DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2023

Course: B. Tech.   Branch: All   Semester: II

Subject Code & Name: BTBS202P (Engineering Physics)

Max Marks: 60   Date:14/07/2023   Duration: 3 Hr.

Instructions to the Students:
1. *All the questions are compulsory.*
2. *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.*
3. *Use of non-programmable scientific calculators is allowed*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Define Damped Vibrations. Set up differential equation for damped vibrations.	(CO1) (Remember & Understand)	6
B)	Explain the construction, working for production of ultrasonic waves using Piezoelectric oscillator.	(CO1) (Understand)	6
C)	State any two applications of ultrasonic waves. Calculate the length of iron rod which can be used to produce ultrasonic waves of 20 KHz. Density of iron is 7.23×10^3 kg/m^3. Young's modulus is 11.6×10^{10} N/m^2	(CO1) (Remember & Understand)	6
Q.2	**Solve Any Two of the following.**		
A)	In Newton's rings, derive an expression for diameter of nth bright ring and dark ring.	(CO2) (Understand)	6
B)	Explain the construction & working of Ruby laser.	(CO2) (Understand)	6
C)	Explain the structure of optical fiber with suitable diagram. Calculate the numerical aperture of a optical fiber with core index $n_1=1.61$ and cladding index $n_2=1.55$	(CO2) (Remember & Understand)	6
Q. 3	**Solve Any Two of the following.**		
A)	With neat diagram, explain the construction & working of Bainbridge mass spectrograph.	(CO3) (Understand)	6
B)	Write short note on Geiger Muller Counter.	(CO3) (Understand)	6
C)	State Heisenberg's Uncertainty Principle with formula.	(CO3)	6

If the uncertainty in position of an electron is 4×10^{-10} m, Calculate the uncertainty in its momentum. ($h=6.62 \times 10^{14}$ J Sec)   (Understand)

Q.4   Solve the following questions.

A)   Calculate Atomic Packing Fraction for SC, BCC and FCC lattices.   (CO4)

(Understand)   6

B)   Explain Continuous X-ray spectra.   (CO4)

Calculate the wavelength of X-rays when a potential difference of 30 KV is applied between filament and anode.   (Understand)   6

Q. 5   Solve Any Two of the following.

A)   Explain Diamagnetic, Paramagnetic and Ferromagnetic materials with examples and diagram.   (Understand)   6

B)   Distinguish between Type I and Type II superconductors.   (Understand)   6

C)   Derive an expression for conductivity of Intrinsic and extrinsic (P Type & N Type) Semiconductors.   (Understand)   6

*** End ***

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	(Level/CO)	Marks
Q. 1 Solve Any Two of the following.		
A) In case of Forced vibrations, prove that $$A = \frac{f}{\sqrt{(\omega^2 - p^2)^2 + 4b^2p^2}}$$	(CO1) (Understand)	6
B) Explain the construction and working for production of ultrasonic waves using Piezoelectric Oscillator.	(CO1) (Understand)	6
C) Write any two applications of ultrasonic waves. Calculate the thickness of quartz plate which is used to produce ultrasonic waves of 2 MHz. Density of quartz is 2.65×10^3 kg/m³ and Young's modulus is 8×10^{10} N/m².	(CO1) (Remember & Understand)	6
Q.2 Solve Any Two of the following.		
A) Derive an expression for diameter of Newton's bright and dark rings.	(CO2) (Understand)	6
B) Explain the construction and working of Ruby Laser.	(CO2) (Understand)	6
C) State and explain Brewster's law. With a slab of flint glass, the angle of polarization is found to be 62° 24'. Calculate the refractive index of the flint glass.	(CO2) (Remember & Understand)	6
Q. 3 Solve Any Two of the following.		
A) With neat diagram, explain the construction and working of Bainbridge Mass Spectrograph.	(CO3) (Understand)	6
B) Explain the construction and working of Geiger Muller Counter.	(CO3) (Understand)	6
C) Derive Schrodinger's time independent wave equation.	(CO3) (Understand)	6
Q.4 Solve the following questions.		
A) Calculate atomic radii in SC, BCC and FCC lattices with suitable diagrams.	(CO4) (Understand)	6
B) Explain characteristics and continuous X-ray spectra.	(CO4) (Understand)	6
Q. 5 Solve Any Two of the following.		
A) Explain B-H curve for ferromagnetic materials. Define the terms Coercivity and Retentivity.	(Understand)	6
B) Distinguish between Type I and Type II superconductors.	(Understand)	6
C) What is Hall effect? Derive an expression for Hall Voltage and Hall Coefficient.	(Remember & Understand)	6

