

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY
 End Term Examination, 2021

Roll No.....

Open notes – Open book exam / Calculators allowed

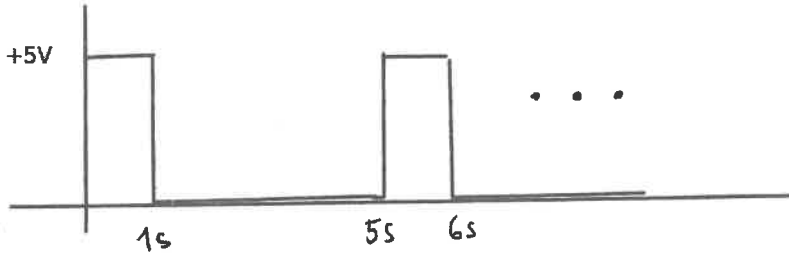
Course Code: Optimisation and Control (EE2104)

Time: 2 hours

Max. Marks: 30

Instructions to students:

1. Write your name, roll number and take a clear photo of your paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever required are an integral part of the answer.

Q.1	Write a PLC program in ladder diagram (LD) language with following specifications: • Three input switches are available: X1, X2, X3. Assume these switches are 0 when open, 1 when closed. • The output Y1 must be 1 if and only if exactly 2 of the input switches are 1. • The output Y2 must be 1 if and only if all three input switches are 1. Note: assume 0 = OFF = OPEN = FALSE, 1 = ON = CLOSED = TRUE	6
Q.2	Determine the eigenvalues and the inverse matrix of $A = \begin{pmatrix} 0 & 1 \\ 1 & 1 \end{pmatrix}$	6
Q.3	A system can be described by the transfer function $G(s) = \frac{Y(s)}{U(s)} = \frac{50}{10s + 1}$ • Determine its time response if $U(s) = \frac{1}{s}$	6
Q.4	It is required to generate the following periodic signal using Arduino UNO:  Draw a suitable flow diagram for the required control program.	6
Q.5	Determine the Fourier series expansion for the signal considered in question Q4.	6