



Name: Roll No.:

Branch: Signature of Invigilator:

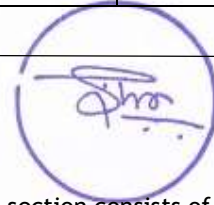
Semester: VIth

Date: 02/05/2022 (MORNING)

Subject with Code: EE417 FUNDAMENTALS OF COMMUNICATION SYSTEMS

| Marks Obtained | Section A (30) | Section B (20) | Total Marks (50) |
|----------------|-------------------|-------------------|---------------------|
| | | | |

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
END SEMESTER EXAMINATION

CLASS : B. TECH.
BRANCH : EEE

SEMESTER: VI
SESSION: SP/2022

SUBJECT: EE417 Fundamentals of Communication System

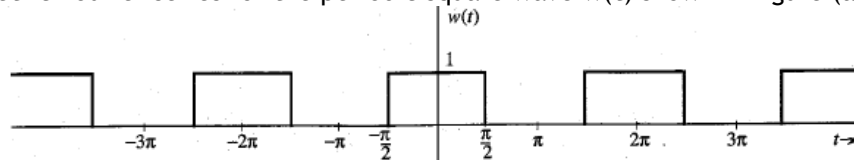
TIME : 2 HOURS
INSTRUCTIONS:

FULL MARKS: 50

1. The question paper has two sections, Part-A and Part-B. The Part-A contains 30 MCQ questions each of 1 mark and Part-B contains 8 subjective questions each of 2.5 marks. Candidates must attempt all.
2. The MCQs should be answered by ticking (✓) the most appropriate options.
4. The missing data, if any, may be assumed suitably.

Part-A

Q1. Find the trigonometric Fourier series for the periodic square wave $w(t)$ shown in figure (assume $\omega_0 T_0 = 2\pi$)



- a) $\frac{1}{2} + \frac{2}{\pi}(\cos\omega_0 t - \frac{1}{3}\cos 3\omega_0 t + \frac{1}{5}\cos 5\omega_0 t - \frac{1}{7}\cos 7\omega_0 t + \dots)$ b) $\frac{1}{2} + \frac{4}{\pi}(\cos\omega_0 t - \frac{1}{3}\cos 3\omega_0 t + \frac{1}{5}\cos 5\omega_0 t - \frac{1}{7}\cos 7\omega_0 t + \dots)$
- c) $\frac{1}{4} + \frac{2}{\pi}(\cos\omega_0 t - \frac{1}{3}\cos 3\omega_0 t + \frac{1}{5}\cos 5\omega_0 t - \frac{1}{7}\cos 7\omega_0 t + \dots)$ d) $\frac{1}{4} + \frac{1}{\pi}(\cos\omega_0 t - \frac{1}{3}\cos 3\omega_0 t + \frac{1}{5}\cos 5\omega_0 t - \frac{1}{7}\cos 7\omega_0 t + \dots)$
- Q2. Which of the following is correct with reference to Parseval's Theorem for aperiodic signal $\int_{-\infty}^{\infty} |x(t)|^2 dt$?
- a) $\int_{-\infty}^{\infty} |X(F)|^2 dF$ b) $\int_{-\infty}^{\infty} |X^*(F)|^2 dF$
c) $\int_{-\infty}^{\infty} |X(F)X^*(F)| dF$ d) All of these
- Q3. Which of the following relations are true if $x(n)$ is real?
- a) $X(\omega) = X(-\omega)$ b) $X(\omega) = -X(-\omega)$
c) $X^*(\omega) = X(\omega)$ d) $X^*(\omega) = X(-\omega)$
- Q4. If $X(\omega)$ is the Fourier transform of the signal $x(n)$, then what is the Fourier transform of the signal $x(n-k)$
- a) $e^{j\omega k} \cdot X(-\omega)$ b) $e^{j\omega k} \cdot X(\omega)$
c) $e^{-j\omega k} \cdot X(-\omega)$ d) $e^{-j\omega k} \cdot X(\omega)$
- Q5. Find the Fourier transform of $j/\pi t$
- a) $\text{sinc}(\omega)$ b) $\text{sa}(\omega)$
c) $\delta(\omega)$ d) $\text{sgn}(\omega)$
- Q6. The Fourier transform of a Gaussian pulse is also a Gaussian pulse
- a) True b) False
- Q7. Find the Fourier transform of $\exp(j\omega_0 t)$
- a) $\delta(\omega + \omega_0)$ b) $2\pi\delta(\omega + \omega_0)$
c) $\delta(\omega - \omega_0)$ d) $2\pi\delta(\omega - \omega_0)$
- Q8. Find the Fourier transform of $u(-t)$
- a) $\pi\delta(\omega) + 1/\omega$ b) $\pi\delta(\omega) + 1/j\omega$
c) $\pi\delta(\omega) - 1/j\omega$ d) $\delta(\omega) + 1/j\omega$
- Q9. Telephones send information through wires in form of _____
- a) radio signals b) electrical signal
c) electromagnetic waves d) microwaves
- Q10. A carrier of peak voltage 15 V is used to transmit a message signal. If the modulation index is 80%, then what will be the peak voltage of the modulating signal?
- a) 10 V b) 11 V
c) 12 V d) 13 V
- Q11. An AM signal is represented by $x(t) = [20 + \sin(500\pi t)]\cos(2\pi \times 10^5 t)$ V. What is the modulation index?
- a) 0.2 b) 0.25
c) 0.4 d) 0.5
- Q12. An AM signal is represented by $x(t) = (20 + \sin(500\pi t))\cos(2\pi \times 10^5 t)$ V. What is the total signal power?
- a) 225 b) 250
c) 200 d) 400
- Q13. A carrier is simultaneously modulated by two sine waves with modulation indices of 0.4 and 0.3. The resultant modulation index will be
- a) 1.0 b) 0.7
c) 0.5 d) 0.35
- Q14. Identify the one that is not required in the process of production of amplitude modulated wave?
- a) Square law device b) Rectifier
c) Bandpass filter d) Combination of message and carrier signal



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