

THE HONG KONG POLYTECHNIC UNIVERSITY
HONG KONG COMMUNITY COLLEGE

Subject Title : Engineering Mechanics I

Subject Code : CCN2251

Session : Semester One, 2018/19

Numerical Answers

Question 1

- (a) $\Sigma \vec{F} = (-24.6\vec{i} - 24.6\vec{j}) \text{ N}; \quad \Sigma \vec{M}_E = (2950\vec{k}) \text{ N} \cdot \text{mm}$
- (b) $\bar{y} = 59.4 \text{ mm}$
- (c) $I_{x'} = 1.64 \times 10^7 \text{ mm}^4$

Question 2

- (b) $\mu_s = 0.268$
- (c) $m_{\max} = 516 \text{ kg}$

Question 3

- (a) $D_x = 0; \quad D_y = 1.67 \text{ kN} \uparrow$
- (b) $F_{AB} = 4.24 \text{ kN}$ (compression)
- (c) $\Delta A = 0.00287 \text{ mm}^2$

Question 4

- (a) $F_{CF} = 718 \text{ N}$
- (b) $\tau_{\max, CF} = 23.9 \text{ MPa}$
- (c) $\delta_D = 0.0399 \text{ m}$

Question 5

- (a) $d_{\min} = 0.0445 \text{ m}$
- (b) $\sigma_{\max, \text{steel}} = 30 \text{ MPa}$

Question 6

- (a) $|v_B/v_C| = 2$
- (b) $v_B = 1.95 \text{ m/s}$

(c) $T = 5.89 \text{ N}$

Question 7

(a) $\theta = 18.2^\circ$

(b) $x = 4.01 \text{ m}$

(c) $h = 2.42 \text{ m}$