## B.E.(with Credits)-Regular-Semester 2012-Electrical Engineering & (E. & P.) Sem VII Elective-I : EP : EHV AC-DC Transmission

P. Pages : 2 Time : Three Hours			$ \begin{array}{c}                                     $	<b>GUG/W/16/6557</b> Max. Marks : 80	
1.	Note	es : 1. 2. 3. 4. 5. 6. Derive t	All questions carry equal marks. Illustrate your answers wherever necessary with the help of neat sketches. Due credit will be given to neatness and adequate dimensions. Assume suitable data wherever necessary. Use of non programmable calculator is permitted. Student may solve the questions per internal choice. he cosine law of voltage gradient for two bundle conductor.	7	
	b)	For a 40 phases i line The othe (H) Hei Spacing 2 sub co Per phas Separati	0 kV line, calculate the maximum surface voltage gradient on the centre and outer n horizontal configuration at the maximum operating voltage to 420 kV line to er dimension are : ght = 13 M (S) = 11 M onductor (N) = 2 se of radius (r) = 0.0159 M on (B) = 0.45 M OR	9	
2.	a)	What ar	e the factors that decide the power handling capacity of AC transmission line?	6	
	b)	A powe 750kV a Suggest power le	r of 2000 MW is to be transmitted over a distance of 800 kM. Use 400 kV and alternatives. the number of ckts required with 40% series compensation and calculate the total oss.	9	

The value of r and x are as follow :

Voltage	r	Х
(kV)	$(\Omega/km)$	$(\Omega / km)$
400	0.031	0.372
750	0.0136	0.272

- **3.** Write short notes :
  - i) Primary shock current and let-go current.
  - ii) Effect of high electrostatic field.
  - iii) Measurement of electrostatic field.

OR

**4.** a) Explain charge-voltage diagram with corona.

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	b)	Describe in short how can the reduction of corona loss be achieved.			
	c)	Find the critical disruptive voltage and the critical voltage for local and general corona on a 66 kV, $3\phi$ overhead line consisting of three stranded copper conductor spaced 2.5 M apart at the corners of an equilateral triangle. Air temp. and pressure are 21°C and 73.6 cm of Hg respectively. The conductor diameter is 10.4 mm.	7		
5.	a)	What are various kinds of dc link ? Explain briefly with applications.	6		
	b)	State the merits of HVDC as compared to EHVAC for long length high power lines transmission.	5		
	c)	What are the troubles caused by earth current? Also state the remedial measures.	5		
		OR			
6.	a)	State the factors to be considered in selecting a site of earth electrode.			
	b)	Derive an expression for the earth resistance of earth electrode.			
	c)	A bridge connected rectifier is fed form 220 kV/110 kV transformer with primary connected to 220 kV. Determine the dc output voltage when the commutation angle is 15° and the delay angle - i) 30° and ii) 45°.			
7.	a)	Draw and explain control characteristics of converter under different load condition.	7		
	b)	What objectives are achieved when dc system is operated in parallel with ac system ?			
	c)	State harmful effects of AC and DC harmonics.			
8.		Write short notes : OR	16		
		i) DC Harmonic filter			
		ii) Cost consideration of AC harmonic filter.			
		iii) Single frequency tuned filter.			
9.	a)	State why HVDC circuit breaker are not necessary in main poles of HVDC system.	4		
	b)	How the commutation principle is used for HVDC circuit breaker.	6		
	c)	Describe the function of MRTB.	6		
		OR			
10.	a)	Compare the protection philosophy of EHVAC and HVDC transmission system.	5		
	b)	Explain the method of sensing and clearing of a pole to earth fault on DC side of	6		
	c)	Explain the term switching energy related with HVDC circuit breaker.	5		