Engineering Chemistry (T2)

Marking Scheme:

Question No.		Difficulty level	Cognitive levels	Marking Scheme
Q.1)	a)	M	Comprehension	Figure – 2 marks, construction – 1 mark, working – 1 mark, calculation – 2 marks
	b)	M	Comprehension	Definition – 1mark, determination with example – 2 marks, effect of chemical structure – 2 marks, improvement of octane number- 1 mark
	c)	M	Application	O_2 required = 1.025 m^3 Air required = 4.881 m^3
Q.2)	a)	M	Comprehension	Definition – 1 mark,2 preparation reactions – 2 marks, 3 merits -1 ½ marks, 3 demerits – 1 ½ marks
	b)	M	Comprehension	Manufacturing of hydrogen by steam reforming of methane – 3 marks, steam reforming of coke-3 marks. (2 reactions with conditions -2 marks, removal of CO_2 – 1 mark)
	c)	M	Application	O_2 required = 2.62 kg Air required = 11.39 kg
Q.3)	a)	M	Comprehension	Definition- 1 mark, Five factors- 5 marks (1 mark each)
	b)	M	Comprehension	4 points- 4 marks
	c)	M	Comprehension	Definition-1 mark, preparation-1 mark, properties-1 mark, uses-1 mark
Q.4)	a)	M	Comprehension	6 points – 6 marks
	b)	M	Comprehension	Definition-1 mark, structure-1 mark, properties-1 mark, applications- 1 mark.
	c)	M	Comprehension	4 points- 4 marks

Received on
26/10/17
3:55 PM

Q.1) c) For $1\ m^3$ gas,

$CO = 0.15$

$CH_4 = 0.36$

$H_2 = 0.46$

O_2 required -

1) $CO + \frac{1}{2} O_2 \longrightarrow CO_2$

$1\ m^3 \quad \frac{1}{2}\ m^3$

$\therefore 0.15 \quad ?$

$0.15 \times \frac{1}{2} = 0.075$

2) $CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$

$1\ m^3 \quad 2\ m^3$

$0.36 \quad ?$

$0.36 \times 2 = 0.72$

3) $H_2 + \frac{1}{2} O_2 \longrightarrow H_2O$

$1\ m^3 \quad \frac{1}{2}\ m^3$

$0.46 \quad ?$

$0.46 \times 0.5 = 0.23$

Total $O_2 = 1.025$

Air required $= 1.025 \times \frac{100}{21}$

$= 4.88\ m^3$

Received on
26/10/17
3:55 pm

Q.2) c) For 1 kg of fuel,

C = 0.9

H = 0.03

O = 0.025

S = 0.005 g

O_2 requirement -

1) $C + O_2 \longrightarrow CO_2$

12 kg 32 kg

0.9 ?

$0.9 \times \frac{32}{12} = 2.4$

2) $H_2 + \frac{1}{2} O_2 \longrightarrow H_2O$

2 kg 16 kg

0.03 ?

$0.03 \times \frac{16}{2} = 0.24$

3) $S + O_2 \longrightarrow SO_2$

32 kg 32 kg

0.005 ?

$0.005 \times \frac{32}{32} = 0.005$

Total O_2 = 2.645 kg

Actual O_2 = 2.645 - 0.025 = 2.62

Air required = $2.62 \times \frac{100}{23}$

= 11.39 kg