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2023

Course: B. Tech.   Branch: All   Semester: II

Subject Code & Name: BTBS202P   (Engineering Physics)

Max Marks: 60   Date:14/07/2023   Duration: 3 Hr.

Instructions to the Students:
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4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		
A)	Define Damped Vibrations. Set up differential equation for damped vibrations.	(CO1) (Remember & Understand)	6
B)	Explain the construction, working for production of ultrasonic waves using Piezoelectric oscillator.	(CO1) (Understand)	6
C)	State any two applications of ultrasonic waves. Calculate the length of iron rod which can be used to produce ultrasonic waves of 20 KHz. Density of iron is 7.23×10^3 kg/m³, Young's modulus is 11.6×10^{10} N/m²	(CO1) (Remember & Understand)	6
Q.2	**Solve Any Two of the following.**		
A)	In Newton's rings, derive an expression for diameter of nth bright ring and dark ring.	(CO2) (Understand)	6
B)	Explain the construction & working of Ruby laser.	(CO2) (Understand)	6
C)	Explain the structure of optical fiber with suitable diagram. Calculate the numerical aperture of a optical fiber with core index $n_1=1.61$ and cladding index $n_2=1.55$ $\sqrt{n^1 + s^1}$	(CO2) (Remember & Understand)	6
Q. 3	**Solve Any Two of the following.**		
A)	With neat diagram, explain the construction & working of Bainbridge mass spectrograph.	(CO3) (Understand)	6
B)	Write short note on Geiger Muller Counter.	(CO3) (Understand)	6
C)	State Heisenberg's Uncertainty Principle with formula.	(CO3)	6

If the uncertainty in position of an electron is 4×10^{-10} m, Calculate the uncertainty in its momentum. (h=$6.62 * 10^{-34}$ J Sec)   (Understand)

Q.4   Solve the following questions.

A)   Calculate Atomic Packing Fraction for SC, BCC and FCC lattices.   (CO4)   6
(Understand)

B)   Explain Continuous X-ray spectra.

Calculate the wavelength of X-rays when a potential difference of 30 KV is applied between filament and anode.   (CO4)   6
(Understand)

Q. 5   Solve Any Two of the following.

A)   Explain Diamagnetic, Paramagnetic and Ferromagnetic materials with examples and diagram.   (Understand)   6

B)   Distinguish between Type I and Type II superconductors.   (Understand)   6

C)   Derive an expression for conductivity of Intrinsic and extrinsic (P Type & N Type) Semiconductors.   (Understand)   6

*** End ***

Course: B. Tech.   Branch: All   Semester: I

Subject Code & Name: BTBS102P (Engineering Physics)

Max Marks: 60   Date: 03-01-24   Duration: 3 Hr.

