

M. Tech. Electrical Power System (C.B.C.S. and Old C.B.S. Pattern) Sem-II  
**EP-202 / PEPS22 - Advanced Power System Protection**

P. Pages : 1

Time : Three Hours



**GUG/S/19/11022**

Max. Marks : 70

- Notes :
1. Attempt **any five** questions.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answers wherever necessary with the help of neat sketches.
  5. Use of slide rule, Logarithmic Tables, Steam Tables, Mollier's Chart, Drawing Instruments, Thermodynamic tables for moist air, Psychometric charts and Refrigeration charts is permitted.

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|----|----|---|---|
| 1. | a) | Explain the performance and operational characteristics of digital protection.  | 8 |
|    | b) | Explain the basic structure of digital relay.   | 6 |
| 2. | a) | Define the term curve fitting. Explain the least squares method for curve fitting.  | 6 |
|    | b) | Derive the Bergeron's equation for single phase lines and hence find the relation between forward wave discriminant function and rms value of supply voltage. | 8 |
| 3. | a) | Explain with a neat sketch forward, backward and centre difference function related to an orbitary waveform.  | 8 |
|    | b) | Discuss the term Walsh functions along with its fundamental properties.   | 6 |
| 4. | a) | Explain the phenomenon of aliasing and sample and hold circuits in digital relaying.  | 8 |
|    | b) | Draw and explain surge protection circuit for digital protection.   | 6 |
| 5. | a) | Explain the principle of multiplexing and analog to digital conversion in digital relaying.   | 7 |
|    | b) | Explain the fractional cycle windows algorithms for sinusoidal wave.  | 7 |
| 6. | a) | Explain the sample and first derivative (Mann & Morrison) Algorithm for sinusoidal wave.  | 7 |
|    | b) | Explain the full cycle window algorithm for sinusoidal wave.  | 7 |
| 7. | a) | Explain in detail the digital differential protection of transformer.   | 7 |
|    | b) | Explain the recent advanced in digital protection of power system.  | 7 |
| 8. | a) | Explain the Walsh function based algorithms for sinusoidal wave.  | 7 |
|    | b) | Explain digital line differential protection.   | 7 |

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