

University Institute of Engineering & Technology

(Recognised Under Section 2(f) and 12B of UGC)

Kurukshetra University, Kurukshetra

TIME – 3 Hrs 15Min

THEORY EXAMINATION – DEC. 2020

B.TECH - ECE

SEMESTER - III

M.M. - 75

PAPER - BS-201

SUBJECT- Optics and Waves

INSTRUCTIONS TO BE FOLLOWED

- Allotted time for examination is 3 hours 15 minutes that includes time for downloading the question paper, writing answers, scanning of answer sheets and E-mailing the PDF files to the designated Email ID.
- For ECE-A Regular Students, the Email ID is:- btech3rdecea@kuk.ac.in
- For ECE-B Regular and All Reappear Students, the Email ID is:- btech3rdeceb@kuk.ac.in
- The candidates will be required to attempt 75% of the question paper (maximum) by choosing to their any best questions accumulating 56 marks.
- The PDF files should be saved as Roll No. and Subject Code. Proper attention should be given while sending the email and in the subject line, the Roll Number and Subject Code should be mentioned.
- Maximum Page Limit should be 20 (Twenty) for attempting the question paper on A4 sheets which could be downloaded and printed from the sample sheets given in the Kurukshetra University Examination guidelines.
- Over-attemptation should be avoided.
- Handwriting should be neat and clean and diagrams should be clear and contrasted.
- The candidate should not write their Mobile No. otherwise Unfair Means Case will be made.
- While attempting the paper, the candidate will use blue/black pen only.
- Before attempting the paper, the candidate will ensure that he/she has downloaded the correct question paper. No complaint for attempting wrong question paper by the candidate will be entertained.
- Candidate must ensure that he/she has put his/her signature on each page of the answer sheet used by him/her. Answer sheet without the signature of the candidate will not be evaluated.

PART-A

Q. No. – 1 Answer the following questions.

15x1=15

(i)	Give examples of mechanical waves.
(ii)	Define phase velocity?
(iii)	What are electromagnetic waves?
(iv)	What is Bandwidth?
(v)	Write two conditions for sustained interference.
(vi)	What do you mean by division of amplitude?
(vii)	Mention names of two experiments, which are based on division of wavefront.
(viii)	Write the condition for constructive interference due to transmitted light.
(ix)	What do you understand by overlapping spectra of diffraction grating?
(x)	Write types of diffraction.
(xi)	What is Brewster's law?
(xii)	What is the use of half-wave plate?
(xiii)	What is the difference between direct and indirect pumping?
(xiv)	Why Population Inversion is required for the production of LASER?
(xv)	How optical resonators are useful in LASER formation?

PART-B

2	Describe the mathematical representation of travelling waves.	5
3	How Fresnel's biprism is used to determine wavelength of monochromatic light?	5
4	Write a note on Nicol prism.	5
5	Explain the characteristics of LASER light.	5

PART-C

6	Explain the terms: energy density, the Poynting vector and Intensity.	10
7	What are boundary conditions? Develop mathematical expressions for Reflection and Transmission coefficient when wave incident normally on boundary.	10
8	What are Newton's rings? Explain the formation of Newton's rings in reflected light.	10
9	Explain theory, construction and working of Michelson's interferometer.	10
10	Explain Fraunhofer diffraction at a single slit.	10
11	Define Specific rotation. Describe the construction and working of biquartz polarimeter.	10
12	Explain the principle, construction and working of Ruby LASER.	10
13	Discuss Einstein's coefficients. Derive relation between them.	10