



MAULANA ABUL KALAM AZAD UNIVERSITY OF THE HINDU ENCLAVE, WEST BENGAL

PH-080

PHYSICS - I

Time Allowed: 3 Hours

Full Marks: 70

*The questions are of equal value.
 The figures in the margin indicate full marks.
 Candidates are requested to give their answers in their own words as far as practicable.
 All symbols are of usual significance.*

GROUP A
(Multiple Choice Type Questions)

1. Answer any ten questions.

(10 × 1 = 10)

(a) Some portion of a simple pendulum having definite length will be
 (A) finite non-zero value (B) infinite
 (C) zero (D) cannot be estimated

(a) The quality factor (Q) for an L-C-R circuit is

- (A) $\frac{R}{\omega L}$ (B) $\frac{\omega L}{R}$
 (C) $\frac{R}{\omega C}$ (D) $\frac{\omega C}{R}$

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1

Full Mark

(a) Polarization conclusively proves that light waves are

- (A) longitudinal (B) progressive
 (C) stationary (D) transverse

(a) The relativistic energy-momentum relation is

- (A) $E^2 - p^2 = m_0^2 c^4$ (B) $E^2 - p^2 c^2 = m_0^2 c^4$
 (C) $E^2 - p^2 = m_0^2 c^2$ (D) $E^2 - p^2 c^2 = m_0^2 c^2$

(a) An α -particle is 4 times heavier than a proton. If a proton and an α -particle are moving with the same velocity then their De-Broglie wavelengths are related?

- (A) $\lambda_p = \lambda_\alpha$ (B) $\lambda_p = 4\lambda_\alpha$
 (C) $\lambda_p = \lambda_\alpha/4$ (D) $\lambda_p = 4\lambda_\alpha$

(a) Assuming that the atoms in a crystal are spheres of equal size and touching each other, it can be shown that the atomic radius of FCC lattice is equal to

- (A) $\frac{a}{\sqrt{2}}$ (B) $a\sqrt{\frac{3}{2}}$
 (C) $a\sqrt{\frac{3}{4}}$ (D) $\frac{a}{2\sqrt{2}}$

(a) In laser action, the spontaneous emission does not depend on

- (A) the number of atoms present in the excited state
 (B) the intensity of the incident light
 (C) the path of A and B
 (D) none of these

(a) If we measure the energy of a particle accurately then the uncertainty of the measurement of time becomes

- (A) 0 (B) ∞
 (C) $\frac{h}{E}$ (D) $\frac{h}{\Delta E}$

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1

Full Mark

(a) According to Maxwell's law, frequency of a spectral line depends on
 (A) mass (B) atomic number
 (C) atomic weight (D) molecular weight

(a) The energy relaxation time τ of a damped oscillator with damping coefficient γ is

- (A) $\tau = \frac{1}{\gamma}$ (B) $\tau = \frac{1}{2\gamma}$
 (C) $\tau = \frac{1}{\gamma}$ (D) $\tau = 2\gamma$

(a) In Young's double slit experiment the two coherent sources are produced by
 (A) division of wave front (B) division of amplitude
 (C) cut off filter (D) none of these

(a) The resolving power of a grating having number of slits N , of order m is

- (A) mN (B) $\frac{m}{N}$
 (C) $\frac{N}{m}$ (D) $\frac{1}{mN}$

(a) When a white light is incident on a plane diffraction grating the central maxima will be

- (A) dark (B) white
 (C) blue (D) red

(a) Newton's ring experiment is based on

- (A) division of amplitude (B) division of wave front
 (C) division of frequency (D) division of phase angle

(a) According to Wien's displacement law

- (A) $\lambda_m T = \text{Constant}$ (B) $\frac{\lambda_m}{T} = \text{Constant}$
 (C) $\lambda_m T^2 = \text{Constant}$ (D) $\frac{\lambda_m}{T^2} = \text{Constant}$

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GROUP B
(Short Answer Type Questions)

Answer any three questions.

(3 × 3 = 9)

1. (a) Draw and explain the electrical equivalent circuit corresponding to damped oscillator.

2

(b) What is critical damping?

1

2. (a) Establish the relation between the logarithmic decrement and quality factor of a damped oscillatory system.

2

3. (a) What is resolving order of double slit diffraction pattern? Explain briefly why.

2

(b) What do you mean by resolving power of plane transmission grating?

2

(c) Write the Bragg's steps are satisfied at what?

