Shri Mata Vaishno Devi University
Department of Electronics and Communication Engineering
Minor I: September 2016

Course Code: ECL 1020
Course: Basic Electrical Engineering

Max. Time: 1 Hrs.
Max. Marks: 20

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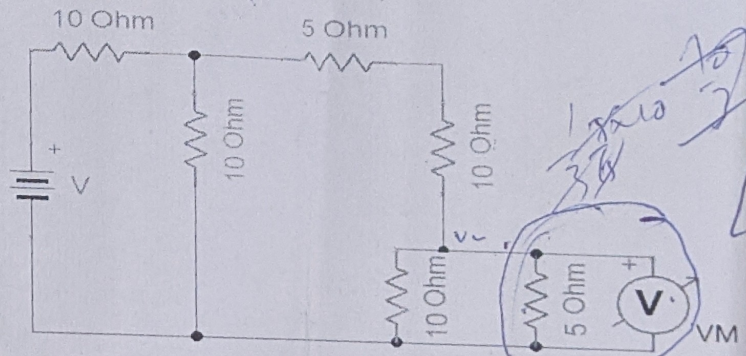
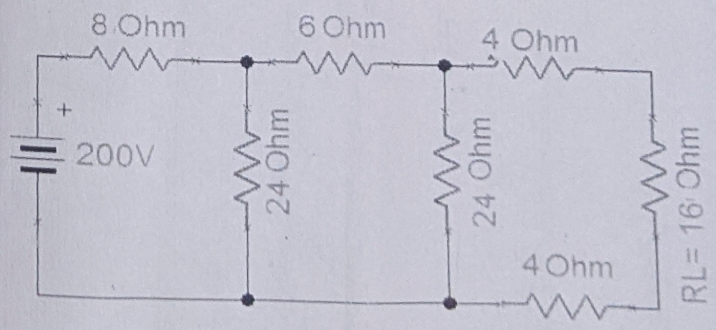
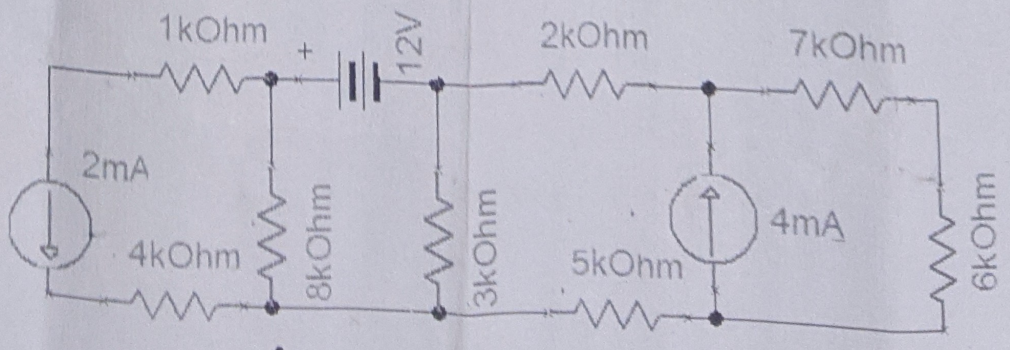
1. In the following circuit, find the value of source voltage V such that the voltmeter VM reads 10V across the shown resistances. 5



2. In the following circuit, find the power dissipated in the RL. What should be the value of RL for the maximum power transfer to the load. Draw the simplified equivalent circuit. (2+2+1)



3. State and prove the Thevenin's theorem. (2+3)
4. Using the superposition theorem, find the current flowing through 3k Ohm resistance in the following circuit. 5



Shri Mata Vaishno Devi University
Department of Electronics and Communication Engineering
Minor II: October 2016

Course Code: ECL 1020 **Max. Time: 1 Hrs.**
Course: Basic Electrical Engineering **Max. Marks: 20**

