

1. 試解釋「木質構造建築」之定義（5分）？請說明從「台灣傳統木建築」至近年來政府致力推廣的「木質構造建築」[例如框組壁(2x4)工法]所使用「木質材料」的種類演變與差異（10分）？並說明「木質構造建築」為何較「混凝土構造建築」能夠「節能減碳」（5分）？
2. 試解釋下列在「木材組織學」範圍之名詞：(A) sapwood and heartwood, (B) radial section and tangential section, (C) ring-porous wood and diffuse-porous wood, (D) compression wood and tension wood。（20分）
3. 試述木材的比重、吸濕性、收縮膨脹、電傳導率等的主要特徵或特性。（16分）
4. The allowable bending stress of a beam is defined as:

$$F_b' = F_b (C_D) (C_M) (C_t) (C_L) (C_F) (C_V) (C_{fu}) (C_r) (C_c) (C_f) (C_i)$$

Where  $F_b'$  = allowable bending stress,  $F_b$  = tabulated bending stress,  $C_D$  = load duration factor,  $C_M$  = wet-service factor,  $C_t$  = temperature factor,  $C_L$  = beam stability factor,  $C_F$  = size factor,  $C_V$  = volume factor,  $C_{fu}$  = flat use factor,  $C_r$  = repetitive member factor,  $C_c$  = curvature factor,  $C_f$  = form factor, and  $C_i$  = incising factor for sawn lumber. Please elucidate the following adjustment factors --- ( $C_D$ ), ( $C_M$ ), ( $C_t$ ), and ( $C_r$ ). (16分)

5. 試說明乾式法製造纖維板之程序？並請說明纖維板的物理性質、機械性質、加工性、用途。（15分）
6. 請翻譯以下短文。（13分）(摘錄修改自 Lin, Cheng-Jung, Ming-Jer Tsai, Chia-Ju Lee, Song-Yung Wang and Lang-Dong Lin (2007) Effects of ring characteristics on the compressive strength and dynamic modulus of elasticity of seven softwood species. *Holzforschung* 61(4): 414-418.)

Tree ring analysis has been widely applied for many purposes. Bending properties of wood in relation to growth ring characteristics have long been established as testified. Scientists indicated the significant relation among ring width, ring density, microfibril angle, and bending properties of spruce trees. Scientists also reported that ring density is significantly related to the bending stiffness.

Besides bending strength, compressive strength is important to the effective utilization of wood as a pole or column of a building component. However, it is difficult to generalize the behavior of woods in transverse compression because of the complex interactions of various anatomic details. As a result, the relationships between compressive strength and tree ring features perpendicular to grain are still not well-known and should be intensively investigated in the future.

試題隨卷繳回