

EEL4936/6936 – Power Plant Engineering

Homework #5: Plant Electrical Systems

Due: 03/09/09

#1. What is the speed of a synchronous 4 pole generator operating at 60 Hz?

- A. 3600 RPM
- B. 1800 RPM
- C. 1200 RPM
- D. 1900 RPM

#2. What is the frequency generated by a synchronous 2 pole generator running at 3000 RPM?

- A. 50 Hz
- B. 60 Hz
- C. 100 Hz
- D. 120 Hz

#3. The purpose of a flux probe is to:

- A. Detect stator bar shorts
- B. Detect rotor bar shorts
- C. Detect high eddy current loss in stator iron
- D. Detect high vibration in journal bearing

#4. A stator slot RTD is located where:

- A. between top coil ground wall insulation and wedge
- B. between top coil ground wall insulation and bottom coil ground wall insulation
- C. between bottom coil ground wall insulation and slot bottom
- D. between core laminations

#5. Given a generator that has field resistance values give as 0.1516 ohms at 125C and 0.1094 ohms at 25C, determine the temperature of the field winding if the measured resistance of the field winding is 0.1225 ohms

- A. 35°C
- B. 42°C
- C. 56°C
- D. 72°C

#6. Fill in the blanks – “A current transformer with a rating of 10C400 that has a 5 amp rated secondary, can develop up to _____ volts on secondary circuit at 20 times rated secondary current (100 amps) and not exceed _____ accuracy”.

- A. 120 volts, 10%
- B. 400 Volts, 10%
- C. 120 volts, 5%
- D. 400 volts, 5%

#7. For a synchronous generator, real power delivered into the transmission system is controlled by the _____ between generator voltage and transmission system voltage, and reactive power is controlled by the _____ between generator voltage and transmission system voltage.

- A. phase angle, voltage magnitude
- B. voltage magnitude, phase angle

#8. As defined by IEEE, device 87 is a (an) ;

- A. instantaneous overcurrent relay
- B. time delay overcurrent relay
- C. differential overcurrent relay
- D. lockout device

#9. Given the table below, what is the **standard** BIL level for a dry type transformer that has a 13.8KV primary and 480V secondary windings for both windings?

Nominal system voltage (kV)	Basic lightning impulse insulation levels (BILs) in common use (kV crest)									
	10	20	30	45	60	95	110	125	150	200
1.2	S	1	1							
2.5		S	1	1						
5.0			S	1	1					
8.7				S	1	1				
15.0					S	1	1			
25.0						2	S	1	1	
34.5								2	S	1

- A. 10 KV crest BIL primary, 60 KV crest BIL secondary
- B. 60 KV crest BIL primary, 10 KV crest BIL secondary

- C. 20 KV crest BIL primary, 95 KV crest BIL secondary
- D. 95 KV crest BIL primary, 20 KV crest BIL secondary