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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: ES – Cluster Elective **Duration: 3 hrs.**
Course Code: 19EE7CE2PQ **Max Marks: 100**
Course: ELECTRICAL POWER QUALITY **Date: 28.02.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) How is power quality defined? What is the need for ensuring power quality in modern day electric grids? **06**

b) Write a short note on IEC (International Electrotechnical Commission) Standards. **06**

c) What do you understand by distributed generation? List atleast five distributed generation technologies **08**

UNIT - II

2 a) Any unbalance in the electricity generation and load results in deviation in frequency. Explain clearly, what happens when the generation falls short of demand? What can be done to compensate for the frequency variations? **07**

b) What is spinning reserve in power systems? Why is it necessary? How does it improve the power quality of electric grids? **07**

c) What do you understand by under frequency tripping? How does it affect the power system? **06**

UNIT - III

3 a) Write short notes on the following power quality issues. **10**

i. Transients
ii. Long duration voltage variations
iii. Short duration voltage variations
iv. Voltage imbalance

b) What do you understand by harmonic distortion? How is it computed? **05**

c) A circuit is excited by a 1-phase 440V, 50Hz supply and draws 20A of current from the source with a power factor of 0.8 lagging. Determine the following: **05**

i. Active power consumed in the circuit
ii. Reactive power consumed in the circuit

OR

4	a)	How do you define waveform distortion? What disturbances are considered as waveform distortion? Explain with neat sketches.	**10**
	b)	What do you understand by harmonic indices? Explain them briefly.	**05**
	c)	Write short notes on harmonic phase sequences?	**05**

UNIT - IV

5	a)	What do you understand by harmonic distortion? What is its impact on capacitors? Explain briefly.	**08**
	b)	What is the need for grounding? Explain briefly.	**06**
	c)	Why is fluorescent lighting preferred in modern applications? Explain briefly.	**06**

OR

6	a)	What is the impact of harmonic distortion on electric motors. Explain with an example.	**08**
	b)	What is the role of Zig-Zag transformers in controlling harmonic distortions	**06**
	c)	Describe briefly the applications of single-phase power supply as commercial loads.	**06**

UNIT - V

7	a)	What do you understand by nonlinear loads? Explain their classification with neat sketches.	**08**
	b)	How are power quality problems mitigated using filters? Write short notes on passive and active power filters?	**06**
	c)	How is power quality monitored by harmonic analyzers and spectrum analyzers? Explain briefly	**06**

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