EE-101 Mid-Semester Response Sheet

QP Code: SD	Invigilator's Signature:
• Give answers in the response sheet • Include SI units, where necessary • Power factor should include lead/lag • Phasors use peak values of the magnitude • All answers for electrical networks should be rounded off to 2 decimal places	
Name:	Roll No:
Tutorial Group:	Division:

Q1.

a. $4\angle 60°\ \Omega$	b. $400 + 400\sqrt{3}j$ VA (or) $800 + 800\sqrt{3}j$ VA (peak)
c. 800 VA (or) 1600 VA (peak)	d. 400 W (or) 800 W (peak)
e. $400\sqrt{3}$ Var (or) $800\sqrt{3}$ Var (peak)	f. 0.5 Lag

Q2.

a. minimal SOP = $\bar{S}_1\bar{X}_2 + \bar{S}_2X_1 + S_2\bar{X}_1 + S_1X_2$

b. minimal POS = $(\bar{S}_1 + S_2 + X_1 + X_2)(S_1 + S_2 + X_1 + \bar{X}_2)(S_1 + \bar{S}_2 + \bar{X}_1 + \bar{X}_2)(\bar{S}_1 + \bar{S}_2 + \bar{X}_1 + X_2)$

Q3.	a. $I_A = 4\angle 23.13°$ A	b. $I_B = 4\angle -53.13°$ A	c. $V_{AB} = 25.17\angle 75°$ V

Q4.

a. K Map:

YZ \ WX	00	01	11	10
00	0	0	0	0
01	0	1	1	1
11	1	1	1	1
10	1	1	1	1

b. minimal SOP = $Y + 2X + 2W$

c. minimal POS = $(Y+2)(Y+W+X)$

Q5.

a. Thevenin equivalent voltage = $2.165 \angle -50.266°$ V

b. Thevenin equivalent impedance = $3.03 \angle 33.32°$ Ω

c. the current I_{AB} = $0.476 \angle -46.10°$ A

Q6.

a. $i(0^+)$ = 2.4 A	b. $v(0^+)$ = 2.4 V
c. $\frac{d}{dt} i(0^+)$ = 0 A/s	d. $\frac{d}{dt} v(0^+)$ = 24 V/s
e. $i(\infty)$ = 0 A	f. $v(\infty)$ = 12 V

Q7.

J_1 = I_2	J_2 = 1
K_1 = I_2	K_2 = $\overline{I_1}$

Q8.

a. state table

Present State		Input	Next state	
A	B	W	A	B
0	0	0	0	1
0	0	1	0	0
0	1	0	1	1
0	1	1	1	0
1	0	0	1	1
1	0	1	1	0
1	1	0	0	0
1	1	1	1	1

b. state equations

$A(n+1) = \bar{A}B + \bar{B}A + WB$ OR $\bar{A}B + \bar{B}A + WA$

$B(n+1) = WAB + \bar{W}\bar{A} + \bar{W}\bar{B}$

c. flip-flop inputs

J_A = B

K_A = $\bar{W}B$

J_B = $\bar{W}$

K_B = $W\bar{A} + \bar{W}A$