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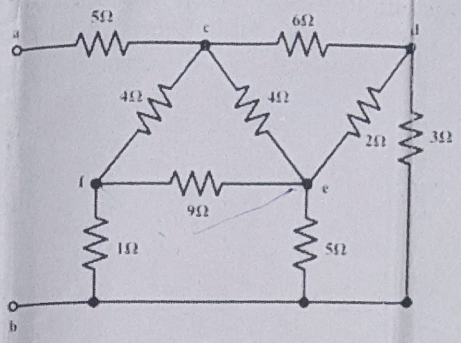
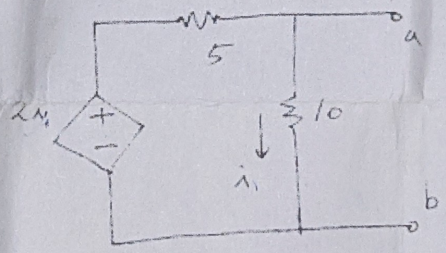
1. Find the equivalent resistance of the following circuit across terminal a-b. (5)



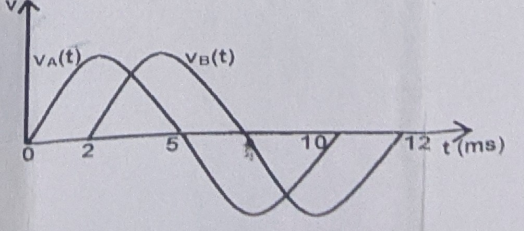
2. Find the Thevenin and Norton equivalent of the following circuit. (5)



3. With the neat diagram, explain the following terms in the case of AC Circuit. (5)
   (a)Period
   (b) Instantaneous value
   (c) Phase
   (d) Peak to peak value
   (e)RMS Value.

4. (a) An alternating current i(t) is given by $i(t)=141.4\sin 314t$. Find the followings. (2)
   (i) Maximum value
   (ii) Peak to peak current
   (iii) Instantaneous value at 3ms
   (iv) Time Period.

   (b) In the following figure two waveforms of same maximum value are given as $v_A(t)$ and $v_B(t)$, respectively. (2+1)
   (i) Find the phase difference between them
   (ii) Identify the leading and lagging waveform.



Shri Mata Vaishno Devi University
Department of Electronics and Communication Engineering
Major: December 2016

Course Code: ECL 1020
Course: Basic Electrical Engineering

Max. Time: 2 Hrs.
Max. Marks: 50

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1. With the help of a neat diagram, explain the working of a single phase transformer. Find the primary to secondary voltage and current ratios. (3+2+1)
2. With the help of the phasor diagram, explain the following terms in detail. (2x4)
   (i) Active Power
   (ii) Reactive power
   (iii)Apparent Power
   (iv)Power Factor
3. Find the expression for the resonance frequency and the bandwidth of a series R-L-C circuit. (3+4)
4. A DC generator having an internal resistance of 1Ω supplies a resistive load as shown in Fig.1 . For what value of Rx, the circuit draws the maximum power from the generator. What is the value of the maximum power drawn. (5+2)
5. Find the source powers in the circuit shown in Fig. 2 after solving it. (6)
6. Find the value of I_3 in Fig. 3 using the superposition theorem. (6)
7. Using Norton's theorem, in the circuit shown in Fig. 4, find the current flowing through the 2 Ohm resistance. (5)
8. Fill in the blanks. (5)
   a) In the open and the short circuits, the -------- and the ------ are zero, respectively.
   b) The unit of the apparent power and the reactive power are ----- and -----, respectively.
   c) --------, ---------- and --------- are the basic circuit elements.
   d) In the series R-L-C network, at the resonance frequency current and the impedance are--- and ----- , respectively.
   e) In the inductance and the capacitance the voltage with respect to the current ---------- and --------, respectively.

