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Seat No.	
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Total No. of Pages : 2

F.E.B.Tech. (All branches) (Semester - I & II) Examination, April - 2019
ENGINEERING PHYSICS (New CBCS Syllabus)

Sub. Code : 71811

Day and Date : Saturday, 27 - 04 - 2019

Total Marks : 70

Time : 10.00 a.m. to 12.30 p.m.

- Instructions:**
- 1) Attempt any three questions from each section.
 - 2) Figures to the right indicate full marks.
 - 3) Given: Avogadro's number. $N = 6.023 \times 10^{26}$ /kg atom, mass of electron = 9.1×10^{-31} kg, charge of electron = 1.6×10^{-19} C, Speed of light, $C = 3 \times 10^8$ m/s, Plank's constant, $h = 6.63 \times 10^{-34}$ Js.

Section - I

Q1) Answer the following questions. [6]

- a) State the difference between
 - i) Ordinary and Extraordinary ray
 - ii) Positive and Negative crystal
- b) Define the term diffraction grating and grating element. Calculate the wavelength of spectral line, when a parallel beam of sodium light is allowed to incident normally on a plane grating having 5250 lines per cm and second order line is observed to be deviated through 45° . [6]

Q2) Answer the following questions.

- a) Explain the terms: spontaneous emission, population inversion and stimulated emission. [6]
- b) Explain the working principle and structure of optical fibre. [5]

Q3) Answer the following questions.

- a) State the factors affecting on the acoustics of auditorium and explain their remedies. [6]
- b) Define reverberation time and absorption coefficient. State and explain Sabine's formula. [5]

P.T.O.

Q4) Answer any two from the following questions.

- Derive an expression for resolving power of diffraction grating. [6]
- The refractive index of core is 1.6 and fractional refractive index change is 0.015. Calculate the refractive index of cladding, numerical aperture and acceptance angle for an optical fibre. [6]
- A room has a volume of 1000 m^3 the total wall area is 200 m^2 the total floor area is 100 m^2 and the total ceiling area is 100 m^2 . The average sound absorption coefficient for wall is 0.02. ceiling is 0.8 and floor is 0.05. Determine the average absorption coefficient and the reverberation time. [6]

Section - II

Q5) Answer the following questions.

- Determine number of atoms per unit cell and coordination number for SC, BCC and FCC lattice. [6]
- (i) Draw (010), (110) and (111) planes in the simple cubic crystal. [3]
(ii) Determine the spacing between (110) and (111) planes in NaCl crystal having Lattice constant $a = 5.64 \text{ \AA}$. [3]

Q6) Answer the following questions.

- What are nanomaterials? Explain the construction and working of atomic force microscope with a neat sketch. [6]
- Describe ball milling method used for synthesis of Nano particle. [5]

Q7) Answer the following questions.

- What do you mean by dual nature of light? Derive an expression for de Broglie's Wavelength associated with an electron accelerated through a potential difference V volt. [6]
- Explain properties of matter waves. [5]

Q8) Answer any two from the following questions.

- With neat diagram explain diad, triad and tetrad axis of cubic crystal system. [6]
- Write note on applications of nanomaterial. [6]
- find the wavelength associated with an electron moving with velocity of $0.3c$. Where c - is the speed of light.
 - Calculate change in wavelength of X rays due to compton scattering at an angle of 30° . [6]

