系組：機械工程學系三年級　　日期節次：7 月 29 日第 4 節 15:20-16:40

科目：**材料力學**　(115-177)

1. **A bar is subjected to a plane stress, and strains are $\varepsilon_x = -0.0024$, $\varepsilon_y = 0.0044$. If the modulus of elasticity $E = 200$GPa and Poisson's ratio $\nu = 0.28$, what is σ_x? (a) –253.5 MPa; (b) 809 MPa; (c) 190 MPa; (d) None of the above. (20 %)**

2. **Which relation is correct? (a) $G = \frac{E}{(1+\nu)}$; (b) $G = \frac{E}{(1-\nu)}$; (c) $G = \frac{E}{(1+2\nu)}$; (d) $G = \frac{E}{2(1+\nu)}$. (20 %)**

3. **The components of plane stress are $\sigma_x = 20$ MPa, $\sigma_y = 0$, $\tau_{xy} = 0$. What is σ_y' at $\theta = 45^\circ$? (a) 0 MPa; (b) 5 MPa; (c) 10 MPa; (d) 20 MPa. (20 %)**

4. **Which relation is correct for deflection v, distributed load w, shear load V, and bending moment M? (a) $\frac{dV}{dx} = M$; (b) $\frac{dM}{dx} = -w$; (c) $\frac{d^3v}{dx^3} = \frac{w}{EI}$; (d) $\frac{d^4v}{dx^4} = \frac{w}{EI}$. (20 %)**

5. **The components of plane strain at $\theta = 0^\circ$ are $\varepsilon_x = -0.008$, $\varepsilon_y = 0.006$, and $\gamma_{xy} = -0.012$. Use Mohr's circle to determine the maximum in-plane shear strain. (20%)**