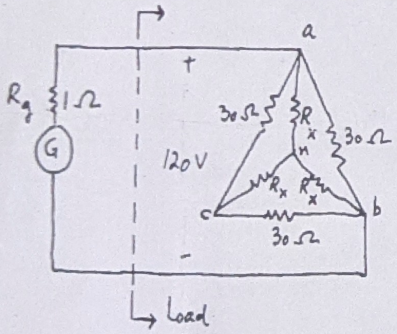


Fig. 1

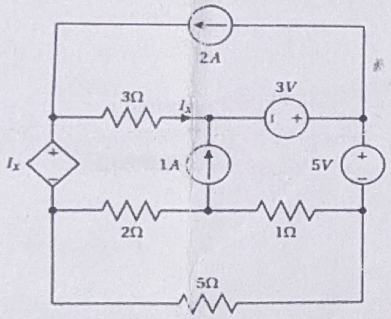


Fig. 2

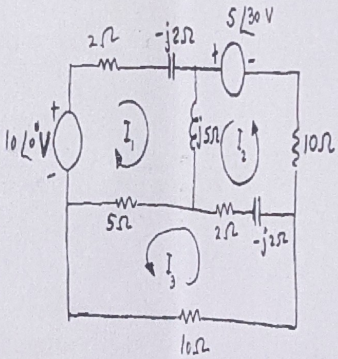


Fig. 3.

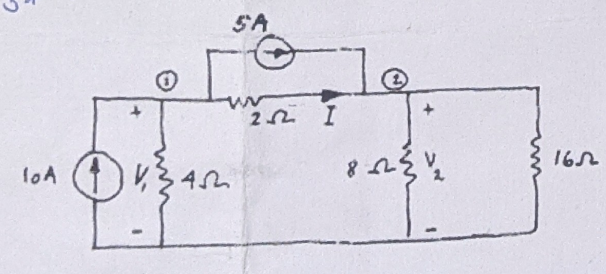


Fig. 4

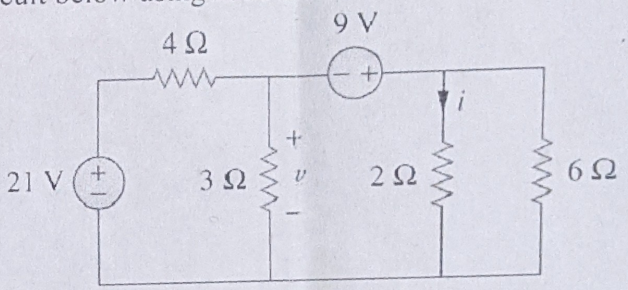
Shri Mata Vaishno Devi University
School of Electronics & Communications Engineering

Minor- I (13/02/2017)

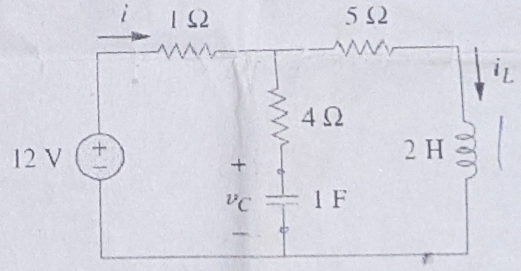
Name of the course: Basic Electrical & Electronics
Course Code : (ECL-1021)
Class: B.Tech Sem –II **(Mechanical)**
Max Marks :20
Time: 1 Hour

Note: Attempt all questions.

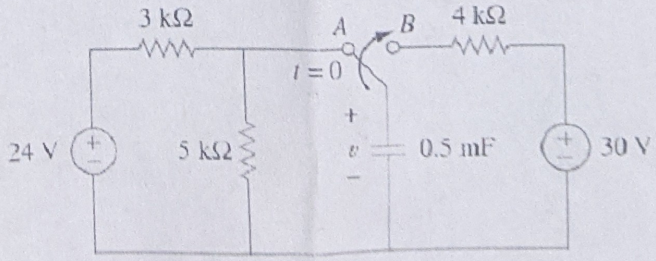
Q1. Find v and i in the circuit below using node method. **[5]**



Q2. Determine v_C, i_L and the energy stored in the capacitor and inductor in the following circuit under **dc** conditions. **[6]**



Q3. The switch in the circuit below has been in position A for a long time. At $t = 0$, the switch closes to B. Determine $v(t)$ for $t > 0$ and calculate its value at $t = 1$ *s* and *4 s*. **[5]**



Q4. Describe real, apparent and reactive power, and draw their relation graphically. **[4]**

