Time allowed: 2 Hrs 30 Min

Max Marks: 50

Roll No: _____

**Instruction:** Students are required to write Roll No on every page of the question paper, writing anything except the Roll No will be treated as Unfair means. In case of rough work please use answer sheet.

## Section A

(Marks 15)

There are 5 questions Attempt any three. Each question carries five marks.

A 1. Macaroni, Inc. announced that it would pay the following dividends over the next five years: $0.50, $0.75, $1.50, $3, and $4. Afterwards, dividends will increase at a rate of 3 percent per year indefinitely. What is the firm's current stock price if the required rate of return is 13%?

A 2. The risk-free rate is 4 percent. The expected return on the market portfolio is 12 percent with a standard deviation of 16 percent. Which security is over, under, or correctly priced?

| Security | $P_0$ | $D_1$ | $P_1$ | Beta |
|---|---|---|---|---|
| ABC | $25.00 | $1.50 | $28.46 | 1.6 |
| DEF | $12.00 | $0.60 | $13.80 | 2.0 |
| GHI | $18.00 | $0.80 | $19.25 | 1.3 |

A 3. Investment X offers to pay you $4,000 per year for nine years, whereas Investment Y offers to pay you $6,000 per year for five years. Which of these cash flow streams has the higher present value if the discount rate is 5 percent? If the discount rate is 20 percent?

A 4. What is agency cost problem? Discuss.

A 5. Raphael Restaurant is considering the purchase of a $10,000 soufflé maker. The soufflé maker has an economic life of five years and will be fully depreciated by the straight-line method. The machine will produce 2,000 soufflés per year, with each costing $2 to make and priced at $5. Assume that the discount rate is 17 percent and the tax rate is 34 percent. Should Raphael make the purchase?

## Section B

(Marks 20)

There are 3 questions. Attempt any two. Each question carries 10 marks

B 1. The following data relate to two companies A Ltd. and B Ltd.

|  | A Limited | B Limited |
|---|---|---|
| Equity share capital (in Rs 10 shares) | 500,000 | 250,000 |
| 9% Debentures | ---- | 250,000 |

| | | |
|---|---|---|
| Earnings before interest & tax | 100,000 | 100,000 |
| Return on capital employed | 20% | 20% |

The equity shareholders of A Ltd. find to their dismay that in spite of same returns earned by their company on the total capital employed, their earning per share is much less as compared to B Ltd.

You are required to state for the satisfactions of the shareholders of A Ltd. the reasons for such lower earnings per share on their capital. Assume the tax at 50%.

B 2. The treasurer of a new venture, Start-Up Limited, is trying to determine how to raise Rs. 60 million of long term capital. Her investment advisor has devised the alternative capital structure shown below:

| Alternative A | Alternative B |
|---|---|
| Rs. 20,000,000 9% debt | Rs. 40,000,000 12% debt |
| Rs. 40,000,000 Equity | Rs. 20,000,000 Equity |

If alternative A is chosen, the firm would sell 2,000,000 shares of common stock to net Rs. 20 per share. Stockholders would expect an initial dividend of Rs. 1 per share and a dividend growth rate of 7 percent.

Under alternative B, the firm would sell 1,000,000 shares of common stock to net Rs. 20 per share. The expected initial dividend would be Rs. 0.90 per share and the anticipated dividend growth rate 12 percent.

Assume that the firm earns a profit under either capital structure and the effective tax rate is 50 percent

   a) What is the cost of capital to the firm under each of the suggested capital structure? Explain your result.
   b) Explain the logic of anticipated higher interest rate on debt associated with alternative B.
   c) Is it logical for shareholders to expect a higher dividend growth rate under alternative B? Explain your answer.

B 3. Hi-tech Limited plans to sell 30,000 units next year. The expected cost of goods sold is as follows:

| | Rs per unit |
|---|---|
| Raw material | 100 |
| Manufacturing expenses | 30 |
| Selling, admin and finance exp. | 20 |
| Selling price | 200 |

The duration of various stages of operating cycle is expected to be as follows:

| | |
|---|---|
| Raw material stage | 2 months |
| Work-in-progress stage | 1 month |
| Finished stage | ½ month |
| Debtor stage | 1 month |

Assuming the monthly sales level of 2000 units, estimate the gross working capital requirement if the desired cash balance is 5 percent of the gross working capital requirements and work-in-progress is 50 percent complete with respect to manufacturing expenses.

Senior executives of Fine Rice Mill Ltd have been considering the proposal to replace the existing coal-fired furnace in the paddy boiling section by a new furnace is cyclone type husk-fired furnace. The capital cost of the new furnace is expected to be Rs 1 lakh. It will have useful life of 10 years at the end of which period its residual value will be negligible. The present furnace has a book value of Rs 15,000 and can be used for another 10 years with only minor repairs. If scrapped now, it can fetch Rs 10,000 but it cannot fetch any amount if scrapped after ten more years of use.

