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**B.TECH.**

**THEORY EXAMINATION (SEM–VIII) 2016-17**

**POWER CONVERTER APPLICATIONS**

***Time : 3 Hours*** ***Max. Marks : 100***

***Note :*** *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

**SECTION – A**

**1. Explain the following:** **10 x 2 = 20**

**(a)** What is the difference between power diode and signal diode?

**(b)** How can a thyristor be turned off ?

**(c)** What is meant by Commutation?

**(d)** Name the different types of DC links.

**(e)** What are the 2 drawbacks of linear power supply ?

**(f)** Explain the need of the FACTS controllers, specially the distribution line like India.

**(g)** Explain single line diagram and working principle of half wave transmission in power systems.

**(h)** What are the causes of voltage and current harmonics?

**(i)** What are advantages and disadvantages of pulverization?

**(j)** Explain induction heating.

**SECTION – B**

**2. Attempt any five of the following questions:** **5 x 10 = 50**

**(a)** Explain with the block diagram; interconnection of wind and small hydro plant. Also discuss the constraints and difficulties associated with it.

**(b)** A 400 kV, 50 Hz, L = 1 mH/km, C = 11.1 * 10–9 F/km, 600 km long symmetrical line is operated at the rated voltage. Find out the following :—

(i) What is the theoretical maximum power carried by the line ? What is the midpoint voltage corresponding to this condition ?

(ii) A shunt capacitor of value 450 ohms is connected at the midpoint of the line. If the midpoint voltage is 0.95, compute the power flow in the line corresponding to this point.

**(c)** Discuss interconnection of renewable energy sources to utility grid. What are the different complications which take place during the grid interconnections ?

**(d)** Explain the working, equivalent circuit and characteristic of the TSSC and SSVC.

**(e)** How the DC circuit breaker would be connected to Photovoltaic array to protect any load ?

**(f)** Define reactive power control in Power Systems. What are the different types of devices used for reactive power control in Power Systems ?

**(g)** Discuss the necessity of excited control of synchronous generators in detail.

**(h)** Explain Unified Power Flow Controllers (UPFC) and discuss its working principle with suitable diagram.

**SECTION – C**

**Attempt any two of the following questions:** **2 x 15 = 30**

**3** Specification for any system are extremely important, therefore in detail specify the following parts of the INVERTER: (i) Battery Charger, (ii) Battery and Rack, (iii) Critical Load Data, (iv) General Specifications.

**4** With suitable block diagram, explain the working difference between "On-line UPS" and "Off-line UPS".

**5** Discuss high frequency inverters for induction heating. Compare induction and dielectric heating.