- Give answers neatly in the spaces provided.
- Answers must include appropriate SI units, where necessary.

Name:

Division:

Roll No:

Tutorial Group:

Q1. In the circuit shown in **Fig.1**, the values of the parameters are:

$I_1 = 3A$, $R_1 = 3\,\Omega$, $R_2 = 2\,\Omega$, $V_1 = 4\,V$, $V_2 = 8\,V$

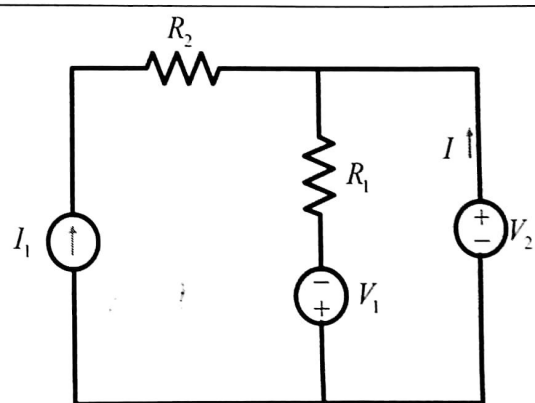What is the value of the current I ?

1 A

[2 marks]

Fig.1: Figure for Q1.

Q2. In the circuit shown in **Fig.2**, the values of the parameters are:

$V_{in} = 8V$, $R_1 = 1\Omega$, $R_2 = 2\Omega$, $R_4 = 0.5\Omega$

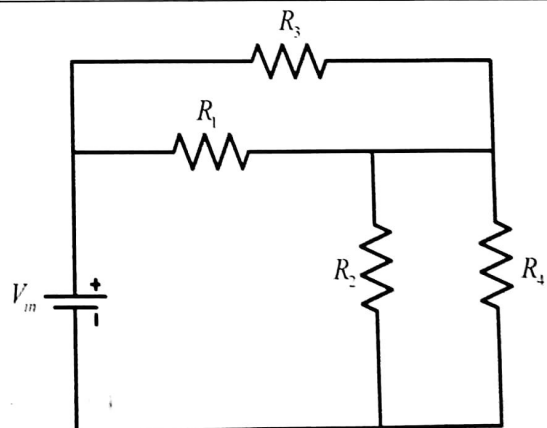For what value of R_3 will the power consumed by R_4 maximum?

0 Ω

[2 marks]

Fig.2: Figure for Q2.

Q3.(a) The base 2 representation of the number $\frac{45}{7}$ (expressed as a fraction in base 10) is

$110.\overline{011}$

[1/2 mark]

Q3.(b) The base 10 representation of the number $(10011.101)_2$ is

19.625

[1/2 mark]

Q4. In the circuit shown in **Fig.3**, the values of the parameters are:

$R_1 = 2\Omega, R_2 = 1\Omega, \alpha = 1$
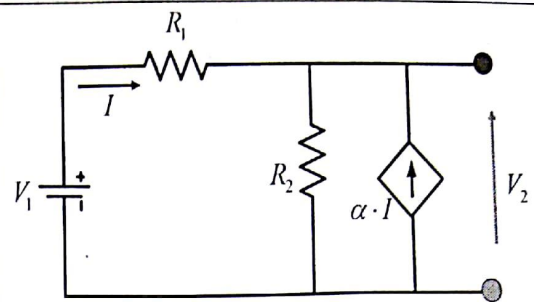
What is the value of V_2 / V_1?

0.5

[1 mark]

Fig.3: Figure for Q4.

Q5. Consider the logic circuit shown in **Fig.4.**

The minimal POS form is

$F = (P + Q + R)(\bar{P} + \bar{Q} + \bar{R})$

A minimal SOP form is
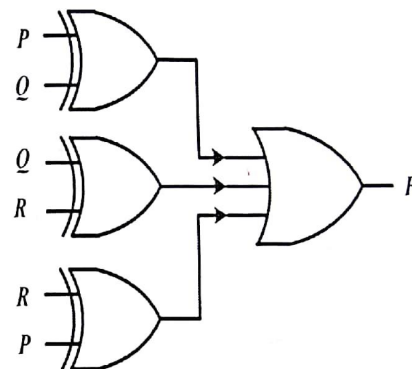
$F = \bar{P}Q + \bar{Q}R + P\bar{R}$

[2 marks]

Fig.4: Figure for Q5.

Q6. Consider logic function described by the Boolean expression

$$F = (P + Q)(R + S) + (P + R)(Q + S) + (P + S)(Q + R)$$

The minimal SOP form of F is

$F = PQ + PR + PS + QR + QS + RS$

The minimal POS form of F is

$F = (P + R + S)(P + Q + R)(P + Q + S)(Q + R + S)$

[2 marks]