Shri Mata Vaishno Devi University
School of Electronics & Communications Engineering

Minor- II (21/03/2017)

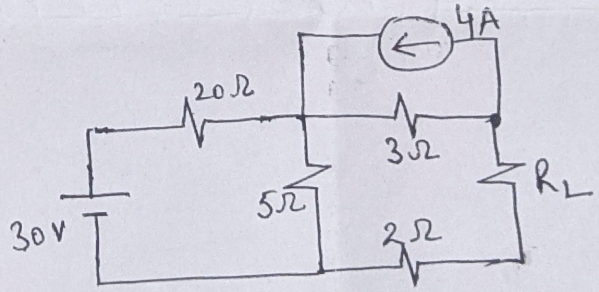
Name of the course: Basic Electrical & Electronics Engg. **Course Code :** (ECL-1021)
Class: B.Tech Sem –II **(Mechanical)** **Max Marks :20**
Time: 1 Hour

Note: Attempt all questions.

Q1. A coil having an inductance of 0.2 H and a resistance of 5Ω, is connected in series with a 40μF capacitor. The voltage applied to the circuit is 220V. Determine the maximum current and corresponding frequency. Also, find the voltage across the capacitor and coil for the maximum frequency. **[5]**

Q2. The turns ratio of a transformer is 100/300, the primary winding is connected to 3.3 KV, 50 Hz. The load impedence of (110+j45) Ω is connected across the secondary. Calculate (i) value of maximum flux in the core, (ii) primary and secondary currents, (iii) real and reactive power. **[5]**

Q3. Determine the Thevenin's equivalent circuit, and find the value of R_L, which gets maximum power from source. Also calculate the value of this power. **[5]**



Q4. Derive the generated EMF equation of the DC generator for Z number of conductors, and having A number of parallel paths. **[5]**

Shri Mata Vaishno Devi University, Katra

School of Electronics and Communication Engineering

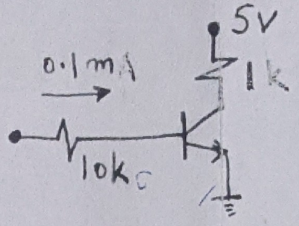
MAJOR – 2016-17 (Even Semester)

Subject: Basic Electrical & Electronics
Class: B.Tech Sem II (Mechanical)
Date of Major: 02/05/2017

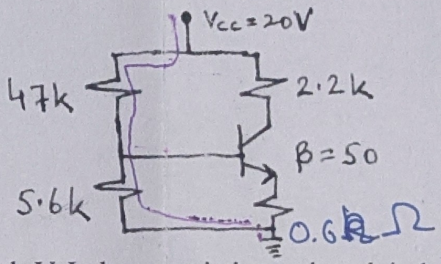
Course Code: ECL1021
Max. Marks: 50
Time: 2hr

Note: Attempt all questions. Draw neat diagrams with clear details

1. **(a)** For a circuit shown below, what should be the value of β for the transistor's $V_{CE(sat)}$=0.2V. [5]

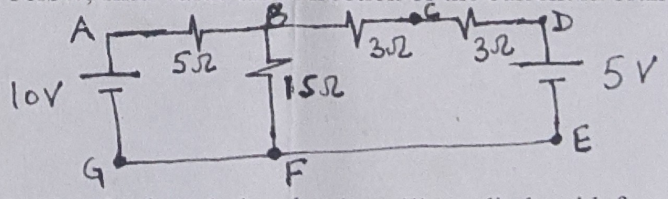


1. **(b)** For a biasing circuit below, find I_C, V_{CE}, I_B, V_E, V_B [5]

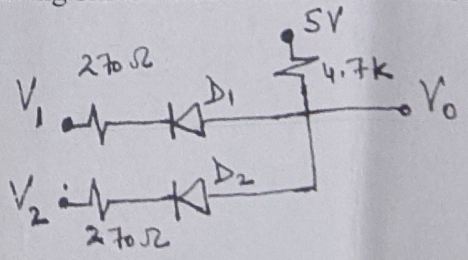


2. **(a)** Describe zener diode with V-I characteristics and explain how it is different than conventional diode. [5]

