BM Mod 18 (Chapter 19) refinancing practice exam questions

A firm's cost of debt capital $r_D$ depends on its debt-to-value ratio D/V as $r_D = 6\% \times (1 + D/V)$.
The corporate tax rate $T_c = 30\%$

At a 23% debt-to-value ratio, the firm's WACC is 11%

A.  At a 23% debt-to-value ratio, what is the firm's cost of debt capital $r_D$?
B.  At a 23% debt-to-value ratio, what is the firm's cost of equity capital $r_E$?
C.  What is the firm's opportunity cost of capital $r$ with all equity financing?
D.  At a 34% debt-to-value ratio, what is the firm's cost of debt capital $r_D$?
E.  At a 34% debt-to-value ratio, what is the firm's cost of equity capital $r_E$?
F.  At a 34% debt-to-value ratio, what is firm's WACC?

*Part A:* At a 23% debt-to-value ratio, the firm's cost of debt capital $r_D$ is 6% × (1 + 23%) = 7.38%

*Part B:* At a 23% debt-to-value ratio, 23% × 7.38% × (1 – 30%) + (1 – 23%) × $r_E$ = 11% ⇒

$r_E$ = ( 11% – 23% × 7.38% × (1 – 30%) ) / (1 – 23%) = 12.74%

*Part C:* By the Miller and Modigliani theorem, if the corporate tax rate is zero, the opportunity cost of capital does not depend on the debt vs equity financing.

The firm's opportunity cost of capital $r$ is 23% × 7.38% + (1 – 23%) × 12.74% = 11.51%

*Part D:* At a 34% debt-to-value ratio, the firm's cost of debt capital $r_D$ is 6% × (1 + 34%) = 8.04%

*Part E:* At a 34% debt-to-value ratio, 34% × 8.04% + (1 – 34%) × $r_E$ = 11.51% ⇒

$r_E$ = ( 11.51% – 34% × 8.04% ) / (1 – 34%) = 13.30%

*Part F:* At a 34% debt-to-value ratio, the firm's WACC is

34% × 8.04% × (1 – 30%) + (1 – 34%) × 13.30% = 10.69%