

Course Title: Electrical Machines

Course code: EE329

Sheet #2

DC Generators

- 1- A **4** pole dc generator has a wave-wound armature with **792** conductors. The maximum flux per pole is **0.0121** Weber. **Determine** the speed in rpm and rad/sec, at which it should be run to generator 240V on no-load.
- 2- A **separately excited** dc generator has a field resistance of **50 Ω** and armature resistance of **0.125 Ω** . At no-load the generated voltage is **275V** and the full load current is **95A**. The field excitation voltage is **120V**, and the friction, windage, and core-losses are **1500W**. If the machine operates at full-load, **Calculate:**
 - a) The terminal voltage and the power output
 - b) The efficiency
- 3- A **50kW, 250V series** generator has an armature resistance of **0.02 Ω** and a series field resistance of **0.045 Ω** . The stray losses are **2.5kW**. **At rated load calculate:**
 - a) Armature current
 - b) Generated voltage
 - c) Armature copper loss.
 - d) Field copper loss.
 - e) Efficiency
- 4- A **shunt generator** has induced armature voltage of **252V**. At rated full-load the terminal voltage is **240V**. If the armature and shunt field resistances are **0.2 Ω** and **300 Ω** respectively. **Calculate** the full load current.
- 5- **Calculate** the flux per pole required on full-load for a **50kW, 400V, 8-pole, 600r.p.m.** dc **shunt** generator with **256** conductors arranged in **lap**-connected winding. The armature and **shunt** field resistances are **0.1 Ω** and **200 Ω** respectively.
- 6- A **50kW, 250V shunt** generator has an armature and field resistance of **0.02 Ω** and **150 Ω** and the windage, friction and core losses are **1.5kW** at full-load. **Calculate:**
 - a) The load current
 - b) The field current
 - c) The armature current
 - d) The shunt field copper loss
 - e) The armature copper loss
 - f) The efficiency
- 7- A **440V dc shunt** generator has a full-load current of **250A**. Its armature and field resistance are **0.06 Ω** and **100 Ω** respectively. **Find** the mechanical horse power of its prime-mover when it is delivering full-load. Assume windage, friction and core losses are **2000W**.