

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VIII (NEW) EXAMINATION – WINTER 2020****Subject Code:2180911****Date:19/01/2021****Subject Name:Power Quality And Management****Time:02:00 PM TO 04:00 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
<b>Q.1</b>	(a) What are the effects of EMI on health? Enlist them.	<b>03</b>
	(b) Explain displacement power factor and true power factor with necessary equation.	<b>04</b>
	(c) Explain various power quality issues due to distributed generation.	<b>07</b>
<b>Q.2</b>	(a) What is THD? According to IEEE 519, state various voltage and current THD?	<b>03</b>
	(b) Explain the Power Quality Issues: Voltage Sag and Swell with suitable example.	<b>04</b>
	(c) Explain the types and causes of the transients in electrical circuits.	<b>07</b>
<b>Q.3</b>	(a) What is grounding and bonding? How do they effect on electrical and electronics circuits?	<b>03</b>
	(b) Write the various shock hazards for 100 $\mu$ A, 1-5 mA, 5-10 mA and 10-20 mA, 30 mA on Human body.	<b>04</b>
	(c) Explain earth resistance test as per NEC code.	<b>07</b>
<b>Q.4</b>	(a) Draw the earth resistance Vs distance graph and write its importance.	<b>03</b>
	(b) Explain the electric shock hazards with necessary diagram when the electric motor is not grounded.	<b>04</b>
	(c) Write a short note on : Signal Reference Ground.	<b>07</b>
<b>Q.5</b>	(a) What is harmonics? Explain with necessary waveforms.	<b>03</b>
	(b) Write a short note on TDD.	<b>04</b>
	(c) Enlist the various EMI mitigation methods. Explain anyone in detail.	<b>07</b>
<b>Q.6</b>	(a) When do we record harmonic signature? How does it help for health of the electrical equipments?	<b>03</b>
	(b) What are the major sources of current harmonics?	<b>04</b>
	(c) Explain improvement in power factor using static VAR compensator.	<b>07</b>
<b>Q.7</b>	(a) How do you select the measurement tools and location for the power quality issues?	<b>03</b>
	(b) Find out apparent power, active power, reactive power and power factor for: $v_s(t) = \sqrt{2} \times 230 \sin(\omega t) + \sqrt{2} \times 50 \sin(3\omega t - 30^\circ)$ $i(t) = 2 + \sqrt{2} \times 10 \sin(\omega t - 30^\circ) + \sqrt{2} \times 5 \sin(3\omega t - 60^\circ)$	<b>04</b>
	(c) What is “k rating” and “derating factor” of a transformer? Find the transformer derating factor for: A transformer with a full load current rating of 1200 A is subjected to a load with nonlinear characteristics	<b>07</b>

of the following data. The transformer has a rated winding eddy current loss density of 10% (0.1 pu).

Harmonic number (h)	fh (pu)
1	1
3	0.38
5	0.19
7	0.11
9	0.06

- Q.8** (a) What is the role of data loggers and chart recorders in case of measurement of power quality? **03**
- (b) What are issues with interfacing of the distributed generations? Enlist them. **04**
- (c) Explain the effects of harmonics on capacitor banks. **07**

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