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

Elective-II : Power Quality

P. Pages : 2 **NRT/KS/19/3655**

Time : Three Hours *0687* 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. Assume suitable data whenever necessary.
9. Diagrams and chemical equations should be given whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.
11. Use of non programmable calculator is permitted.

1. a) What do you mean by power quality? Why we are more concerned about power quality? **7**

b) Define **6**

i) Over - voltage , ii) Transients,
iii) Noise iv) Inter-harmonics
v) DC offset vi) Voltage sag

OR

2. a) What are the three reasons for grounding? **6**

b) Write common problems associated with grounding. **7**

3. a) Define flicker. What are the main sources of flicker? **8**

b) Write mitigation techniques for reducing flickers. **6**

OR

4. a) State the principles of voltage regulation. **6**

b) Write short note on hybrid UPS & on-line UPS. **8**

5. a) Derive the equation for voltage sag using voltage divider model. **7**
For 11kV overhead line, the line impedance is (0.117 + j 0.315) ohm/km. The fault level is 750 MVA and source impedance is purely reactive $Z_s = j\,0.161\Omega$. Calculate voltage sag if fault is at
i) 20 km,
ii) 50 km from PCC.

b) Write mitigation techniques for voltage sag at utility level. **6**

OR

6. a) What is CBEMA curve? Explain. **6**

b) Write short note on: **7**
i) Equipment sensitivity.
ii) Area of Vulnerability.

7. a) Distinguish between Harmonics & transients. **6**

b) Write note on active filters. **7**

OR

8. a) Define THD and TDD. **7**
The harmonic contents of adjustable speed drive (ASD) load at a particular instant are as follows.
$I_1 = 16$ A, $I_3 = 1$A, $I_5 = 0.5$ A, $I_9 = 0.2$ A & $I_{13} = 0.01$A.
The specifications of ASD are 250V, 20 A. Calculate THD & TDD.
Also calculate RMS value of the current.

b) What is impact of harmonics on **6**
i) Moters, ii) Capacitors.

9. a) What are the main objectives of power quality monitoring? **8**

b) Write note on smart power quality monitors. **6**

OR

10. a) What are the various power quality monitoring equipment's? Explain any one in detail. **6**

b) Write short note on: **any two.**

i) K-rated Transformers. **4**

ii) Disturbance analyzer. **4**

iii) IEC flicker meter **4**

11. a) Explain on-line power quality assessment. **7**

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

OR

12. a) Explain off - line power quality assessment. **7**

b) Explain the requirements of transducers used in power quality monitoring. Name the transducers used in power quality monitoring. **6**

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