



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 120854**

Roll No.

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## B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

### POWER CONVERTERS APPLICATIONS

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1 Attempt any two parts of the following : **10×2=20**

- (a) What is meant by 'Induction Heating' ? Discuss the current source, parallel resonant inverter configuration for this purpose.
- (b) Explain the working of switch-mode welder with high frequency transformer. Also discuss the limitations.
- (c) Compare AC and DC transmissions in terms of economics of transmission, technical performance and reliability.

**2** Attempt any two parts of the following : **10×2=20**

- (a) Explain the operations of 12-pulse converter unit, transformer unit, filters and smoothing reactor units of a HVDC converter station in detail.
- (b) With the help of equivalent circuit, explain how the magnitude of the current harmonics on the DC transmission line could be minimized ?
- (c) Explain thyristor switched capacitor and thyristor controlled inductor schemes for reactive power compensation. Explain why a series inductor is required in thyristor switched capacitor.

**3** Attempt any two parts of the following : **10×2=20**

- (a) Explain the operation of a unified power flow controller (UPFC) with the help of neat schematic diagram.
- (b) Discuss the static excitation control of synchronous generators. How it differs from rotary excitation ?
- (c) Explain the operation of a full-bridge SMPS. What are its advantages and disadvantages ?

**4** Attempt any two parts of the following : **10×2=20**

- (a) Discuss the small hydro and wind generator interconnection schemes with the help of neat circuit diagrams.

- (b) What are various sources of power line disturbances ? Explain different configurations of static UPS system.
  - (c) Describe a typical aircraft power system with the help of neat illustrations.
- 5** Write short notes on any two of the following : **10×2=20**
- (a) Power factor correction capacitors.
  - (b) HVDC links
  - (c) Electronic ballast.
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