



# GOVERNMENT COLLEGE OF ENGINEERING, JALGAON

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Name of Examination : **Winter 2020** - (Preview)

Course Code & Course Name : **ET402 - Satellite and Mobile Communication**

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Maximum Marks : **60**

Duration : **3 Hrs**

[Edit](#) [Print](#) [View Answer Key](#) [Close](#) **Answer Key Submission Type:** Marking scheme with model answers and solutions of numerical

Instructions:

1. Solve any four questions.
2. Illustrate your answer with suitable figures/sketches wherever necessary.
3. Assume suitable additional data; if required.
4. Use of logarithmic table, drawing instruments and non programmable calculators is allowed.
5. Figures to the right indicate full marks.

- 1) a) Define and explain three laws of Kepler to describe the motion of an artificial satellite around earth. [7]
- b) A satellite link operating at 14 GHz has receiver feeder losses of 1.5 dB and a free-space loss of 207 dB. The atmospheric absorption loss is 0.5 dB, and the antenna pointing loss is 0.5 dB. Depolarization losses may be neglected. Calculate the total link loss for clear-sky conditions. [4]
- c) Explain the following orbital effects: [4]
  1. Solar eclipse
  2. Sun transit outage
- 2) a) Explain GSM channel types in detail. [6]
- b) What is IEEE 802.11 Wireless LAN (WLAN) technology? [5]
- c) An antenna has a noise temperature of 35 °K and is matched into a receiver which has a noise temperature of 100 K. Calculate - [4]
  1. The noise power density
  2. The noise power for a bandwidth of 36 MHz.
- 3) a) Write a short note on ionospheric depolarization. [6]
- b) Enlist the advantages of satellite communication. [5]
- c) Explain the orbital perturbations due to gravitational and non-gravitational forces. [4]
- 4) a) Calculate the semi major axis , semi minor axis and eccentricity of orbit if a satellite has apogee height of 42000km and perigee height of 620 km. [7]
- b) Explain the following techniques used for improving the coverage and capacity in cellular systems: [8]
  1. Cell splitting
  2. Sectoring
- 5) a) Explain forward and reverse CDMA channel. [7]
- b) If a 20 MHz of total spectrum is allocated for a duplex wireless cellular system, each simplex channel has 25kHz RF bandwidth. Find the total number of duplex channels and The total number of channels per cell site if N=4 cell reuse is used. [4]
- c) Explain the services provided by GSM. [4]

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