

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Summer Examination – 2026

Course: F.Y.B.Tech.

Branch: All Branch

Semester: II

Subject Code & Name: BTBS202P/PHY1202 & Engineering Physics

Max Marks: 60

Date 11/07/2026

Duration: 3 Hr.

Instructions to the Students:

1. Each question carries 12 marks.
2. Question No. 1 will be compulsory and include objective-type questions.
3. Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.
4. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
5. Use of non-programmable scientific calculators is allowed.
6. Assume suitable data wherever necessary and mention it clearly.

	(Level/CO)	Marks
Q.1 Select an appropriate option for each of the following. (Compulsory)		12
1 In case of damped oscillations amplitude will be _____ with respect to time. a. decreases b. increases c. constant d. none	Remember (CO1)	1
2 Which methods produces ultrasound frequency a. Piezoelectric b. Magnetostriction c. both d. none	Remember (CO1)	1
3 Formation of Newton's rings is due to phenomenon of.... a. Interference b. polarization c. diffraction d. none	Understand(CO2)	1
4 A Plane Polarized light can be produce by.... a. Reflection b. Double refraction c. refraction d. All of these	Remember (CO2)	1
5 The mathematical equation of Heisenberg's uncertainty principle is a. $\Delta x. \Delta p \geq \frac{h}{2\pi}$ b. $\Delta x. \Delta p \geq 0$ c. $\Delta x. \Delta p \geq h$ d. $x. v \geq \frac{h}{4\pi}$	Understand(CO3)	1
6 The de-Broglie wavelength associated with material particle is given by a. $\lambda = \frac{h}{mv}$ b. $\lambda = \frac{p}{h\sqrt{V}}$ c. $\lambda = hmv$ d. $\lambda = hv$	Remember (CO3)	1
7 Miller Indices are written as, a. (s2k) b. (hkl) c. {abc} d. none	Remember (CO4)	1
8 Wavelength of X-Rays is a. 0.01nm b. 10 nm c. 1 Å d. All of these	Remember (CO4)	1
9 Co-ordination number of FCC is a. 0 b. 6 c. 12 d. 8	Remember (CO4)	1
10 Ferrites are.... materials. a. dielectric b. diamagnetic c. ferrimagnetic d. conducting	Remember (CO5)	1
11 When magnetic field is then superconducting state is perfect diamagnetic a. zero b. not zero c. infinity d. none	Remember (CO5)	1
12 The pure semiconductor is called as _____ Semiconductors. a. Extrinsic b. Intrinsic c. p-type d. n-type	Remember (CO5)	1

Q.2 Solve the following.

12

A)	What are free oscillations? Derive differential wave equation of free oscillations.	Understand(CO1)	6
B)	Explain construction and working of Piezoelectric Effect with neat labelled diagram. Calculate the natural frequency of 60 mm length of a pure iron rod. Given density of pure iron is $7.86 \times 10^3 \text{ kg/m}^3$ and Young's Modulus is $2 \times 10^{11} \text{ N/m}^2$	Understand(CO1)	6
Q.3	Solve the following.		12
A)	Describe the construction and working of He-Ne Laser with neat labelled energy level diagram. In a Newton's Ring experiment, find the radius of curvature (R) of a plano convex lens when the light of wavelength is $5890 \text{ \AA}$ and the diameter of the 5 th dark ring is 0.44cm.	Understand(CO2)	6
B)	Explain Optical fibre structure with suitable diagram. Optical fibre has a refractive index of core is 1.55 and numerical aperture is 0.455 find refractive Index of cladding (n_2).	Understand(CO2)	6
Q. 4	Solve Any Two of the following.		12
A)	Explain the construction and working of G. M. Counter with neat labeled diagram.	Understand(CO3)	6
B)	Derive Schrodinger's time dependent wave equation.	Understand(CO3)	6
C)	Explain Continuous X-ray Spectrum with the help of diagram.	Understand(CO3)	6
Q.5	Solve Any Two of the following.		12
A)	Find the number of atoms per unit cell of SC, BCC and FCC with suitable diagrams.	Understand(CO4)	6
B)	Write Maxwell's Equations in differential and integral form.	Remember (CO4)	6
C)	Prove that lattice constant(a) is inversely proportional to the crystal density (ρ) The (122) plane of a calcite crystal have a lattice constant of $3.036 \text{ \AA}$. calculate interplanar spacing.	Understand(CO4)	6
Q. 6	Solve Any Two of the following.		12
A)	Explain types of magnetic materials with examples.	Understand(CO5)	6
B)	What is a superconductor? State Meissner Effect and prove superconductors are perfect diamagnetic materials.	Understand(CO5)	6
C)	State Hall effect and derive the relation of Hall voltage. The Hall coefficient (R_H) of silicon specimen was found to be $8.35 \times 10^{-5} \text{ m}^3/\text{c}$. Find the charge carrier density (n). [given charge of an electron is $1.6 \times 10^{-19} \text{ C}$].	Understand(CO5)	6

*** End ***