2. **(b)** For the circuit below, find value and direction of the current in branch BF. [6]

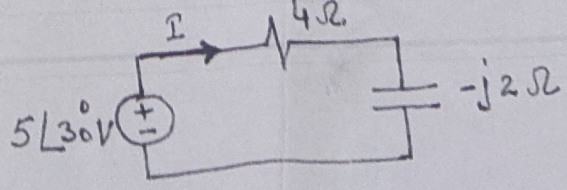


3. Determine the Vo in circuit given below having silicon diode with forward bias resistance R_F=35Ω for following conditions:
   a. V1=V2=5V [4]
   b. V1=V2=0V [4]



4. **(a)** Explain the DC generator and derive its EMF equation. [6]

3. **(b)** Find average power supplied by the source and absorbed by the resistor in the circuit below [5]



4. Construct the BJT circuits for the following, and describe their working
   a. NOT gate [5]
   b. NOR gate [5]

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SHRI MATA VAISHNO DEVI UNIVERSITY

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

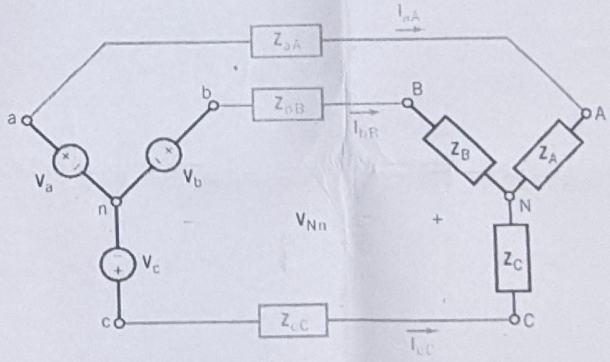
MINOR-II EXAMINATION- B.TECH (Mechanical Engineering) – 2nd Semester (March-2018)

Time: 1Hr Subject: **Basic Electrical and Electronics Engineering**

Course Code: **ECL 1021** Maximum Marks: **20**

NOTE:
(1) All questions are compulsory.
(2) Write the formula used with symbols. Show all steps of calculation.
(3) Use proper unit with the final result. Assume any missing data.
(4) ***No marks*** will be awarded for just attempting a question/writing the formula/drawing merely the figure without proper explanation.
(5) ***Step marking is not proposed.***

Q1: Draw four wire Y-to-Y balanced circuit. Find complex, real, and apparent power for the following circuit. Given that $V_a = 220\angle 0°$, $V_b = 220\angle -120°$ and $V_c = 220\angle -240°$, and $Z_A = Z_B = Z_C = 100 + j\,160\ \Omega$.



[5]

Q2: Define voltage regulation and efficiency for a single phase transformer with suitable mathematical expression. Draw the exact equivalent circuit of a real transformer, indicating electrical components which are incorporated to account for losses. [5]

Q3: Draw the basic structure of a DC generator, mentioning basic parts. Explain its principle of operation briefly. Also discuss various losses in a DC machine. [5]

Q4: An 8-pole lap connected armature has 960 conductors, a flux of 40 m Wb per pole and a speed of 400 rpm. Determine the emf generated. Repeat the problem for wave connected armature. (Other things being same). [5]

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA
School of Electronics and Communication Engineering
B. Tech. (Mechanical Engineering)-1st Year Major Examination (Even) 2017-18

Entry No: 1 7 b m e 0 2 1
Date:

Total Number of Pages: [04]
Total Number of Questions: [12]

Course Title: Basic Electrical and Electronics Engineering
Course Code: ECL 1021

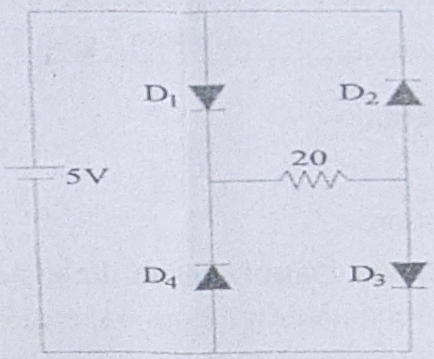
Time Allowed: 3.0 Hours **Max Marks: [50]**

