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Question Paper Code : 13939

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Second Semester

Power Systems Engineering

PX 7204 — POWER QUALITY

(M.E. Power Electronics and Drives and M.E. Electrical Drives and Embedded Control)

(Regulation 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate between impulsive transients and oscillatory transients.

2. Define CBEMA curve.

3. Define k-factor of a transformer.

4. State the influence of non-linear loads on single phase and three phase systems.

5. How are the instantaneous real and reactive power represented?

6. Define Detroit Edison Sag score.

7. Mention the primary objectives of a shunt compensator in a distribution system.

8. Differentiate between state feedback control and output feedback control of DSTATCOM in voltage control mode.

9. What do you mean by a Rectifier supported DVR?

10. List out the functions of UPQC.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss the IEEE and IEC power quality standards in detail.   (6)

          (ii) Define waveform distortion. Explain the categories of waveform distortion.   (10)

Or

     (b) Mention the power quality problems and discuss their implications in detail.   (16)

12. (a) Discuss the three phase balance system and three phase unbalanced system. How does a distorted source supply power to an unbalanced system with non-linear loads?   (16)

Or

     (b) Explain the concept of pf in three phase three wire and three phase four wire systems.   (16)

13. (a) (i) Describe the procedure involved in online extraction of fundamental sequence components from measured samples.   (10)

          (ii) Discuss the voltage distortion limits at the PCC in the IEEE 519 standard.   (6)

Or

     (b) (i) Mention the different types of classical load balancing. Explain them in detail.   (10)

          (ii) Write short notes on Dip reduction.   (6)

14. (a) Discuss DSTATCOM current control through phasors under the following three conditions :

          (i) When both source and load are balanced

          (ii) When both source and load are unbalanced and only load is distorted

          (iii) When both source and load are unbalanced as well as distorted. (16)

Or

     (b) (i) Describe the compensation schemes for a three phase four wire system for generating reference currents using instantaneous symmetrical components.   (6)

          (ii) Explain the generation of compensating currents three phase system to achieve equal resistance, equal source current magnitude and equal sharing of average power.   (10)

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15. (a) With neat diagram explain the structure of DVR with capacitor filter and LC filter. Discuss the filter realization methods in detail. (16)

Or

(b) (i) Explain the characteristics of a right shunt UPQC and left shunt UPQC in detail. (8)

(ii) Briefly discuss voltage restoration using series compensator. (8)

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