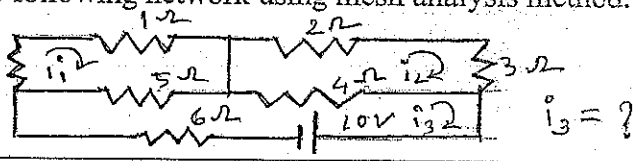
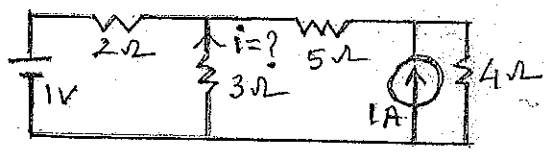
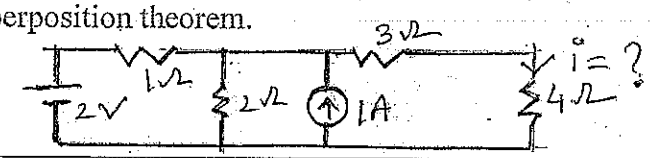
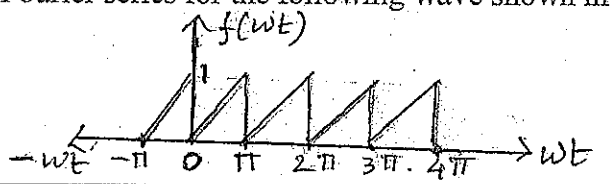
Ref. No. : EX/IT/PE/T/116/2018(S)

B.E INFORMATION TECHNOLOGY 1ST YR, 1ST SEM. SUPPLE. EXAM.- 2018
Subject: ELECTRICAL CIRCUITS Time: Three Hours Full Marks: 100

Answer any FIVE questions

No. of Questions		Marks
1.a)	Derive short transmission network parameters from transmission line equations. Define transmission line regulation and efficiency.	8+2+2
b)	The capacitance per Km. of a 3 phase cable are 0.75 μF in between the three cores bunched & the sheath, 0.45 μF in between one core and other two connected to sheath. Calculate the charging current per phase taken by 6 Km of this cable when connected to a 3 ph, 50 Hz, 6600V supply. [Assume C_s=capacitance between conductor and sheath, C_c= capacitance between conductors, C_n=capacitance between each conductor and neutral, $C_n=3C_c+C_s$, charging current per phase, $I_c=\omega.C_n.V_p$, where ω= angular frequency in rad/sec=$2\pi f$, f=frequency in Hz, V_p=per phase voltage,]	8
2.a)	State the difference between linear and non-linear network with example. Solve the following network using mesh analysis method. 	2+8
b)	Define: Norton's theorem. Solve following network using Norton's theorem. 	2+8
3.a)	State Superposition theorem in any network. Solve the following network using superposition theorem. 	2+8
b)	Derive the condition of Maximum power transfer theorem in any d.c network.	5
c)	How can you convert any star network into an equivalent delta network?	5
4.a)	Determine Fourier series for the following wave shown in figure. 	10

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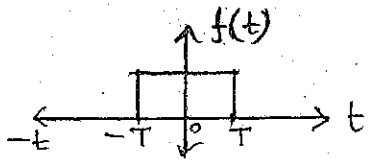
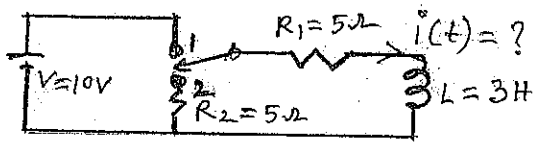
b)	Obtain the Fourier transform of the following function shown in figure. 	**10**
5.a)	Define Laplace transform of any function f(t) & inverse Laplace transform.	**2+2**
b)	The circuit in following figure is initially under steady state condition. The switch is moved from position-1 to position-2 at t=0. Find the current after switching. 	**8**
c)	Determine the Laplace transform of any unit step function & ramp function.	**4+4**
6.a)	Derive the condition of resonance in series R-L-C circuit & define significance of series resonance condition. Show the frequency response of current, impedance and power factor in series resonance.	**6+2+2+2**
b)	A coil of resistance 10Ω & inductance 100μH is in series with a variable capacitor C. The voltage of supply is 300Volt at a frequency 10^6Hz. Calculate value of C to give resonance, Q-factor of the coil, the current in the circuit at resonance.	**8**
7.a)	Classify and define a.c filters.	**2+2**
b)	Briefly explain different types of passive filters.	**16**