**20EE602**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **July/August, 2023** | **Electrical & Electronics Engineering** | | |
| **Sixth Semester** | **Power Quality** | | |
| **Time:** Three Hours | | **Maximum:** 70 Marks | |
| ***Answer question 1 compulsory.*** | | | **(14X1 = 14Marks)** |
| ***Answer one question from each unit.*** | | | **(4X14=56 Marks)** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | CO | BL | M |
| 1 | a) | What are the causes for interruptions? | CO1 | L1 | 1M |
|  | b) | Define Voltage sag? | CO1 | L1 | 1M |
|  | c) | What are the power quality standards? | CO1 | L1 | 1M |
|  | d) | List out the causes of sag | CO2 | L1 | 1M |
|  | e) | What is transient overvoltage? | CO2 | L1 | 1M |
|  | f) | What do you mean by capacitor switching? | CO2 | L1 | 1M |
|  | g) | What is the cause of harmonics? | CO3 | L1 | 1M |
|  | h) | Define odd harmonics? | CO3 | L1 | 1M |
|  | i) | What is the need of filters in power system? | CO3 | L1 | 1M |
|  | j) | What is the importance of improving power quality? | CO4 | L1 | 1M |
|  | k) | Write the importance of Shunt injection. | CO4 | L1 | 1M |
|  | l) | What is flicker meter? | CO4 | L1 | 1M |
|  | m) | How the switching transient effects the load? | CO2 | L1 | 1M |
|  | n) | List out any two applications of DVR? | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Explain briefly about long duration and short duration voltage variations. | CO1 | L2 | 7M |
|  | b) | Summarize the impact of poor power quality on utility and consumers | CO1 | L2 | 7M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Discuss in detail about transients and waveform distortion related to the power quality | CO1 | L3 | 7M |
|  | b) | What is the impact of transient on power quality? Classify the transients that occur in  power systems. | CO1 | L2 | 7M |
| **Unit-II** | | | | | |
| 4 | a) | Discuss the following causes of over voltages   1. Switching the loads on or off 2. Capacitor switching | CO2 | L3 | 7M |
|  | b) | Describe in detail about the sag performance evaluation indices. | CO2 | L2 | 7M |
| **(OR)** | | | | | |
| 5 | a) | Explain the various methods of protection against utility system lightning? | CO2 | L2 | 7M |
|  | b) | Illustrate the phenomena of impulsive transients and oscillatory transients? | CO2 | L2 | 7M |
| **Unit-III** | | | | | |
| 6 | a) | What are effects of harmonics? Explain harmonic distortion evaluation procedure? | CO3 | L2 | 7M |
|  | b) | Illustrate the control techniques for the mitigation of harmonics? | CO3 | L3 | 7M |
| **(OR)** | | | | | |
| 7 | a) | Explain the function of active filters and how it overcomes the drawbacks of passive filter in controlling harmonics? | CO3 | L2 | 7M |
|  | b) | Explain the harmonic sources from commercial and industrial loads? | CO3 | L2 | 7M |
| **Unit-IV** | | | | | |
| 8 | a) | Explain the operation of Distribution Static Compensator (DSTATCOM) used for sag mitigation? | CO4 | L2 | 7M |
|  | b) | Distinguish between series and shunt compensators? | CO4 | L3 | 7M |
| **(OR)** | | | | | |
| 9 | a) | Explain the principle of DVR operation used for sag mitigation? | CO4 | L2 | 7M |
|  | b) | Sketch the line diagram of unified power quality conditioner and explain its operation in power quality improvement. | CO4 | L3 | 7M |

