

## Question 1

- ① Nodal Analysis @ node 2
  - 6 marks
  - equation - 3 marks
- ② Nodal Analysis @ node 3
  - 6 marks
  - equation - 3 marks
- ③ Solving for  $V_1$  or  $V_2$ ,
  - 3 marks
- ④ Finding  $i_1, i_2, i_3, i_4$ 
  - 4 marks.

## Question 2

- ① Recognizing Super Mesh - 2 marks
- ② KVL of Super Mesh - 4 marks
- ③ Equation ①  $\rightarrow$  1 mark
- ④ KVL loop 2  $\rightarrow$  4 marks
- ⑤ Equation ②  $\rightarrow$  1 mark
- ⑥ KCL at node 2  $\rightarrow$  2 marks
- ⑦ Relation between  $I_2$  &  $I_1 \rightarrow$  2 marks
- ⑧ Solving Equation ① & ②  $\rightarrow$  3 marks
- ⑨  $i_1, i_2, i_3, i_4$  - 4 marks
- ⑩  $v_3, v_2$  - 2 marks

### Question 3

→  $V_1$  - (2)

→  $V_4$  - (2)

→ Super node 2 - 3 - (2)

→ KCL @ Super node - (5)

→ equation 1 - (2)

→  $V_2 - V_3 = 2i_0$  &  $i_0 = \frac{V_2}{5}$  - (4)

→ solving for  $V_2$  - (2)

→  $V_2$  - (~~1~~)

→  $V_3$  - (~~1~~)

→  $i_0, i_2, i_4, i_3$  - (4)

~~R<sub>TH</sub>~~

Question 4

Shorting voltage source & opening current source  
① Recognizing parallel resistors

— 2 marks

(2 || 4 || 4) → ~~3~~ marks

R<sub>TH</sub> — 1 mark

② KCL @ node 1 — 2 marks

KVL in loop 1 — 2 marks

equation — 2 marks

solving equations ① or ② — 2 marks

V<sub>TH</sub> — 1 mark

③ Shorting nodes of circuit — 2 marks

I<sub>N</sub> — finding V<sub>2</sub>' — 2 marks

KCL at node V<sub>2</sub>' — 3 marks

I<sub>TH</sub> — 1 mark

④ Thevenin & Norton equivalent circuits (drawn)

— 2 marks