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**SUGGESTED SOLUTION**

**CS PROFESSIONAL JUNE '19**

**SUBJECT- F.M.**

**Test Code – CSP 3003**

**BRANCH - () (Date :)**

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**Answer : 1**

(A) One Simplification of CAPM formula was done by Sharpe, who developed the Single – Index Model. The single – index model imposes restrictions on how security returns can co – vary. In particular, it is assumed that all covariance arises through an “index”.

Sharpe’s model has since been extended to multi – index models, and leads to a more general theory called the Arbitrage Pricing Theory, developed by Ross.

**The major assumption of Sharpe’ single – index model is that all the co – variation of security returns can be explained by a single factor. This factor is called the index, hence the name “single – index model.”**

According to the Sharpe single index model the return for each security can be given by the following equation :

$$R = \alpha I + \beta I + E$$

Where,

R = Expected return on a security

$\alpha$  = Alpha Coefficient

$\beta$  = Beta Coefficient

I = Expected Return an index

E = Error term with a mean of zero and a constant standard deviation.

[5 Marks]

(B) Following are the main difference between deep discount bonds & disaster bonds :

Points	Deep Discount Bonds	Disaster Bonds
Meaning	A bond that sells at a <b><u>significant discount from par value</u></b> is known as Deep Discount Bond.	Disaster bonds are issued by companies and institutions to <b><u>share the risk and expand the capital to link investors return with the size of insurer losses.</u></b> The bigger the losses, the smaller the return and vice – versa.
Interest	Deep discount bond is a bond that <b><u>does not pay periodic coupon or interest.</u></b> These bonds are issued at a discount to their face value and therefore the difference between the face value of the bond and its issue price represents the interest yield of the bond.	Disaster Bonds is a debt instrument in which <b><u>rate of interest is not fixed.</u></b> The rate of interest or return to investor will depend upon the risk or occurrence of casually or disaster.

[5 Marks]

**Answer : 2**

**(A)** Computation of beta :

Division	Market Value (Rs. In lakh)	Weight	Beta	Product
Personal computers	120	22.22%	1.40	31.11
Software	160	29.63%	1.90	56.30
Computer mainframes	260	48.15%	1.00	48.15
Total	540	100%		135.56

$$\text{Beta of the equity of the firm} = \frac{135.56}{100} = 1.3556$$

Beta of equity if the firm divested itself of its software business :

Division	Market value (Rs. In lakh)	Weight	Beta	Product
Personal computers	120	31.58%	1.40	44.21
Computer mainframes	260	68.42%	1.00	68.42
Total	380	100%		112.63

$$\text{New beta of the firm after disinvestment in software business} = \frac{112.63}{100} = 1.1263$$

To value the software business for the divestiture, beta 1.9 would be used for valuation.

**[4 Marks]**

**(B)** Calculation of intrinsic value of the bond :

The appropriate discount rate for valuing the bond for Mr. Z is :  $9 + 3 + 2 = 14\%$

Year	Cash flow	PV Factor 14%	PV
1 to 5	150	3.433	514.95
5	1,000	0.519	519.00
Intrinsic value of bond			1,033.95
(-) Current market price			(1,025.86)
			8.09

Since, the current market value is less than the intrinsic value by Rs. 8.09; Mr. Z should buy the bond.

Calculation of current yield :

$$\text{Current yield} = \frac{\text{Annual Interest}}{\text{Price}} = \frac{150}{1025.86} = 14.62\%$$

Calculation of YTM :

We have already calculated PV at 14; so let's calculate PV for higher rate say 15%.

Year	Cash flow	PV Factor 15%	PV
1 to 5	150	3.352	502.80
5	1,000	0.497	497.00
			999.80
			(1,025.86)
			(26.06)

$$\begin{aligned}
 \text{YTM} &= 14 + \frac{8.09}{8.09+26.06} \times 1 \\
 &= 14 + \frac{8.09}{34.15} \times 1 \\
 &= 14 + 0.24 \\
 &= \mathbf{14.24\%}
 \end{aligned}$$

[6 Marks]

**Answer : 3**

(A) In order to hedge its position trader would go short on future at current future price of Rs. 18.50 per kg. This will help the trade to realize sure Rs. 18.50 after 6 months.

$$\text{No. of future contract to be sold} = \frac{4,40,000 \text{ kg.}}{2,000 \text{ kg.}} = 220 \text{ Contracts}$$

Future price = Rs. 18.50

Exposure in future market (18.50 × 220 × 2,000) = Rs. 81,40,000

After 6 months the trader would cancel its position in future market by buying a future contract of same quantity and will sell wheat in spot market and position shall be as follows:

**Computation of gain/ loss in cash market :**

Value of wheat today (4,40,000 × 19)	83,60,000
Value of wheat after 6 months(4,40,000 × 17.50)	77,00,000
Loss in cash market	6,60,000

**Computation of gain / loss in future market :**

Value of wheat future sold today (4,40,000 × 18.50)	81,40,000
Value of wheat future after 6 months (4,40,000 × 17.55)	77,22,000
Gain in future market	4,18,000

Saving in loss by entering into future contract = 6,60,000 – 4,18,000 = 2,42,000

$$\text{Effective realized price} = \frac{83,60,000 - 2,42,000}{4,40,000} = 18.45 \text{ Per kg.}$$