1

4. (a) The refractive indices of double reflecting crystal for ordinary and extraordinary rays are 1.56 and 1.54 respectively, for wavelength $\lambda = 5000 \text{ \AA}$. Determine the thickness of the crystal to produce half wave plate.

2

(b) Describe briefly the principle of operation of a laser.

1

5. (a) What is Compton effect?

1

(b) A photon of Compton shift is wavelength for an electron. Explain the origin of unshifted Compton spectrum.

2+1

6. (a) A particle strikes head on a ^{12}C crystal. What is Bragg's lattice?

1+1

(b) The absorption spacing of a photo of a crystal is 1.2 \AA and the angle for the maximum Bragg's reflection is 30° . Determine the energy of the X-ray beam in eV.

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Didier Musso



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Pelobatidae, with only one extant genus Pelobates, containing six species. They are native to Europe ... Pelobatidae They are collectively known as the "spadefoot toads" due to the presence of a keratinized "spade" on each hind foot which are used in burrowing. While all ... European Spadefoot Toads (Family Pelobatidae) The European spadefoot toads are a family of frogs, the Pelobatidae, with only one extant genus Pelobates, containing four species. ADW: Pelobatidae: INFORMATION Pelobatids are squat and toadlike, with soft skins and fossorial habits. This treatment places Megophryidae in a separate family, leaving but two or three ... Spadefoot Toads (Pelobatidae) Frogs in this family are often mistaken for toads (exemplified by the common name, "spadefoot toads"). They do not have the warty skin of true toads, however, ... Natural History of the White-Inyo Range Spadefoot Toads (Family Pelobatidae). Great Basin Spadefoot Toad, Spea ... A related species in southeastern California, the Couch's Spadefoot Toad (*S. couchii*) ... Couch's spadefoot (*Scaphiopus couchi*) Couch's spadefoot (*Scaphiopus couchi*). Order: Salientia Family: Pelobatidae (spadefoots) Other common name: spadefoot toad. Spanish names: sapo con espuelas ... Spadefoot toad | burrowing, nocturnal, desert 3 days ago — All spadefoot toads are classified in the family Pelobatidae. Spadefoot toads have a broad, horny “spade” projecting from the inside of each Pelobatidae - European Spadefoot Toad Family - Apr 21, 2017 — The family Pelobatidae is the European Spadefoot toads but they aren't just found in Europe, they are also found in Asia and Northern Africa. Captivated by You by Sylvia Day - Books on ... The fourth novel in the #1 New York Times and #1 USA Today bestselling Crossfire series. Gideon calls me his angel, but he's the miracle in my life. Captivated by You Captivated by You. #4 in series. by Sylvia Day. ebook. 2 of 2 copies available ... The library reading app. Download on the App Store · Get it on Google Play. (PDF) Captivated by You | Karina Picus “I think of nothing but you. All day. Every day. Everything I do, I do with you in mind. There's no room for anyone else. It kills me that you have room for him ... Captivated by You by Sylvia Day - ebook | Crossfire Nov 18, 2014 — The fourth novel in the #1 New York Times and #1 USA Today bestselling Crossfire series. Gideon calls me his angel, but he's the miracle in ... Captivated By You (Crossfire, Book 4) - Kindle edition ... The #1 New York Times and #1 USA Today bestseller. Gideon calls me his angel, but he's the miracle in my life. My gorgeous, wounded warrior, so determined ... Captivated by You Audiobook by Sylvia Day Publisher Description. Gideon calls me his angel, but he's the miracle in my life. My gorgeous, wounded warrior, so determined to slay my demons while ... Captivated by You - Audiobook Download Nov 18, 2014 — Download or stream Captivated by You by Sylvia Day. Get 50% off this audiobook at the AudiobooksNow online audio book store and download or ... Sylvia Day - Jax & Gia series, Crossfire ... 392 KB · Sylvia Day - Reflected in You (Book 2).epub. 400 KB · Sylvia Day - Entwined with You (Book 3).epub. 389 KB · Sylvia Day - Captivated by You (Book 4). Captivated by You - Crossfire Series, Book 4 Nov 18, 2014 — The penultimate novel in the searingly romantic series following Gideon Cross and Eva Tramell, written by Sylvia Day. The Crossfire Saga ... Captivated by you Time Management Proven Techniques for Making Every Minute Count ... This book is available at quantity discounts for bulk purchases. For information the side of ... Web Development and Design... by Felke-

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