B.E. Eighth Semester (Electrical Engineering (Electronics & Power)) (C.B.S.)

Elective - II : Power Quality

P. Pages : 2 **KNT/KW/16/7573**

Time : Three Hours * 0 3 3 2 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Use of non programmable calculator is permitted.

1. a) Why do we more concern about power quality? **7**

b) Define: **6**
i) Waveform distortion.
ii) Noise.
iii) Harmonics,
iv) Interharmonics.
v) Flickers.
vi) Voltage imbalance.

OR

2. a) Write the common problems associated with grounding. **7**

b) Draw and explain detailed schematic of the Grounding as per IEEE definition. **6**

3. a) What are the various causes of Transient overvoltage's? **6**

b) Write short note on
i) Ferroresonant Transformer. **4**

ii) shielding of power system **3**

OR

4. a) What are the various devices used for voltage regulation? Explain any one in detail. **7**

b) What are the various measures to reduce flickers? **6**

5. a) Explain various causes of voltage sag. **8**

b) Explain the concept of Area of vulnerability for voltage sag. **6**

OR

6. a) Derive an expression for voltage sag using voltage divider model. What is the effect of distance of fault on voltage sag? **6**

b) For 11 kv overhead line with 150 sq.m, the line impedance is (0.117+j0.135) Ω /km. The fault level is 750 MVA and source impedance is purely reactive Z_s = j0.161 Ω . calculate. **8**
i) Voltage sag if fault is at 20 Km from Pcc.
ii) Voltage sag if fault is at 50 km from Pcc and Z_s= j 3.36 Ω

7. a) Distinguish between transients and harmonics. **6**

b) Define harmonic indices THD and TDD. The harmonic contents found at a particular instant in input current of CSI based adjustable speed drive of rating 250v, 18A are as follows: I_1=15A, I_3=2A, I_5=0.5A, I_7=0.2A, I_9=0.1A. calculate THD and TDD. **8**

OR

8. a) What is the impact of harmonics on: **8**
i) Motors,
ii) Transformers.
iii) Capacitors,
iv) metering.

b) How will you locate harmonic sources in power system? Also write causes of inter harmonics. **6**

9. a) What are the objectives of power quality monitoring? **6**

b) Write a list of equipment's used for permanent power quality monitoring. Explain any one. **7**

OR

10. a) Write short note on: **6**
i) Wiring and grounding test devices

ii) Setting monitor thresholds.

iii) Smart power quality monitoring.

b) Draw block diagram & explain function of each block of IEC flicker meter. **7**

11. a) What is power quality state estimation? **6**

b) Explain the requirements of transducers used for power quality monitoring & what are the transducers used for? **7**

OR

12. a) Write on-line and off-line power quality assessment. **7**

b) What are the various power quality standards and indices as per IEEE & IEC. **6**

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