

**PHASE II – DESCRIPTIVE TYPE WRITTEN TEST**  
**ASSISTANT ENGINEER (ELECTRICAL)**  
**(Answer ANY 6 questions given below. Total 6\*5 = 30 marks)**

1. What are the conditions to be satisfied for parallel operation of Alternators? Also detail how active & reactive power is controlled for Diesel Generator sets.

2. Explain any three (3) of the following: -

- i. Power factor improvement
- ii. Energy Audit
- iii. Crawling and Cogging of an Induction Motor
- iv. Draw the schematic of generator differential protection
- v. ISO Quality Management Systems

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3. A 1000 kVA, 11kV/433 V transformer having maximum efficiency of 98% occurs at full load. The transformer is on full load for 4 hours, on half load for 6 hours and on 1/10th load for 14 hours per day. Determine the all-day efficiency of the transformer (Assume unity power factor).

4. Explain different methods of neutral grounding.

5. Explain any two (2) of the following: -

- i. Intrinsically safe equipment
- ii. Explosion Proof equipment
- iii. Solar 'Off Grid & On Grid' installation

6. Explain the following:-

- i. Skin effect
- ii. Proximity effect
- iii. Common PPE's used for electrical safety in an industry & its purpose
- iv. How a LOTO program implemented improves electrical safety

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7. Explain different type of starting methods employed for AC 3 phase induction motor, including solid state devices. Mention the advantages and disadvantages, and its commercial overview.

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8. Answer any five (5) of the following: -

- i. A given power supply is capable of providing 6 A for 3.5 h. Its ampere-hour rating is .....
- ii. If the field of synchronous generator is under excited, the power factor will be .....
- iii. In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be .....
- iv. A 200 kVA transformer has full load Cu loss of 1600 W and iron loss of 900 W. It will have maximum efficiency for a load of .....
- v. The electricity bill of a certain establishment is partly fixed and partly varies as the number of units of electricity consumed. When in a certain month 540 units are consumed, the bill is Rs 1800. In another month 620 units are consumed and the bill is Rs 2040. In yet another month 500 units are consumed, the bill for the month would be .....
- vi. Specify the measured parameter with the following instruments:  
a) anemometer b) hygrometer c) hydrometer d) megger

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