

MS101 2023-24/II (Spring)

Quiz 2 Solution (Mar 22, 2024) – Soln Ver – Apr22,2024

Duration: 45 min, Total Marks: 25

Ques.	Solution	Answer and SAFE range	Marks
1	<p>Solution 1: 180 RPM = 3 RPS = $4 \times 3 = 12$ sectors/sec. Waveform period = $1000/(12) = 83.33$ ms</p> <p>Solution 2: 180 RPM = 3 RPS = $8 \times 3 = 24$ sectors/sec. Waveform period = $1000/(24) = 41.67$ ms</p> <p>Both answers will be given full credit.</p>	<p>83.3 to 83.4</p> <p>41.6 to 41.7</p>	3
2	Correct option: 0, 1 (A, B)	0, 1	2
3	Correct option: 1 (B)	1	2
4	$I_C = (V_{cc} - V_{OUT})/R_C = (6-3)/1 = 3$ mA $I_B = 3/100 = 0.03$ mA. $R = (6-0.6)/0.03 = 180$ k	180	3
5	$I_C = 2$ mA ($\beta/[\beta+1]$) = $2 \times 80/81 = 1.9753$ mA	1.97 to 1.98	2
6	Option: 0) Clockwise (A)	0	1
7	Option: 1) Negative (B)	1	1
8	Correct option: 1 (B)	1	2
9	Correct options: 1, 3 (B, D)	1, 3	2
10	Correct options: 1, 3 (B, D)	1, 3	3
11	<p>Maximum $I_C = (V_{cc} - V_{CEsat})/R_{Coil} = (10 - 0.2)/0.4 \text{ k}\Omega = 24.5$ mA</p> <p>If we assume BJT to be in the active mode, $I_B = (V_{IN} - V_{BE})/R_B = (10 - 0.6)/10 \text{ k}\Omega = 0.94$ mA. $I_C = 0.94 \times 50 = 47$ mA.</p> <p>This current is far more than the I_{Cmax} value of 24.5 mA. Hence current through the relay = 24.5 mA</p>	24.5 to 25	2
12	<p>Correct options: For SAFE: 1, 3 (B, D)</p> <p>For Manual Question paper: A, D</p>	1, 3	2
Total marks			25