outline the pharmacological properties of an ideal agent for sedating patients undergoing mechanical ventilation in intensive care (50% of marks). Describe how propofol compares to the 'ideal' agent (50% of marks) (80% pass)

	Ideal Agent properties	Propofol Y/N
PC	long shelf life,	Y
	stable when drawn up and on exposure to light	Y
	water soluble	N
	no refridgeration	Y
	cheap,	Y
	mixes well with other agents in the central line lumen.	Y
	Bacteriostatic.	N
PK	Low volume of distribution,	N
	rapid onset	Y
	low protein binding	N
	inactive metabolites	Y
	non-toxic metabolites	Y
	rapid clearance (context-sensitive half-life),	Y
	clearance not affected by either renal or hepatic dysfunction.	N
	Little inter-individual variation in pharmacokinetics.	Y
	Availability of an antagonist.	N
PD	Known MOA	N
	Affects only CNS	N
	No excitatory or emergence phenomenon	N
	No pain on injection	N
	Safe on Intra-arterial injection	N
	No trigger for MH or porphyria	N
	Safe in pregnancy	Y
	Reliable dose – effect curve with little inter-individual variation in effect.	Y
	Anxiolysis.	Y
	Analgesic properties	N
	No effect on cardiovascular performance	N
	Does not depress respiratory drive	N
	Minimal side effects	N
	No incidences of allergy / anaphylaxis.	Y
	No idiosyncratic reactions.	N
	No tachyphylaxis.	Y

Propofol infusion syndrome

- Metabolic acidosis,
- Lipaemia,
- rhabdomyolysis
- Cardiac failure
- arrhythmias and death

When used at >4mg/Kg/Hr for more than 24 hours

Examiner Comments

Candidates can benefit by having a system by which they approach topics that involve a broad and general topic such as that of the pharmacology of a particular drug or ideal agent. A good answer included the following logical subheadings: Desirable pharmacology – long shelf life, stable when drawn up and on exposure to light, cheap, mixes well with other agents in the central line lumen. Bacteriostatic. Desirable pharmacokinetics – Low volume of distribution, rapid clearance (context-sensitive half-life), clearance not affected by either renal or hepatic dysfunction. Little inter-individual variation in pharmacokinetics. (Availability of an antagonist). Desirable pharmacodynamics – Affects only CNS. Reliable dose – effect curve with little inter-individual variation in effect. Anxiolysis. (Analgesic properties). No effect on cardiovascular performance. Does not depress respiratory drive. Minimal side effects – No incidences of allergy / anaphylaxis. No idiosyncratic reactions. No tachyphylaxis. As indicated, 50% of the marks were allocated to mentioning how well propofol reflects these properties. Mention of ‘propofol infusion syndrome’ characterised by cardiac failure which can occur when propofol is used at >4mg/Kg/Hr for more than 24 hours also attracted marks.