Instructions / NOTE

i. Attempt All Questions.
ii. **Attempt all subparts of a question at the same place in proper sequence.**
iii. Support your answer with neat freehand sketches/diagrams, wherever appropriate.
iv. Write the formula used with symbols. Show all steps of calculation and show proper units.
v. ***No marks will be awarded for just attempting a question/writing the formula/drawing merely the figure without proper explanation.***
vi. ***Step marking is not proposed.***
vii. Assume any missing data to suit the case / derivation / answer. Symbols have their usual meanings.
viii. Use of IS Code (IS 456: 2000) is permissible in examination.

	Section – A	
Q1.	**(a)** Why D-Flip-Flop is also called as a delay FF?	[02]
	(b) Explain insulator, semiconductor and conductor on the basis of energy band diagram.	[02]
Q2.	**(a)** Draw the circuit of transistor in the common emitter configuration. Sketch the output characteristics and indicate the active, saturation, and cutoff regions.	[03]
	(b) Draw the schematic circuit for digital to analog converter. Explain its operation.	[03]
	Section – B	
Q3.	An N-type silicon has a resistivity of 1500 Ω-m at a certain temperature. Compute the electron-hole concentration given that $n_i = 1.5 * 10^{16}$ m−3, $\mu_e = 0.14$ m2/V-s, $\mu_h = 0.05$ m2/V-s and e = 1.6 × 10−19 C.	[04]

Q4. Find the current through the 20 Ω resistor shown in the following figure. Each silicon diode has a barrier potential of 0.7 V and a dynamic resistance of 2 Ω. [04]



0.15

Q5. Using the ideal Zener approximations, find current through the diode of Fig-Q5 when load resistance R_L is **(i)** 30 K **(ii)** 5 K [04]

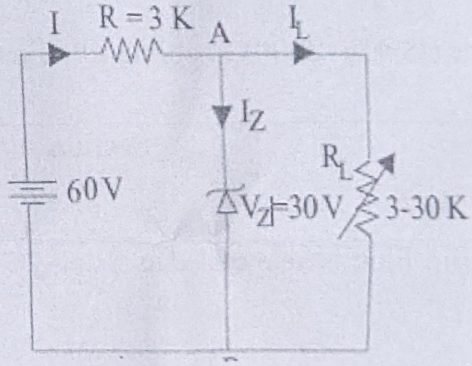


Fig-Q5

Q6. In the circuit of Fig. Q6, find **(i)** I_E, **(ii)** I_B, **(iii)** I_C and **(iv)** V_{CE}. Neglect V_{BE} and take $\beta = 100$. [04]

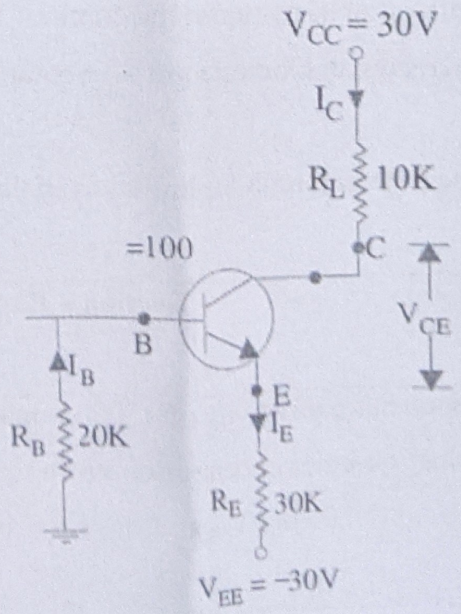


Fig-Q6

Q7. Design and implement a digital circuit to realize the following truth table. Comment on the result. [04]

Input		Output	
A	B	W	D
0	0	0	0
0	1	1	1
1	0	0	1
1	1	0	0

Q8 Two electrical signals represented by A = 101101 and B = 110101 are applied to a 2-input AND gate. Sketch the output signal and the binary number it represents [04]