Instructions to the Students:
1. All the questions are compulsory.
2. 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Define free oscillations. Derive an expression for differential equation of free oscillations.	(CO1) (Remember & Understand)	6
B)	Explain the construction, working for production of ultrasonic waves using Magnetostriction method.	(CO1) (Understand)	6
C)	State properties of ultrasonic waves. A quartz crystal having 03 mm thickness is vibrating at resonance. Calculate the fundamental frequency of vibrations for which ultrasonic waves are generated. Given for quartz, Young's Modulus is 7.9×10^{10} N/m^2, Density is 2650 Kg/m^3	(CO1) (Remember & Understand)	6
Q.2	**Solve Any Two of the following.**		**12**
A)	Derive an expression for the optical path difference for the reflected rays in a thin film of constant thickness and hence find the conditions for maxima and minima.	(CO2) (Understand)	6
B)	Explain the construction & working of Helium-Neon Laser with neat & labeled diagram.	(CO2) (Understand)	6
C)	Explain the structure of optical fiber with suitable diagram. Refractive index of the core is 1.48 and that of cladding is 1.47 in an optical fiber. Calculate numerical aperture.	(CO2) (Remember & understand)	6
Q. 3	**Solve Any Two of the following.**		**12**
A)	With neat diagram, explain the construction & working of Bainbridge mass spectrograph.	(CO3) (Understand)	6
B)	With graph and suitable diagram explain the construction & working of Geiger Muller Counter.	(CO3) (Understand)	6
C)	Derive Schrodinger's time independent wave equation.	(CO3) (Understand)	6
Q.4	**Solve the following questions.**		**12**
A)	Calculate Atomic Packing Fraction for SC, BCC and FCC structures.	(CO4) (Understand)	6

B)	Explain Characteristics X-ray spectra. Calculate the wavelength of X-rays when a potential difference of 20 KV is applied between filament and anode.	(CO4) (Understand)	6
Q. 5	**Solve Any Two of the following.**		12
A)	Explain B-H curve for ferromagnetic materials.	(Remember & Understand)	6
B)	What is Superconductivity? Explain Meissner effect in Superconductors.	(Remember & Understand)	6
C)	What is Hall effect? Derive an expression for Hall Voltage and Hall coefficient.	(Remember & Understand)	6
	*** End ***		

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination – Winter 2019

Course: B. Tech	Sem: I
Subject: Engineering Physics (PHY1202)	Marks:60M
Date:13/12/2019	Duration: 3 Hr.

Instructions to the Students:
1. All the questions are compulsory.
2. The level 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.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		
A)	What are forced oscillations? Obtain the differential equation of forced oscillations.	(Synthesis)	06
B)	Explain the production of ultrasonic waves using magnetostriction effect. Calculate the length of Ni rod needed to produce ultrasonic waves of frequency 40 KHz. Density of rod is 8.9 gm/cm^3 and Young's modulus of rod is 20.8 X 10^{10} N/m^2.	(Knowledge /Remember)	06
C)	Explain the effect of frequency and temperature on polarization in dielectric.	(Knowledge /Remember)	06
Q.2	Solve Any Two of the following.		
A)	Prove that in Newton's Rings by reflected light, the diameters of bright rings are proportional to square root of odd natural numbers.	(Evaluation)	06
B)	Explain the construction and working of Ruby laser with neat diagram.	(Comprehension/Understand)	06
C)	Define acceptance angle and numerical aperture. Refractive index of core is 1.48 and that of cladding is 1.47 in an optical fiber. Calculate critical angle, numerical aperture and acceptance angle.	(Analysis)	06
Q. 3	Solve Any Two of the following.		
A)	Explain the principle and working of Bainbridge Mass Spectrograph with neat diagram.	(Comprehension/Understand)	06

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B)	What is uncertainty principle? Using this principle prove that electron cannot exist in the nucleus.	(Synthesis)	06
C)	Explain the construction and working of G.M. counter.	(Comprehension/ Understand)	06
Q.4	**Solve Any Two of the following.**		
A)	Show that shortest wavelength of continuous X-rays is inversely proportional to the potential difference applied.	(Synthesis)	06
B)	Derive the relation between lattice constant and density of the cubic crystal. Copper has FCC structure and its atomic radius is 1.278×10^{-10}m. Calculate density of Cu. Given atomic weight of Cu = 63.5.	(Application)	06
C)	Derive an expression for electromagnetic wave in free space and hence calculate the velocity of light in free space.	(Synthesis)	06
Q. 5	**Solve the following.**		
A)	Differentiate Type I and Type II superconductors.	(Application)	06
B)	What is Hall effect? Derive an expression for Hall voltage and Hall coefficient.	(Analysis)	06
	***Paper End ***		