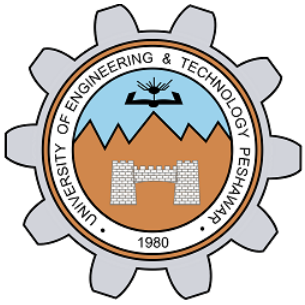

University of Engineering and Technology, Peshawar

Department of Computer Systems Engineering

Mid Term Examination - Spring 2021 Semester

Course Title: Circuit and Systems 1
Time Allowed: 2 hours

Max Marks: 30
Total Pages: 2 (including this)

INSTRUCTIONS:

1. Attempt the Mid Term Exam in your copies or notebooks or registers that you have

2. Write your name, registration number and page number on the top of every page in your copy (on pages that you are submitting)

3. Once your finish attempting the question paper, then take pictures of all the pages that you want to submit

4. After taking pictures of all the pages, then copy those pictures in an MS-Word file (include snapshot of MATLAB software code if you have used any)

5. Your cover page or title page (or the first page) in MS-word must have your complete name, correct registration number and the total number of pages (including cover page) that you are submitting

6. Covert the MS-Word file into a pdf file and submit it in Google Forms file management system. No email submissions will be accepted and no extensions in time will be given under any circumstances.

7. Email the pdf file to your own uetpeshawar domain email address (please do not send any email to Dr. Salman email address).

8. There are total 3 questions in the paper. Your answer must be supported by facts and calculations. Please do not skip any calculation (even if it is too simple, still perform the calculations). Paste a clear screenshot of MATLAB code if you are using it.

9. Save your final file as Yourname_Answers.pdf and upload it very carefully. If by mistake you upload the Mid Exam question paper again in place of your answer sheets, you will get zero marks. In case you upload the answer sheet of another paper or you upload a garbage file, you will get zero marks.

Question 1 - (10 Marks): The circuit of Figure 1 was assigned as homework problem to students of $\mathbf{2^{nd}}$ semester. The answer at the end pages of textbook says that the current $\boldsymbol{i}$ is $\mathbf{2.5A}$. Sometimes textbooks may have typo errors. By applying current division rule, can you verify that $\boldsymbol{i}$ in Figure 1 is $\mathbf{2.5A}$

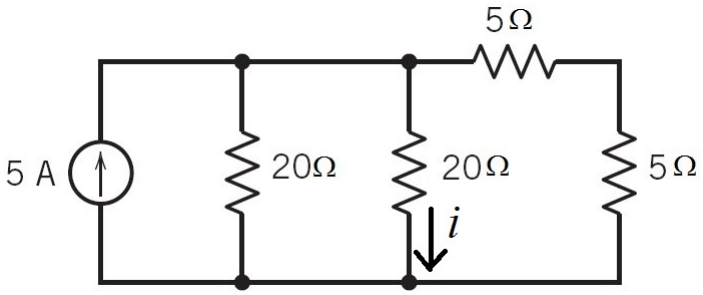

Figure 1: Circuit to consider for solving Question 1.

Question 2 - (10 Marks): Consider the circuit shown in Figure 2. If the current $\boldsymbol{i_1}$ is $\mathbf{1A}$ and $\boldsymbol{i_2}$ is $\mathbf{2.5A}$, then compute the power dissipated in the $\mathbf{50\Omega}$ resistor.

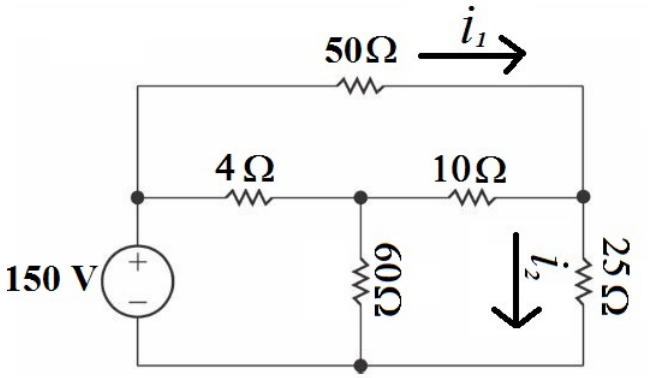

Figure 2: Circuit to consider for Question 2.

Question 3 - (10 Marks): Bicycles are convenient, environment friendly and efficient transportation devices. With the recent developments in electronics and computing systems, electronic bicycles are available which are also called e-bikes or powerbikes. Dr. Mohsin Ayaz is in Canada and he purchases an e-bike which consumes $\mathbf{16W}$ and requires $\mathbf{110V}$ to operate. Then Dr. Mohsin sends back this e-bike to Pakistan. Now this e-bike needs to be operated here in Pakistan. You are hired to operate this e-bike. If you have $\mathbf{12V}$ batteries, can you design a circuit to operate this e-bike. If you can design, then show the schematic of your circuit and label the e-bike in your schematic. You are free to choose any value of resistors in your circuit but the power supply must be from the available $\mathbf{12V}$ ideal voltage sources. Use a rectangle symbol to denote the e-bike and treat this e-bike as a resistor in your calculations. Your circuit must exactly supply $\mathbf{16W}$ and $\mathbf{110V}$ to the e-bike.

The End of Mid Term Question Paper