Q9 Determine the Boolean expression for the logic circuit shown in Fig. Q9. Simplify the Boolean expression using Boolean Laws and De Morgan's theorem. Redraw the logic circuit using the simplified Boolean expression. [04]

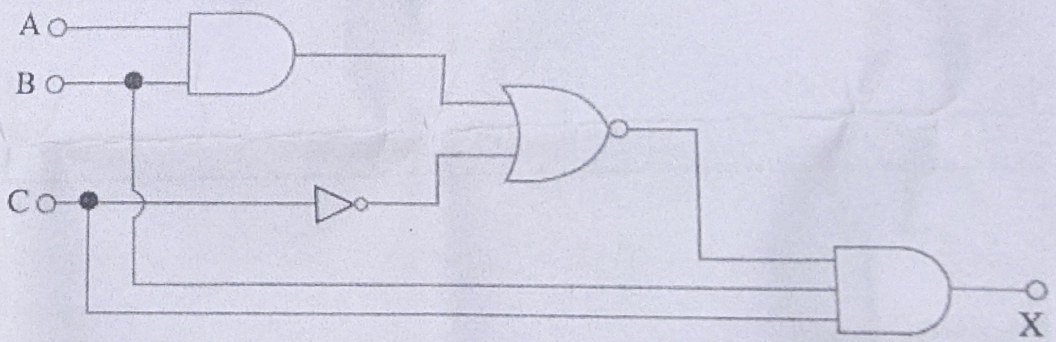
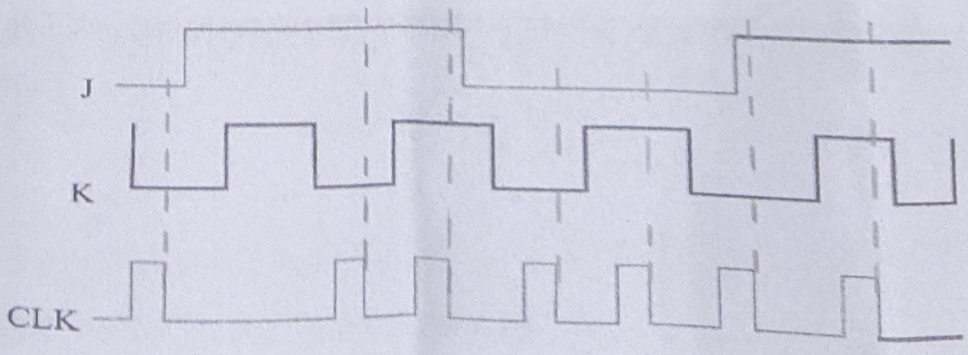
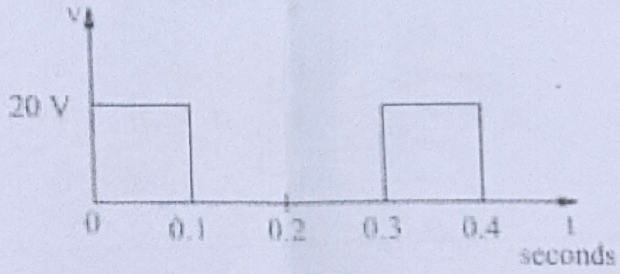


Fig: Q9

Q10 What will be the output waveform Q of a J-K flip-flop if the following waveforms are applied at the input? Assume the flip-flop triggers at the falling edge of clock pulse. [4]



Q11	Compute the average and effective values of the square wave signals in the FigQ11.  Fig Q11	[4]
Q12	A 500 V d.c. series motor runs at 400 rpm. The efficiency is 90% and the shaft torque is 1 95 Nm. Determine the current taken by the motor.	[4]

Course Outcomes

1. To learn basic concepts of electrical engineering and electronics engineering and be able to understand their applications.
2. To apply basic circuit analysis concept to solve basic electronic/electrical circuits
3. To learn operating principle of electrical generator/motors and transformers and their applications.
4. To learn basic semiconductor devices and their operating principle with applications.
5. To learn basic concept of digital electronics and their applications

Mayor 52

BEEE

2017