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M.E. / M.TECH. DEGREE EXAMINATIONS, MAY 2019

Second Semester

PD18203 – POWER QUALITY

(Power Electronics and Drives)

(Regulation 2018)

Time: Three Hours

Maximum : 100 Marks

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. Mention any four Power quality issues.
2. Define THD and TIF.
3. How the power electronics converter is responsible for harmonics?
4. Define distortion and displacement factors.
5. Compare the characteristics of linear and non linear loads with examples.
6. List out the loads that cause power quality problems.
7. What is the contribution of transformer inrush current to power quality?
8. How will you select active/ passive filters in harmonic filtering?
9. What is PQ theory?
10. Mention the advantages DSTATCOM.

PART B - (5 X16 = 80 Marks)

11. (a) (i) Classify Power Quality problems based on Power System Electromagnetic phenomena. (8)
(ii) Brief about various short duration voltage variations. (8)
 - (b) (i) Discuss in detail about power quality measures & standards. (12)
(ii) Show the significance of Power acceptability curves. (4)
12. (a) What is the impact of harmonic distortion on Transformers and motors. (16)

(OR)

- (b) (i) Discuss the sources of harmonics in Industrial loads in detail. **(12)**
(ii) Define Inter harmonics and list out the sources of inter harmonics. **(4)**
13. (a) Derive the synchronous machine harmonic model based on dq0 coordinates. **(16)**
(OR)
(b) (i) Write a note on current balancing at fundamental and harmonic frequencies. **(6)**
(ii) Describe Newton based harmonic power flow algorithm. **(10)**
14. (a) Explain any one series active power filtering techniques for harmonic cancellation and isolation in detail. **(16)**
(OR)
(b) How will you apply PQ theory for a three phase three wire system? Elaborate. **(16)**
Mention the advantages over conventional theory.
15. (a) What is UPQC? Explain the principle of operation with neat diagrams and show the power quality improvement using UPQC. **(16)**
(OR)
(b) Describe the operation of DVR and explain how it suppresses voltage sag, swell and flicker problems. **(16)**