Student Exam No: _____

GANPAT UNIVERSITY
B. TECH SEM-VIII (ELECTRICAL ENGINEERING)
REGULAR EXAMINATION APRIL-JUNE 2017
2EE833 EHVAC & HVDC TRANSMISSION

Time: 3 Hours **Total Marks: -70**

Instructions: - 1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

SECTION-I

Q:1 **(A)** Enlist main type of insulators and give brief description on insulator requirement in EHVAC transmission line. **(06)**

(B) The spacing between two circuits of a 3-phase, vertically configured double circuit overhead line is 8 m and distance between adjacent phase conductors in individual circuit is 4 m. The phase sequence is ABC and the line is completely transposed. The conductor radius in 1.6 cm. Find the inductance per phase per kilometer. **(06)**

OR

Q:1 **(A)** Analyze 12 pulse converter also discuss its application? **(06)**

(B) What do you mean by phase control? Explain individual phase control & Equidistant phase control. **(06)**

Q:2 **(A)** What are the modern trends in HVDC transmission technology? Explain in detail. **(05)**

(B) Discuss advantages of EHVAC Transmission line over HVDC system of transmitting power. **(06)**

OR

Q:2 **(A)** Draw block diagram of HVDC-VSC system and discuss about the function of each component? **(07)**

(B) High voltage rectifier has no load ideal DC voltage of 375 kV. The DC current is 1.9 A & actual DC voltage is 260 V. Find reactive power consumed by rectifier? **(04)**

Q:3 **(A)** Why transmission of electrical power at extra-high voltage is preferred? Explain in detail with equations. **(05)**

(B) A Single phase overhead AC line has inductance/km as 2mH and a capacitance of 0.125x10-7 F/km. Estimate the surge impedance loading of the line when the system voltage is 400KV. **(03)**

(C) Explain in brief. **(04)**

A. Aeolian Vibration
B. Galloping

SECTION-II

Q:4 **(A)** A power of $12*10^3$ MW is required to be transmitted over a distance of 1000 km. The values of r=0.003 & x=0.25 At different voltage levels of 800KV,1000KV & 1200 kV. Determine:(i) Possible number of circuits required with equal magnitudes for sending and receiving end voltages with 30° phase difference. (ii) The value of transmission currents. (iii) The total system line losses. **(09**

(B) What do you mean by critical disruptive voltage? How does it differ from visual critical voltage? **(03**

OR

Q:4 **(A)** A power of 2000 MW is to be transmitted from a super thermal power station in Central India over 800 km to Delhi. Use 750 kV transmission line. Suggest the number of circuits required with 50% series capacitor compensation, and calculate the total power loss and loss per km. (Consider values of r=0.0136, x=0.272 and take δ=30°) **(08**

(B) Deduce the relationship of % P=100(sin δ)(r/x). **(04**

Q:5 **(A)** Elaborate basic operational issues involved with High Voltage DC transmission system? **(05**

(B) The configuration of some EHV lines for 400 kV to 1200 kV are given. Calculate GMR for each bundle conductor. **(06**

(a)	400 kV :	N=2	d=3.18 cm	B=45 cm
(b)	750 kV :	N=4	d=3.46 cm	B=45 cm
(c)	1000 kV :	N= 6	d=4.6 cm	B=12 d
(d)	1200 kV :	N= 8	d=4.6 cm	R=0.6 m

OR

Q:5 **(A)** What do you mean by conductor bundling? Discuss about advantages of bundle conductors? **(05**

(B) A 400-kV Indian transmission line uses a 2-conductor bundle with d_m = 0.0318 m for each conductor. The phase current is 500 Amps per conductor. The area of each conductor is 515.7 mm^2, ϱa = 2.7×10^{-8} ohm-m at 20°c, α = 0.0045 ohm/°C at 20° c. Take the ambient temperature t_a = 40°C, atmospheric pressure p = 1, wind velocity v_m = 1 m/s, e = 0.5 and neglect solar irradiation. Calculate the final temperature of conductor due to only to I^2R loss heating. (Take L=1.05m). **(06**

Q:6 **Attempt any two.** **(12**

(A) Discuss the following types of bundle conductors:(A)AAC (B)AAAC (C)ACSR

(B) A 3-phase line has conductors 2 cm in diameter spaced equilaterally 1 m apart. If the dielectric strength of air is 30 kV (max) per cm, find the disruptive critical voltage for the line. Take air density factor δ=0.952 and irregularity factor m0 = 0.9.

(C) Explain factor affecting corona effect ?

END OF PAPER

Best of Luck