Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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| **Code : 14EE2016** | |  | **Duration :** | **3hrs** |
| **Sub. Name : POWER SYSTEM PROTECTION AND**  **SWITCHGEAR** |  | | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Sketch and formulate the construction, working principle of induction type directional over-current relay | CO1 | 20 |
| (OR) | | | | |
| 2. | a. | Determine the actual time of operation of a 5ampere, 3 second over current relay having a current setting of 150% and a time setting multiplier of 0.4 connected to supply circuit through a 400/5 current transformer when the circuit carries a fault current of 6000A.Time of operation is 2.8 seconds for the estimated value of P.S.M. | CO1 | 5 |
| b. | Demonstrate the construction, working principle and characteristics of impedance relay type distance relay. | CO1 | 15 |
|  |  |  |  |  |
| 3. | a. | Illustrate the merits and demerits of static relay over an electromagnetic relays. | CO1 | 8 |
| b. | Describe the operation of negative sequence relays and how it responds for positive and zero sequence currents. | CO1 | 12 |
| (OR) | | | | |
| 4. | a. | List the abnormal conditions and failure that occur in induction motor. | CO2 | 8 |
| b. | Justify how the Mertz-Price protection scheme will protect the alternator stator windings. | CO2 | 12 |
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| 5. | a. | A 3-phase 500KVA, 11KV/0.4KV transformer is connected in delta/star. The protection transformer on the LV side have turns ratio of 500/5. What will be the C.T. ratio on the HV side of the transformer? | CO2 | 8 |
| b | Sketch and elaborate the Mertz-Price protection scheme for Star-Delta transformer. | CO2 | 12 |
| (OR) | | | | |
| 6. | a. | In a short circuit test on a circuit breaker the following readings were observed on a single frequency transient time to reach the peak recovery voltage 40μsec and peak restriking voltage 100KV.  Determine an average RRRV and the frequency of oscillation. | CO3 | 8 |
| b. | Elaborate the arc phenomena and various methods of arc extinction. | CO3 | 12 |
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| 7. | a. | With neat sketch, narrate the constructional details and working principle of SF6 circuit breaker. | CO3 | 12 |
| b. | Outline the merits and demerits of air blast circuit breaker. | CO3 | 8 |
| (OR) | | | | |
| 8. | a. | Categorize the operation of various types of surge obserbers. | CO2 | 10 |
| b. | Define tower footing resistance? Identify the methods to reduce this resistance? | CO2 | 10 |
|  | | **Compulsory**: |  |  |
| 9. |  | Distinguish the following:  (a)Resistance earthing (b) Reactance earthing (c) Resonant earthing (d) Solid grounding | CO2 | 20 |