

ASSIGNMENT BOOKLET
Bachelor's Degree Programme (B.Sc.)

COMMUNICATION PHYSICS

Valid from January 1, 2020 to December 31, 2020

**It is compulsory to submit the Assignment before filling in the
Term-End Examination Form.**

Please Note

- You can take electives (56 or 64 credits) from a minimum of TWO and a maximum of FOUR science disciplines, viz. Physics, Chemistry, Life Sciences and Mathematics.
- You can opt for elective courses worth a MINIMUM OF 8 CREDITS and a MAXIMUM OF 48 CREDITS from any of these four disciplines.
- At least 25% of the total credits that you register for in the elective courses from Life Sciences, Chemistry and Physics disciplines must be from the laboratory courses. For example, if you opt for a total of 64 credits of electives in these 3 disciplines, at least 16 credits out of those 64 credits should be from lab courses.
- You cannot appear in the Term-End Examination of any course without registering for the course. Otherwise, your result will not be declared and the responsibility will be yours.



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2020

Dear Student,

We hope you are familiar with the system of evaluation to be followed for the Bachelor's Degree Programme. At this stage you may probably like to re-read the section on assignments for Elective Courses in the Programme Guide that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, which would consist of **one tutor-marked assignment (TMA)** for this course. **Submit your assignment response at your Study Centre.**

Instructions for Formatting Your Assignments

Before attempting the assignment please read the following instructions carefully:

- 1) On top of the first page of your TMA answer sheet, please write the details exactly in the following format:

ENROLMENT NO. :

NAME :

ADDRESS :

.....

.....

COURSE CODE :

COURSE TITLE :

ASSIGNMENT CODE :

STUDY CENTRE : DATE :

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

- 2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 4) Your answers should be precise and in your own words. Do not copy answers from study material.
- 5) While solving problems, clearly indicate the question number along with the part being solved. Write units at each step of your calculations as done in the text because marks will be deducted for such mistakes. Take care of significant digits in your work. Recheck your work before submitting it.
- 6) **This assignment will remain valid from January 1, 2020 to December 31, 2020.** However, you are advised to submit it within **12 weeks** of receiving this booklet to accomplish its purpose as a teaching-tool.

We strongly recommend that you should retain a copy of your assignment response to avoid any unforeseen situation. If possible, please attach a photocopy of this assignment along with your response.

You could obtain response to the difficulties you may face in PHE-16 course via e-mail by writing to **sgokhale@ignou.ac.in**. Please note that, we do not provide answers to Assignment questions.

We wish you good luck.

Tutor Marked Assignment COMMUNICATION PHYSICS

Course Code : PHE-16
Assignment Code: PHE-16/TMA/2020
Max. Marks: 100

Note: Attempt all questions. Symbols have their usual meanings. The marks for each question are indicated against it.

1. State **with reasons** whether the following statements are True or False. (2×10)
 - i) Optical fibre is an ideal medium for microwave transmission.
 - ii) Adding redundant bit in a transmitted signal ensures error free communication.
 - iii) A transmission line with infinite VSWR is ideal for signal transmission.
 - iv) Bandwidth of frequency modulated (FM) signal is narrower than that of amplitude modulated (AM) signal.
 - v) Amplitude shift keying is modulation of digital carrier by analog signal.
 - vi) GSM is a spread spectrum technology.
 - vii) TRF receivers are preferred over super-heterodyne receivers in audio communication.
 - viii) Schottky diode can handle higher frequency signals than $p-n$ junction diode.
 - ix) Assembly language programmes are portable.
 - x) Same web browser can be used to access Internet as well as Intranet network.

2. a) In case of a receiver explain the following terms with the help of graphs: (i) sensitivity, (ii) half power point, (iii) linearity and (iv) fidelity. What should be their ideal behaviour/value? (8)
b) Why do we prefer repeating waveforms for characterizing any communication system? (2)

3. a) Draw the circuit representing a practical transmission line in terms of lumped components. What are the values of R and G in case of ideal transmission line? Why? (2+1+2)
b) A computer key board has 108 keys. Assuming equal probability of any key pressing calculate the information content, I , carried by each key. Prove that this information is more than the information carried by a key on the number pad of a touch tone telephone. [**Hint:** Touch phone has 16 keys on its pad] (3+2)

4. a) 20 kHz audio signal is amplitude modulated over a 100 kHz carrier frequency. The peak amplitude of carrier wave is 10 V. If the modulation index is 0.8, find out the frequencies present in the modulated output. Also calculate the ratio of maximum and the minimum amplitude of the envelope of modulated signal. (5)
b) Depict the digital signal 1001101110 in (i) unipolar RZ, (ii) bipolar NRZ, and (iii) Manchester code. (1+1+3)

5. a) Explain the time division switching used in telephony. (5)
- b) Design a TDM system to handle 3 PAM channels if the maximum input frequency of each channel is 5 kHz. (5)
6. a) Explain the special features of stereo receiver circuit as compared to normal FM receiver. (5)
- b) Explain the functions of blanking and synchronizing pulses in a television receiver. How are these functions accomplished by using a sync separator circuit? (2+3)
7. a) Discuss the various types of microwave horn antennae on the basis of their construction, directivity and applications. (5)
- b) Compare the different types of optical fibres on the basis of their construction. Explain, how the modal dispersion is avoided in case of graded index fibre. (3+2)
8. a) Explain the process of instruction execution in a van Neumann machine. (5)
- b) Describe the two main LAN protocols. How is data collision avoided in case of token ring protocol? (3+2)
9. a) Compare the merits and demerits of various types of datagram switching methods. (5)
- b) What is blue tooth technology? How are the concerns regarding the interference among blue tooth device connections resolved? (2+3)
