Registration No: | | | | | | | | | | |

Total Number of Pages: 02

M.TECH
P2PRCC01

2nd Semester Regular Examination 2016-17

ELECTRICAL POWER SYSTEM TRANSIENT

BRANCH: (ELECTRIC &ELECTRONIC ENGG.(POWER SYSTEM ENGG.),ELECTRICAL ENGG.,ELECTRICAL POWER SYSTEM,POWER SYSTEM ENGG.,POWER SYSTEMS)

Time: 3 Hours

Max Marks: 100

Q.CODE:Z362

Answer Question No.1 which is compulsory and any FOUR from the rest.
The Figures in the right hand margin indicate marks.

Q1 **Answer the following questions: *Short answer type*** (2 x 10)

a) What are the sources of transient?
b) What do you mean reflection and refraction of a wave?
c) What is the meaning of TRV?
d) Why we use lightning arrester?
e) What do you mean crest and front of a wave?
f) What is counterpoise?
g) Define kilometric fault.
h) How does ferroresonance condition arises in practice?
i) What is tower footing resistance?
j) Does the interruption of no load current in a transformer ever poses a threat?

Q2 a) What are the types of power system transients? Describe the expression for the transient recovery voltage(TRV) described by PARK. (10)

b) Derive the mathematical derivation of reflected and refracted voltage in terms of incident voltage . Also calculate reflection and refraction coefficient. (10)

Q3 a) What is resistance switching? Draw equivalent circuit for resistance switching. Write down its characteristic impedance formulae. (10)

b) A 13.8kV, 60Hz, single phase transformer takes a current of 2.8A rms (assumed sinusoidal) at a power factor 0.15 when energized on no load at its rated voltage. When disconnecting the transformer under these conditions, a circuit breaker chops 2A. Calculate the peak voltage transient that ensues due to the chop. The effective winding capacitance is $2.5x10^{-9}$ F. (10)

Q4 a) Explain the Simpson's rule of lightning. (10)

b) Explain the Insulation coordination procedures (IES) for low voltage system and high voltage system. (10)
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Q5 a) What do you mean surge capacitor and surge reactors? Write down their merits and demerits about protection system. (10)

	b)	A surge of 500kV traveling in a line of natural impedance 550Ω arrives at a junction with two lines of impedances 700Ω and 250Ω respectively. Find the refracted voltage and refracted current transmitted into each branch of line. Also calculate the reflected current for this circuit.	(10)
Q6	a)	How do ferroresonance arise in practice? Give and explain with a typical example.	(10)
	b)	Describe the types and selection procedure of surge arresters.	(10)
Q7		**Write short notes on any two.**	(2X10)
	a)	Traveling waves on multi conductor system	
	b)	Cloud formation	
	c)	Double frequency transient phenomena	