The basic advantage of the new furnace is that it does not depend on the coal whose supplies are becoming increasingly erratic in recent years. On a conservative estimate, the new furnace will result in a saving of Rs 25,000 per annum on account of eliminated coal cost. However, the cost of electricity and other operating expenses are likely to go up by Rs 8,000 and Rs 4,000 per annum respectively.

The husk which results as a by-product during the normal milling operations at 3,000 metric ton of paddy milled per year is considered adequate for operating the new furnace. On an average, for every metric ton of paddy milled, the husk content is 20 per cent. At present, the husk resulting during the milling operations is sold at a price of Rs 50 per metric ton. Once the new furnace is installed, the husk will be diverted for own use. 'White Ash' which constitutes about 5 percent of the husk burnt in the new furnace, will be collected in a separate ash-pit as it has considerable demand in the refractory industry. It can be sold very easily at a price of Rs 1,500 per metric ton. All the assets of the company are in the same block. Depreciation will be on straight line basis and the same is assumed to be acceptable for tax purpose as well. Applicable tax rate is 35 per cent and cost of capital is 12 per cent.

Required:

(i) Formulate the incremental net after-tax cash flows associated with the replacement project. (ii) Also calculate the project's NPV

# Present Value Table

Present value of 1 i.e. $(1 + r)^{-n}$

Where      r = discount rate

           n = number of periods until payment

*Discount rate (r)*

| Periods (n) | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0·990 | 0·980 | 0·971 | 0·962 | 0·952 | 0·943 | 0·935 | 0·926 | 0·917 | 0·909 | 1 |
| 2 | 0·980 | 0·961 | 0·943 | 0·925 | 0·907 | 0·890 | 0·873 | 0·857 | 0·842 | 0·826 | 2 |
| 3 | 0·971 | 0·942 | 0·915 | 0·889 | 0·864 | 0·840 | 0·816 | 0·794 | 0·772 | 0·751 | 3 |
| 4 | 0·961 | 0·924 | 0·888 | 0·855 | 0·823 | 0·792 | 0·763 | 0·735 | 0·708 | 0·683 | 4 |
| 5 | 0·951 | 0·906 | 0·863 | 0·822 | 0·784 | 0·747 | 0·713 | 0·681 | 0·650 | 0·621 | 5 |
| 6 | 0·942 | 0·888 | 0·837 | 0·790 | 0·746 | 0·705 | 0·666 | 0·630 | 0·596 | 0·564 | 6 |
| 7 | 0·933 | 0·871 | 0·813 | 0·760 | 0·711 | 0·665 | 0·623 | 0·583 | 0·547 | 0·513 | 7 |
| 8 | 0·923 | 0·853 | 0·789 | 0·731 | 0·677 | 0·627 | 0·582 | 0·540 | 0·502 | 0·467 | 8 |
| 9 | 0·941 | 0·837 | 0·766 | 0·703 | 0·645 | 0·592 | 0·544 | 0·500 | 0·460 | 0·424 | 9 |
| 10 | 0·905 | 0·820 | 0·744 | 0·676 | 0·614 | 0·558 | 0·508 | 0·463 | 0·422 | 0·386 | 10 |
| 11 | 0·896 | 0·804 | 0·722 | 0·650 | 0·585 | 0·527 | 0·475 | 0·429 | 0·388 | 0·305 | 11 |
| 12 | 0·887 | 0·788 | 0·701 | 0·625 | 0·557 | 0·497 | 0·444 | 0·397 | 0·356 | 0·319 | 12 |
| 13 | 0·879 | 0·773 | 0·681 | 0·601 | 0·530 | 0·469 | 0·415 | 0·368 | 0·326 | 0·290 | 13 |
| 14 | 0·870 | 0·758 | 0·661 | 0·577 | 0·505 | 0·442 | 0·388 | 0·340 | 0·299 | 0·263 | 14 |
| 15 | 0·861 | 0·743 | 0·642 | 0·555 | 0·481 | 0·417 | 0·362 | 0·315 | 0·275 | 0·239 | 15 |

