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Q.1) IRR (internat rate of return) is.

Ans Q. Interest rate for which NPV = 0.

Q.2) ⇒ α = Jensen's Index.

Size of firms

r_{SMB} = Historical rate of return on (small size portfolio − big size portfolio)

r_{HML} = Historical rate of return on. (High B/M ratio portfolio − Low B/M ratio portfolio)

eq^n. $(r_i - r_f) = \alpha + \beta_1 (r_M - r_f) + B_2 r_{SMB} + \beta_3 r_{HML}$ + error.

Q.3). ⇒ Sharpe ratio = $\frac{r_a - r_f}{\sigma_A}$.

Risk adjusted excess return of a portfolio/individual stock.

Q.4). Given,

PV = 1 \$ FV = 2 \$ $r = 10\%$ per annum

$FV = PV(1+r)^n$

On Applying log both sides,

$\ln(FV) = \ln(PV) + n \ln(1+r)$

$\ln(2) = \ln(1) + n \ln(1+0.1)$

$$\frac{\ln(2)}{\ln(1.1)} = n$$

$\therefore$ $\boxed{n = 7.27254 \text{ yrs}}$

Q.5) ⇒ Given.

~~$\sigma_{AM} = 0.5$~~ $\sigma_A = 10\%$ $\sigma_B = 15\%$

$\boxed{\text{Consider } M = B}$

$$\rho_{AM} = \frac{\sigma_{AM}}{\sigma_A \cdot \sigma_M}$$

$\underline{w_A = 0.75}$ $\underline{w_B = 0.25}$

$$\sigma^2 = w_A^2 \sigma_A^2 + 2 w_A w_B \sigma_{AB} + w_B^2 \sigma_B^2$$

$\rho_{AM} = 0.5$

$$= (0.75)^2 (0.1)^2 + 2(0.75)(0.25)(0.0075) + (0.25)^2 (0.15)^2$$

$$0.5 = \frac{\sigma_{AB}}{\sigma_A \sigma_B}$$

$\boxed{\sigma_{AB} = 0.5 \times 0.1 \times 0.15 = 0.0075}$

$= 0.005625$
$+ 0.0028125$
$+ 0.00140625$

$\sigma^2 = 0.00984475$

σ = ~~0.004922~~ 0.09922

∴ Risk of portfolio = 0.09922

in percentage = 9.922%.

Q.6) Ordinary Annuity

Fixed amt. of money to be paid at the end of time period for certain no. of years.

eg. LOAN, Education.

Annuity Due :- When the fixed amount is paid in advance for a certain no. of years.

eg. Insurance.

Q.7) ⇒ $\sigma_a = 10\%$ $\sigma_b = 20\%$ $\rho_{ab} = 0$. $\sigma_{ab} = 0$.

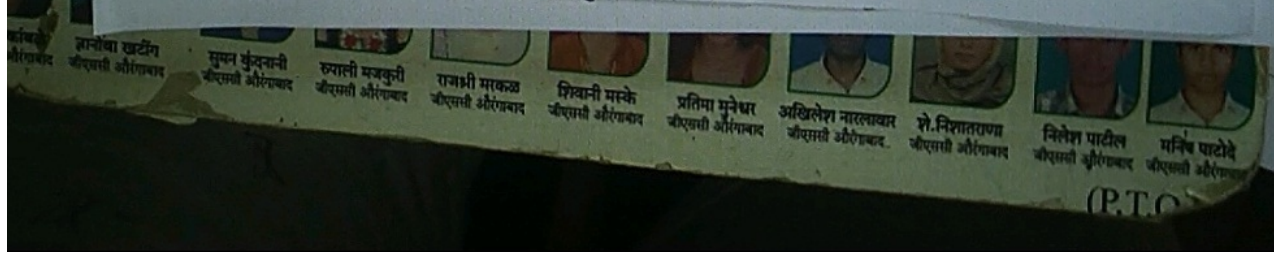
5)

w_A w_B.

$$\alpha = \frac{1}{2} \sum_{i,j=1}^{2} w_i w_j \sigma_{ij} \quad \lambda [\Sigma w_i \gamma_i - \gamma$$

$$L = \frac{1}{2}\left(w_A^2 \sigma_A^2 + \sigma_{AB}(w_1 w_2 + w_2 w_1) + w_B^2 \sigma_B^2 \right)$$

$$- \lambda (\gamma_A w_A +$$



(P.T.O.)

$$\sigma^2 = (1-\alpha)^2\sigma_B^2 + 2\alpha(1-\alpha)\sigma_{AB} + \alpha^2\sigma_A^2$$

$$= (1-\alpha)^2\sigma_B^2 + 0 + \alpha^2\sigma_A^2$$

$$\sigma^2 = (1-\alpha)^2(0.2)^2 + 0 + \alpha^2(0.1)^2$$

For min σ ;

$$\alpha^2 + 4(1-\alpha)^2 = 0$$

$$\alpha^2 + 4(\alpha^2 + 1 - 2\alpha) = 0$$

$$5\alpha^2 - 8\alpha + 4 = 0$$

$$\alpha = \frac{8}{10}$$

$\boxed{\alpha = 0.8}$ $\boxed{(1-\alpha) = 0.2}$

weigh of a and b

9.8) ⇒ Annuity due = 100.

Ordinary Annuity due = 120

$$\Rightarrow 100 = 120(1+r)$$

$$-20 = 120r$$

$$r = \frac{-20}{120}$$

$$r = -1/6.$$

$$\boxed{r = -16.67\%}$$

$$120 = 100(1+r)$$

$$\frac{20}{100} = r.$$

$$0.2$$

Q.9) $r_M = 7\%$

$\beta_A = 1.2 \qquad \beta_B = 1.3$

$r_A = 8\% \qquad r_B = 9\%$

$r_f = 2\%$

$$r_A - r_f = \beta_A (r_M - r_f) + J_A$$

$$r_B - r_f = \beta_B (r_M - r_f) + J_B$$

$$r_f + \beta_A (r_M - r_f) + J_A = r_f + \beta_B (r_M - r_f) + J_B$$

$$1.2 (0.07 - 0.02) + J_A = 1.3 (0.$$

$$0.08 - 0.02 = 1.2 (0.07 - 0.02) + J_A$$

This is coorect (consider) $(0.06) - 1.2(0.05) = J_A$

$$\boxed{J_A = 0}$$

$$0.09 - 0.02 = 1.3 (0.07 - 0.02) + J_B$$

$$0.07 = 1.3 (0.05) + J_B$$

as $r_B > r_A$ $\Rightarrow$ $0.07 - 0.065 = J_B$

$\Rightarrow$ $\boxed{J_B = 0.05}$ must be negative for equal profits

(P.T.O.)

Q10) →

CAPM

Only contains excess market returns to affect the return of ith stock.

$(r_i - r_f) = \beta(r_M - r_f)$

APT

Here, along with excess market return, gdp growth, inflation, Exchange rate movement, interest rate these factors are also considered.

$(r_i - r_f) = \beta_1(r_M - r_f) + \beta_2$(gdp growth) $+ \beta_3$(inflation) $+ \beta_4$(Exchange rate movement $+ \beta_5$(interest rate)

(extension of CAPM)