[6 Marks]

(B) 1 \$ = Rs. 68.40

For above exchange rate, India considered as domestic country as given spot rate is direct quote for India.

$$\frac{1 + I_D}{1 + I_F} = \frac{F}{S}$$

$$\frac{1 + 0.065}{1 + 0.03} = \frac{F}{68.40}$$

$$\frac{1.065}{1.03} = \frac{F}{68.40}$$

$$F = 70.72$$

Thus, one year forward rate should be 1 \$ = Rs. 70.72

**Calculation of expected forward rate after 3 years :**

$$\left[ \frac{1.065}{1.03} \right]^3 = \frac{F}{68.40}$$

$$1.033981^3 = \frac{F}{68.40}$$

$$1.105446 = \frac{F}{68.40}$$

$$F = 75.61$$

Thus, 3 year forward rate should be 1 \$ = Rs. 75.61

[4 Marks]

**Answer : 4**

**Option I : Taking loan from Indian Bank in Rs. :**

Amount payable to foreign supplier	¥ 2,460 lakhs
Present exchange rate	Rs. 100 = ¥ 246
Amount payable at spot rate (2,460/ 246 × 100)	Rs. 1000 lakhs
[out of loan from Indian bank in Rs. @ 12% p.a.]	
Rate of interest p.a. (quarterly compounded)	12% p.a.
Amount payable with interest after 90 days [Note 1]	Rs. 1,030 lakhs

**Note I :** Amount payable with interest after 90 days

$$= 1,000 \times \left( 1 + \frac{0.12}{4} \right)^{90/360 \times 4}$$

$$= 1,000 \times 1.03^1$$

$$= 1,000 \times 1.03$$

$$= 1,030$$

[3 Marks]

**Option II :** Borrowing from Japanese Bank in ¥ :

**Step 1 :** Computation of total amount repayable on borrowing in Rs.

Amount loan taken from Japanese bank	¥ 2,460 lakhs
Applicable rate of interest	2% p.a.
Amount repayable on borrowing in ¥ after 90 days	¥ 2,472.3 lakhs
$2,460 \times [1 + (0.02 \times 90/360)]$	
90 days forward rate	Rs. 100 = ¥ 250
Amount repayable in Rs. (2,472.3/250 × 100)	Rs. 988.92 lakhs

**Step 2 : Computation of commission payable on borrowing in Rs.**

Commission charged by bank for letter of credit (2,460 / 246 × 100 × 4% × 90 / 360 (Above amount will be loan from local bank @ 12% p.a. quarterly compounded)	Rs. 10 lakhs
Total amount payable after 90 days <b>[Note 2]</b>	Rs. 10.3 lakhs

Total Cost of ₹ loan in Rs. = 988.92 + 10.3 = Rs. 999.22

**Analysis :** the Option II proves to be better than Option I and hence the offer from foreign branch should be accepted.

**Note 2 :** Amount repayable on borrowing in ₹ after 90 days

$$= 10 \times \left(1 + \frac{0.12}{4}\right)^{90/360 \times 4}$$

$$= 10 \times 1.03^1$$

$$= 10 \times 1.03$$

$$= 10.3$$

**[7 Marks]**

**Answer : 5**

**(A)** Following are the main points of difference between bid price and ask price.

Points	Bid Price	Ask Price
<b>Meaning</b>	In direct quote, price at which bank will buy the one unit of foreign currency is known as bid price.	In direct quote, price at which bank will sell the one unit of foreign currency is known as Ask price.
<b>Example</b>	If bank quote rate as \$ 1 = Rs. 65.2012 – 65.2025, the bid price is Rs. 65.2012. This means the bank will buy \$ 1 at Rs. 65.2012	If bank quote rate as \$ 1 = Rs. 65.2012 – 65.2025, the ask price is Rs. 65.2025. This means the bank will sell \$ 1 at Rs. 65.2025.
<b>Appearance in direct quote</b>	In direct quote bid price appear at left hand side.	In direct quote ask price appear at right hand side.
<b>Appearance in Indirect quote</b>	In indirect quote bid price appear at right hand side.	In indirect quote ask price appear at left hand side.
<b>Customers angle</b>	Bid price is buy price for bank but sell price for customer.	Ask price is sell price for bank but buy price for customer.

**[5\*1 = 5 marks]**

**(B) Advantages of commodity derivative trading are as follows:**

1. **Leverage:** Commodity futures operate on margin, meaning that to take a position only a fraction of the total value needs to be available in cash in the trading account.
2. **Commission cost :** It is a lot cheaper to buy/sell one futures contract than to buy/ sell the underlying instrument.
3. **Liquidity:** the involvement of speculator means that futures contracts are reasonable liquid. However, how liquid depends on the actual contract being traded. Electronically traded contracts, such as the e- minis tend to be the most liquid whereas the pit traded commodities like corn, orange juice are not available to the retail trader and more expensive to trade in terms of commission and spread.
4. **Ability to go short :** future contracts can be sold as easily as they are bought enabling a speculator to profit from falling markets as well as rising ones.
5. **No time delay :** options suffer from time decay because the closer they come to expiry the less time is for the option to come into the money. Commodity futures do not suffer from this as they are not anticipating a particular strike price at expiry.

**[5\*1 = 5 marks]**