B.TECH. SEM -I (CHEMICAL/ CIVIL/ ELECTRICAL/ MECHANICAL/ PRODUCTION) 2014 COURSE (CBCS) : SUMMER - 2018

SUBJECT: ENGINEERING PHYSICS

Day: **Thursday** Time: **10.00 AM TO 01.00 PM**

Date: **24/05/2018** **S-2018-2207** Max Marks: 60

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the right indicate **FULL** marks.
3) Use to the non-programmable **CALCULTOR** is allowed.
4) Neat diagram must be drawn **WHEREVER** necessary.
5) Assume suitable data wherever necessary.

Constants:
$e=1.6\times10^{-19}C$
$m_e = 9.1\times10^{-31}kg$
$h=6.63\times10^{-34}$ J-s
$m_p= 1.66\times10^{-27}$ kg
$N_a= 6.025\times10^{23}$atoms/gm-mole

Q.1 **a)** Explain the motion of an electron in parallel electric field. Derive the formula for impact velocity. **(06)**

b) In a cyclotron, the maximum radius that the path of a proton may have before it is deflected out of magnetic field is 50 cm. Calculate the energy in J. **(04)**

OR

Q.2 **a)** What is nuclear fusion? Explain C-N cycle. **(06)**

b) Find the radius of path followed by an electron when injected in magnetic field of 1×10^{-3} Wb/m^2 with velocity 5×10^7 m/s. **(04)**

Q.3 **a)** Explain the role of superconductors in i) power transmission ii) defense **(06)**

b) Draw the band structure of forward and reverse biased diode. **(04)**

OR

Q.4 **a)** Explain give the principle and working of solar cell. Also explain the term fill factor and efficiency. **(06)**

b) Write in short, formation of Cooper pair. **(04)**

Q.5 **a)** Give uses of nanoparticles in the field of i) medicine ii) automobile **(06)**

b) State and explain second law of thermodynamics. **(04)**

OR

Q.6 **a)** State first law of thermodynamics. Explain Joule's method for determination of J. **(06)**

b) In short, explain chemical method of synthesis of nanoparticles. **(04)**

Q.7 **a)** In Newton's rings prove that the diameter of n^{th} dark ring is proportional to the square root of natural number. **(06)**

b) A slit of variable width is illuminated by light of wavelength 7×10^{-7} m. At what width of the slit, the first minimum will fall at $\theta= 30^0$? **(04)**

OR

Q.8 **a)** Differentiate between Fraunhofer's and Fresnel's diffraction. **(06)**

b) Diameter of certain ring in Newton's rings changes from 0.14cm to 0.12 cm when air is replaced by water. Calculate the refractive index of the water. **(04)**

P.T.O

Q.9 **a)** What is retardation plate? Derive formula for thickness of quarter wave plate. **(06)**

b) Write a short note on holography. **(04)**

OR

Q.10 **a)** With energy level diagram, explain the construction and working of He- Ne laser. **(06)**

b) How plane polarized light can be obtained using polaroid? **(04)**

Q.11 **a)** Derive the formula for energy eigen value for a particle confined in a potential well of infinite depth. **(06)**

b) What is reverberation and reverberation time? Give the Sabine's formula for reverberation time. **(04)**

OR

Q.12 **a)** What are different types of noise? Give their source and remedies. **(06)**

b) Prove that $\Delta E x \Delta t \geq h$. **(04)**

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