B.Tech. Sem-I All Branch.

B.Tech. SEM -I (Chemical/ Civil/ Electrical/ Mechanical/ Production)
2014 Course (CBCS) : SUMMER - 2019
SUBJECT : ENGINEERING PHYSICS

Day : Tuesday
Date : 14/05/2019

S-2019-2528

Time : 10.00 AM TO 01.00 PM
Max. Marks : 60

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of electronic pocket calculator is allowed.
4) Assume suitable data if necessary.

Constants:
$e = 1.6 \times 10^{-19} C$
$m_e = 9.1 \times 10^{-31}$ Kg
$h = 6.63 \times 10^{-34}$ J-s
$m_p = 1.66 \times 10^{-27}$ kg
$N_a = 6.025 \times 10^{23}$ atom/gm-mole

Q.1 a) What are thermonuclear reactions? Explain proton-proton cycle. **(06)**

b) An electron starts from rest and moves freely in an electric field E = 24 kV/m. Determine (a) the force on the electron (b) its acceleration. **(04)**

OR

Q.1 a) Give principle, construction and working of Bainbridge mass spectrograph. **(06)**

b) Protons in a cyclotron describe a circle of radius 0.4 m just before emerging from the dees. If the magnetic field intensity is 1.5 wb/m^2, what is the maximum K.E. of the protons? **(04)**

Q.2 a) Explain working of p-n junction diode on the basis of band theory of solids. **(06)**

b) Give differences between type – I and type – II superconductors. **(04)**

OR

Q.2 a) State and explain any six applications of superconductors. **(06)**

b) Calculate the conductivity of pure silicon at room temperature when the concentration of carriers is $1.6 \times 10^{10}/cm^3$. Given : $\mu_e = 1500$ cm^2/V-sec, $\mu_h = 500$ cm^2/V-sec, **(04)**

Q.3 a) What is entropy? Discuss the change in entropy in reversible and irreversible process. **(06)**

b) Discuss the following properties on the nanoparticles **i)** magnetic **ii)** electrical. **(04)**

OR

Q.3 a) Explain high energy bill milling method productivity nanoparticles. **(06)**

b) State and explain third low of thermodynamics. **(04)**

P.T.O.

Q.4 a) Explain the formation of Newton's rings. Derive the formula for dark ring in reflected system. **(06)**

b) A slit of width 0.16 mm is illuminated by a light of wavelength 5600A°. Find the half angular width of the central maximum. **(04)**

OR

Q.4 a) State Rayleigh's criterion of resolution. Derive the formula for resolving power of a diffraction grating. **(06)**

b) MgF_2 of refractive index 1.38 is coated on a glass plate in order to reduce the reflection from the glass surface using ARC. Calculate the thickness of ARC $(Take, \lambda = 5500A°)$. **(04)**

Q.5 a) Width energy level diagram, explain construction and working of Ruby laser. **(06)**

b) Give differences between positive and negative crystals. **(04)**

OR

Q.5 a) What is retardation plate? Derive the formula for thickness of a quarter wave plate. **(06)**

b) Write a short note on optical pumping. **(04)**

Q.6 a) State requirements of acoustically good hall. **(06)**

b) Assume that the uncertainty in the location of a particle is equal to its De Broglie wavelength. Show that the uncertainty in its velocity is equal to its velocity. **(04)**

OR

Q.6 a) Derive the formula for energy eigen value and eigen function of a particle trapped in a potential well of an infinite depth. **(07)**

b) Define reverberation and reverberation time. **(03)**

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