JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- SEP- 2018

B.Tech 8TH Sem

COURSE CODE: Solid Mechanics in Structural Engineering   MAX. MARKS: 15

COURSE NAME: 12M1WCE211

COURSE CREDITS: 3   MAX. TIME: One Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. At a point P the rectangular stress components are

$\sigma_x = 1$, $\sigma_y = -2$, $\sigma_z = 4$, $\tau_{xy} = 2$, $\tau_{yz} = -3$ and $\tau_{xz} = 1$, all units are in KPa. Find the principal stresses and check for invariance.   **[4, CO1]**

Q2. Show that Lame's ellipsoid and the stress-director surface together completely define the state of stress at a point.   **[5, CO1]**

Q3. The displacement field for a body is given by   **[3, CO2]**

$$U = (x^2+y)i + (3+z)j + (x^2+2y)k$$

What is the deformed position of a point originally at (3,1,-2) ?

Q4. Consider the displacement field $U = [y^2 i + 3yz j + (4 + 6x^2)k]10^{-2}$ **[3, CO2]**

What are the rectangular strain components at the point P= (1,0,-2) ? Use only linear terms