Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: GENERATION, TRANSMISSION & DISTRIBUTION [ELE 3104]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 01 December 2016** **MAX. MARKS: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.
- Use of ordinary graph sheets may be allowed.

1A. The run off data at a site is given below. Draw Hydrograph and flow duration curve. Assume 30days per month. Flow is in $m^3 \times 10^6$

Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
500	200	1500	2500	3000	2400	2000	1500	1500	1000	800	600

Also find the average power and minimum power generated if head=90m and efficiency is 90%. Find the number of units of Francis turbine required if the specific speed is 300. The synchronous speed is 250 rpm. ***05***

1B. With a neat diagram, describe the general layout and working of a Thermal power plant. ***05***

2A. With a neat sketch, explain the working of Boiling Water Reactor in a Nuclear power plant. State its advantages and disadvantages. ***04***

2B. Discuss the merits and demerits of a Diesel power plant. ***02***

2C. Derive the expression for inductance in composite conductors. Compute the GMR of seven stranded conductor, the radius of each strand being 0.5cm. ***04***

3A. A 3 phase transposed line is composed of Bobolink conductors per phase with flat horizontal spacing of 11 m between two adjacent phases. The conductor has a GMR of 1.5 cm. The line is to be replaced by a two sub-conductor bundle of Hawk conductors. Each sub-conductor has a GMR of 0.9 cm. The new line will also have a flat horizontal configuration, but the Inter-phase spacing is increased to 15 m from centre to centre. The spacing between the conductors in a bundle is 45cm. Determine the %change in inductance and capacitance ***04***

3B. A 345 kV, 3-phase, 200 Km medium line has a per phase series impedance of (0.032 + j0.35) Ω/Km and shunt admittance of j4.2 μ siemens/Km. Using nominal π model, determine the transmission line ABCD parameters. Find the sending end voltage, current and power, voltage regulation and efficiency when the line delivers 700 MW, 0.99 pf leading at 95% of rated voltage. ***04***

3C. Write a short note on (i) Ferranti effect (ii) Proximity effect ***02***

4A. A 3-phase overhead line has a series impedance of 10 + j30 ohms per phase. For receiving and sending end voltages of 132 kV and 140 kV respectively draw the receiving end power circle and determine i) the maximum real power which the line can supply and the load angle for drawing this maximum power ii) the capacity of shunt compensation equipment for supplying a load of 150 MVA at 0.8 p.f. lagging and power angle for this load condition iii) the capacity of shunt compensation equipment needed to maintain the above voltages under no load condition and iv) the unity p.f. load which the line can supply with voltages at above values. ***07***

4B. A transmission line has a span of 200 meters between level supports. The conductor has a cross sectional area of 1.29cm^2, weighs 1170kg/km and has a breaking stress of 4218kg/cm^2. Calculate sag for a safety factor of 5, allowing a wind pressure of 122kg/m^2 of projected area. What is vertical sag? ***03***

5A. A 3 phase line is supported by suspension string having three units. The voltage across the unit nearest to the line is 20kV and that across the adjacent unit is 15kV. Find i) ratio of the capacitance of joint to capacitance to disc ii) system line voltage and iii) string efficiency. ***04***

5B. What is corona? What is the effect of conductor radius on corona loss? ***02***

5C. Derive the expression for capacitance/ph of a 3 core belted cable. Explain the tests to be conducted to measure the capacitance/ph. ***04***