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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION- FEBRUARY -2020

B.Tech VIII Semester and M.Tech II Semester

COURSE CODE: 12M1WCE211

MAX. MARKS: 15

COURSE NAME: Solid Mechanics in structural engineering

COURSE CREDITS: 03

MAX. TIME: 1 HRS

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

1. What is the condition of the state of pure shear? Discuss the Octahedral stresses.
2. Derive the stress components on an arbitrary plane.
3. At a point P in a body, $\sigma_x = 10,000 \text{ N/cm}^2$ (1020 kgf/cm²), $\sigma_y = -5,000 \text{ N/cm}^2$ (-510 kgf/cm²), $\sigma_z = -5,000 \text{ N/cm}^2$, $\tau_{xy} = \tau_{yz} = \tau_{zx} = 10,000 \text{ N/cm}^2$. Determine the normal and shearing stresses on a plane that is equally inclined to all the three axes.
4. What do you mean by stress invariants? Prove that the cubic equation of stress has real roots.
5. Discuss the Mohr's circles for three dimensional state of stress in detail.