Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Programme Name: **B.tech Electrical & PSE** **Semester : V**
Course Name : Power transmission & distribution **Time : 03 hrs**
Course Code : EPEG 3001 **Max. Marks : 100**
Nos. of page(s) : 2

SECTION A

S. No.		Marks	CO
Q 1	The calculations performed using short-line approximate model instead of nominal pi model for a medium length transmission line delivering lagging load at a given receiving-end voltage always results in higher. 1. Sending end current 2. Sending end power 3. Regulation 4. Efficiency Which of these statements are correct?	**5**	**CO2**
Q.2	The reactance of a generator designated X'' is given as 0.25 pu based on the generator's name plate rating of 18 kV, 500 MVA. If the base for calculations is changed to 20 kV, 100 MVA, what will be generator reactance X'' on new base?	**5**	**CO1**
Q.3	When a travelling wave travelling along a loss-free overhead lie does not result in any reflection after it has reached the far end.	**5**	**CO2**
Q.4	A 3-phase overhead transmission line has its conductor horizontally spaced with spacing between adjacent conductors equal to 'd'. If, now the conductors of the lines are rearranged to form an equilateral triangle of sides equal to 'd', then what will be impact on line average inductance and capacitance?	**5**	**CO1**
	SECTION B		
Q.5	Determine the efficiency and regulation of a 3-phase, 100 km, 50 Hz transmission line delivering 20 MW at .8 lagging p.f. and 66 kV to a balanced load. The conductors are of copper, each having resistance 0.1 ohm per km, 1.5 cm outside dia, spaced equilaterally 2 meters between centers. Neglect leakage and use nominal pi method.	**10**	**CO3**
Q.6	Show that the inductance per unit length of an overhead line due to internal flux linkage is constant and is independent of size of conductor. **OR** Explain the concept of GMD and mutual GMD for evaluating inductance of transmission lines.	**10**	**CO2**
Q.7	Show that for long transmission line, at any point, voltage is the sum of these two components i.e., sums of incident and reflected voltages.	**10**	**CO3**

Q.8	A single phase transmission line has conductors of diameter 1.25 cm and spaced 2.5 meters apart. Derive an expression for the potential gradient at any point on a line joining the centers of the conductors if the operating voltage of line is 60 kV. Calculate the voltage at which corona will start. **OR** Derive an expression for critical visual disruptive voltage for corona, taking into account irregularity factor.	**10**	**CO3**
SECTION-C (Attempt any two question)			
Q.9	A single circuit 50 Hz, 3-phase transmission line has the following parameters per km: R = 0.2 ohm, L = 1.3 mH and C = 0.01 micro F The voltage at the receiving end is 132 kV. If the line is open at the receiving end, find the rms value and phase angle of the following: (i) The incident voltage to neutral at the receiving end (ii) The reflected voltage to neutral at the receiving end. (iii) Efficiency of the line if the line is 120 km long and delivers 40 MW at 132 kV and 0.8 p.f. lagging	**5+5+ 10**	**CO3,4**
Q.10	Derive an expression for sag and tension in a power conductor strung between two supports at equal heights taking into account the wind and ice loading.	**20**	**CO4**
Q.11	How grading of cables can reduce the size of cable for same operating voltage, justify your answer by considering capacitance grading	**20**	**CO5**