**18EE4602**

**Hall Ticket Number:**

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| |  | | --- | | **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | | |
| **June, 2022** | **Electrical and Electronics Engineering** | | |
| **Sixth Semester** | **Power system protection** | | |
| **Time:** Three Hours | | **Maximum:** 50 Marks | |
| ***Answer question 1 compulsory.*** | | | **(10X1 = 10Marks)** |
| ***Answer one question from each unit.*** | | | **(4X10=40Marks)** |
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|  |  |  | CO | BL | M |
| 1 | a) | Define selectivity of protective relaying | CO1 | L1 | 1M |
|  | b) | Define reach of a relay | CO1 | L1 | 1M |
|  | c) | What are the advantages of static relays over electromagnetic relays | CO1 | L1 | 1M |
|  | d) | What are the features of directional relays | CO2 | L1 | 1M |
|  | e) | What do you understand by level detectors? | CO2 | L1 | 1M |
|  | f) | What is restricted earth fault protection? | CO2 | L1 | 1M |
|  | g) | What are the relays employed for protection of long transmission lines? | CO3 | L1 | 1M |
|  | h) | What is meant by recovery voltage? | CO3 | L1 | 1M |
|  | i) | What are the types of air circuit breakers | CO3 | L1 | 1M |
|  | j) | Mention the different methods of high resistance arc interruption. | CO4 | L1 | 1M |
| **Unit-I** | | | | | |
| 2 | a) | Explain the principle of operation of IDMT relay. | CO1 | L2 | 5M |
|  | b) | Explain the construction and operating principles of a balanced beam type relay. | CO1 | L2 | 5M |
|  |  | **(OR)** |  |  |  |
| 3 | a) | Describe the functional characteristics of protective relaying. | CO1 | L2 | 5M |
|  | b) | Explain the working principle of the following distance relays with sketches and R-X diagrams. i) Mho relay ii) Reactance relay | CO1 | L3 | 5M |
| **Unit-II** | | | | | |
| 4 | a) | Compare the electromagnetic, static and numerical relays. | CO2 | L2 | 5M |
|  | b) | Discuss the inverse time current relay with a block diagram? | CO2 | L2 | 5M |
|  |  | **(OR)** |  | | |
| 5 | a) | Discuss the duality between the amplitude and phase comparators. | CO2 | L3 | 5M |
|  | b) | Discuss the operation of a PC based relay with a block diagram? | CO2 | L2 | 5M |
| **Unit-III** | | | | | |  |  |  |  |
| 6 | a) | Explain with a neat diagram the application of Merz-price circulating current principle for the protection of alternator. | CO3 | L3 | 5M |
|  | b) | A 3-phase, 66/11 kV star-delta connected transformer is protected by Merz-price system. The CT’s on LV side have a ratio of 400/5 A. Find the ratio of CT’s on the HV side. | CO3 | L3 | 5M |
|  | | **(OR)** |  | | |
| 7 | a) | Describe the construction and working of Buchholz relay with neat sketch. | CO3 | L2 | 5M |
|  | b) | What is the necessity to suppress the field in an alternator? Explain in detail. | CO3 | L2 | 5M |
| **Unit-IV** | | | | | |
| 8 | a) | Discuss the recovery rate theory and energy balance theory of arc interruption in circuit breaker. | CO4 | L2 | 5M |
|  | b) | Discuss the construction and principle operation of Minimum oil circuit breaker. What are its relative merits and demerits | CO4 | L2 | 5M |
|  |  | **(OR)** |  | | |
| 9 | a) | Describe construction, operating principle and application of vacuum circuit breaker | CO4 | L2 | 5M |
|  | b) | What is resistance switching? Derive the expression for critical resistance in terms of system inductance and capacitance, which give no transient oscillation. | CO4 | L3 | 5M |

