For better preparation, better understanding and better results

1. Find your strong points and weaknesses. (e. g. either theory or numerical and select your favorite chapters.)
2. Get idea of questions by preparing last 2-3 years GTU question papers.
3. Try to focus maximum on your strong areas and don't leave anything not prepared from these areas.
4. Make your own summary notes while studying.
5. If you have language problem and can't remember or write long answers then,
   a. Focus on numerical and remember all formulas given below. Don't forget to write the units.
   b. Prepare definitions and short questions
   c. Remember diagrams used in long questions and their introductory sentences.
   d. Remember mathematical equations by written practice.
6. Write and present well.
   a. Answer the questions you know well, first.
   b. Underline the important points.
   c. Use diagrams or figures or circuits wherever possible.
   d. Consider the mark weightage of question and explain accordingly.

Ch. No.	Definitions	Formulas	Full form	Long Question
1	Types of sound waves Properties of musical sound & noise, Characteristics of musical sound, Intensity & Intensity level, Absorption coefficient, Reverberation time	$\mathrm{IL} = 10\log_{10}\left(\frac{I}{I_0}\right)$ $T = \frac{0.165V}{\sum aS}$ $\text{Intensity of sound} = \frac{\text{Radiating power}}{\text{Area}} = \frac{P}{4\pi r^2}$	OWU	Factors affecting acoustics of the building Characteristics of musical sound
2	Properties of ultrasonic, Magnetostriction method, Piezoelectric effect, inverse Piezoelectric effect, acoustic grating, examples of piezoelectric materials	$f_2 = \frac{P}{2l}\sqrt{\frac{E}{\rho}}$ $v = 2\nu n\lambda/\sin\theta_n$ $f_1 = \frac{1}{2\pi\sqrt{L_2 C}}$	SONAR	Explain: Magnetostriction oscillator, Piezoelectric oscillator, acoustic grating
3	crystalline structures; amorphous solid; space lattice; basis; unit cell; miller indices; primitive cell; coordination number; atomic packing factor	$a^3 = \frac{nM}{\rho N_A}$, $d_{hkl} = \frac{a}{\sqrt{h^2+k^2+l^2}}$ For BCC $a = \frac{4}{\sqrt{3}}r$;		Derive relation between inter planner distance and cube edge a. Explain Miller indices

		For FCC $a=\frac{4r}{\sqrt{2}}$		
4	Principles and applications of: LED, Solarcell, Varactor diode. Hall effect	$\lambda=\frac{hc}{E_g}$ $R_H=\frac{1}{ne}$ $J=\frac{I}{bt}$, $R_H=\frac{tV_H}{IB}$ $\sigma_n=\mu_e ne$, $\mu_e=-\sigma_n R_H$ $E_H=\frac{V_H}{b}$	LED	Give principle, Construction, working and applications of: LED, Solarcell, Varactor diode, PN junction diode, Zener diode. Explain Hall effect
5	Metastable State, Population Inversion, Optical Pumping, Spontaneous and stimulated emission, optical resonator	$\lambda=\frac{hc}{E_g}$	LASER, Nd:YAG laser	Characteristics of LASER, Einstein theory of radiation, Explain Construction, working and applications of: Nd:YAG laser, CO_2 laser, Semiconductor laser, Holography
6	Fibre optic system, Kevlar, Acceptance angle, Critical angle, Total Internal, Reflection, Index profile, step index optical fibre.	$\theta_c=\sin^{-1}\left(\frac{n_1}{n_2}\right)$ $\phi_{max}=\sin^{-1}\left(n_1^2-n_2^2\right)^{1/2}$ $NA=\sin\phi_{max}=\sqrt{n_1^2-n_2^2}$	TIR	Advantages of Optical fiber (OF), Derivation of acceptance angle and Numerical aperture, Construction of OF, Differences between: Single mode and Multi mode OF, Step index and graded index OF
7	Electrical Conductivity, Drift-velocity, mobility of charge carrier, Relaxation time, Mean free path, Current density, Thermal conductivity, thermal resistance, Lorentz number (unit), State Wiedemann-Franz law	$\sigma=ne\mu$ $\sigma=\frac{ne^2\tau}{m}$ $\sigma=ne^2\lambda\sqrt{\frac{1}{3mkT}}$ $\frac{K}{\sigma}=LT$		Postulates, success and limitations of Classical free electron theory; Derivation of electrical conductivity in terms of mobility, Relaxation time and Mean free path; Derivation of thermal conductivity
8	Superconductivity, Critical magnetic field, Critical	$H_c=H_0[1-(T/T_c)^2]$	HTS,	Properties of superconductor, Meissener effect, Type-1 and type-2

	temperature, Meissner effect, Isotope effect, Critical current density, Josephson Junction, Maglev		MagLev SQUID	superconductors, Applications of superconductor
9	NDT, Objective of NDT, Principle of Radiography, Types of flaw, Steps of liquid penetrant method, X-ray fluoroscopy method	$f_2 = \frac{P}{2l}\sqrt{\frac{E}{\rho}}$	NDT	Describe: Liquid penetrant method, Radiography method, Ultrasonic inspection
10	Metallic glass, Shape memory effect, pseudo elasticity,		SME	Short note on: Metallic glass, Nano materials, Bio materials, Shape memory alloys