



R20 Regulation

Subject code: 3P5BC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech V Semester Supplementary Examinations, November 2025

POWER SYSTEMS-II

(EEE)

Maximum Marks: 70

Date: 10.11.2025

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		Marks	CO	BTL
1	What are main components of overhead lines?	2M	1	L1
2	Define GMD & GMR.	2M	1	L1
3	Write equations for A B C D parameters of Nominal-T method of medium transmission line.	2M	2	L1
4	Define voltage regulation and efficiency of transmission line.	2M	2	L1
5	Define characteristics impedance and propagation constant.	2M	3	L1
6	What the advantages and disadvantages of long transmission line.	2M	3	L1
7	Define Skin effect.	2M	4	L1
8	What is Travelling Wave Phenomenon	2M	4	L1
9	Define Sag and factors affecting the sag.	2M	5	L1
10	Classify different types of insulators.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	Derive the expression for the inductance of three phase single circuit line with Unsymmetrical spacing (Transposed lines).	10M	1	L2
OR				
12	In a 3 phase transmission line the conductors are placed at the corners of an equilateral triangle of each side 2.5cm. If the radius of each conductor is 0.8cm find the inductance per phase per kilometer.	10M	1	L2
13	Explain a medium transmission line with nominal π method and nominal-T method.	10M	2	L2
OR				
14	A three phase transmission line is 135 km long. The series impedance is $Z=0.04 + j 0.95$ ohm per phase per km, and shunt admittance is $Y=j 5.1 \times 10^{-6}$ mho per phase per km. The sending end voltage is 132 kV and the sending end current is 154 A at 0.9 power factor lagging. Determine the voltage, current and power at the receiving end and the voltage regulation using medium line-T model.	10M	2	L2

15	Derive the expressions for VS, IS and A B C D parameter with analysis of Long Transmission Line (Rigorous method).	10M	3	L2
OR				
16	A 3- ϕ transmission line 200 km long has the following constants: Resistance/phase/km = 0.16 Ω Reactance/phase/km = 0.25 Ω Shunt admittance/phase/km = 1.5×10^{-6} S Calculate by rigorous method the sending end voltage and current when the line is delivering a load of 20 MW at 0.8 p.f. lagging. The receiving end voltage is kept constant at 110 Kv.	10M	3	L2
17	a) What is corona? What are the factors affecting corona? b) Compare skin and proximity effect.	5M 5M	4	L2
OR				
18	Discuss the phenomenon of wave reflection and refraction. Derive expression for reflection and refraction coefficients for open circuit and short circuit lines.	10M	4	L2
19	An overhead line is erected with span of 150m on level supports. The conductor which has an effective diameter of 20mm a cross-sectional area of 300mm ² and weighs 2.3 Kg/m is subjected to a wind pressure of 382 N/m ² of projected area. Assuming a maximum stress of 100 KN/m ² , estimate, approximately the sag under given conditions.	10M	5	L2
OR				
20	A 3-phase overhead transmission line is being supported by three disc insulators. The potential across top unit and middle unit are 8 kV and 11 kV respectively. Calculate: (a) Ratio of capacitance between pin and earth to the self-capacitance of each unit, (b) The line voltage, (c) String efficiency.	10M	5	L2