| (n) | 11% | 12% | 13% | 14% | 15% | 16% | 17% | 18% | 19% | 20% | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0·901 | 0·893 | 0·885 | 0·877 | 0·870 | 0·862 | 0·855 | 0·847 | 0·840 | 0·833 | 1 |
| 2 | 0·812 | 0·797 | 0·783 | 0·769 | 0·756 | 0·743 | 0·731 | 0·718 | 0·706 | 0·694 | 2 |
| 3 | 0·731 | 0·712 | 0·693 | 0·675 | 0·658 | 0·641 | 0·624 | 0·609 | 0·593 | 0·579 | 3 |
| 4 | 0·659 | 0·636 | 0·613 | 0·592 | 0·572 | 0·552 | 0·534 | 0·516 | 0·499 | 0·482 | 4 |
| 5 | 0·593 | 0·567 | 0·543 | 0·519 | 0·497 | 0·476 | 0·456 | 0·437 | 0·419 | 0·402 | 5 |
| 6 | 0·535 | 0·507 | 0·480 | 0·456 | 0·432 | 0·410 | 0·390 | 0·370 | 0·352 | 0·335 | 6 |
| 7 | 0·482 | 0·452 | 0·425 | 0·400 | 0·376 | 0·354 | 0·333 | 0·314 | 0·296 | 0·279 | 7 |
| 8 | 0·434 | 0·404 | 0·376 | 0·351 | 0·327 | 0·305 | 0·285 | 0·266 | 0·249 | 0·233 | 8 |
| 9 | 0·391 | 0·361 | 0·333 | 0·308 | 0·284 | 0·263 | 0·243 | 0·225 | 0·209 | 0·194 | 9 |
| 10 | 0·352 | 0·322 | 0·295 | 0·270 | 0·247 | 0·227 | 0·208 | 0·191 | 0·176 | 0·162 | 10 |
| 11 | 0·317 | 0·287 | 0·261 | 0·237 | 0·215 | 0·195 | 0·178 | 0·162 | 0·148 | 0·135 | 11 |
| 12 | 0·286 | 0·257 | 0·231 | 0·208 | 0·187 | 0·168 | 0·152 | 0·137 | 0·124 | 0·112 | 12 |
| 13 | 0·258 | 0·229 | 0·204 | 0·182 | 0·163 | 0·145 | 0·130 | 0·116 | 0·104 | 0·093 | 13 |
| 14 | 0·232 | 0·205 | 0·181 | 0·160 | 0·141 | 0·125 | 0·111 | 0·099 | 0·088 | 0·078 | 14 |
| 15 | 0·209 | 0·183 | 0·160 | 0·140 | 0·123 | 0·108 | 0·095 | 0·084 | 0·074 | 0·065 | 15 |

## Annuity Table

Present value of an annuity of 1 i.e. $\dfrac{1-(1+r)^{-n}}{r}$

Where    r = discount rate
             n = number of periods

*Discount rate (r)*

| Periods (n) | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% | 10% | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0·990 | 0·980 | 0·971 | 0·962 | 0·952 | 0·943 | 0·935 | 0·926 | 0·917 | 0·909 | 1 |
| 2 | 1·970 | 1·942 | 1·913 | 1·886 | 1·859 | 1·833 | 1·808 | 1·783 | 1·759 | 1·736 | 2 |
| 3 | 2·941 | 2·884 | 2·829 | 2·775 | 2·723 | 2·673 | 2·624 | 2·577 | 2·531 | 2·487 | 3 |
| 4 | 3·902 | 3·808 | 3·717 | 3·630 | 3·546 | 3·465 | 3·387 | 3·312 | 3·240 | 3·170 | 4 |
| 5 | 4·853 | 4·713 | 4·580 | 4·452 | 4·329 | 4·212 | 4·100 | 3·993 | 3·890 | 3·791 | 5 |
| 6 | 5·795 | 5·601 | 5·417 | 5·242 | 5·076 | 4·917 | 4·767 | 4·623 | 4·486 | 4·355 | 6 |
| 7 | 6·728 | 6·472 | 6·230 | 6·002 | 5·786 | 5·582 | 5·389 | 5·206 | 5·033 | 4·868 | 7 |
| 8 | 7·652 | 7·325 | 7·020 | 6·733 | 6·463 | 6·210 | 5·971 | 5·747 | 5·535 | 5·335 | 8 |
| 9 | 8·566 | 8·162 | 7·786 | 7·435 | 7·108 | 6·802 | 6·515 | 6·247 | 5·995 | 5·759 | 9 |
| 10 | 9·471 | 8·983 | 8·530 | 8·111 | 7·722 | 7·360 | 7·024 | 6·710 | 6·418 | 6·145 | 10 |
| 11 | 10·37 | 9·787 | 9·253 | 8·760 | 8·306 | 7·887 | 7·499 | 7·139 | 6·805 | 6·495 | 11 |
| 12 | 11·26 | 10·58 | 9·954 | 9·385 | 8·863 | 8·384 | 7·943 | 7·536 | 7·161 | 6·814 | 12 |
| 13 | 12·13 | 11·35 | 10·63 | 9·986 | 9·394 | 8·853 | 8·358 | 7·904 | 7·487 | 7·103 | 13 |
| 14 | 13·00 | 12·11 | 11·30 | 10·56 | 9·899 | 9·295 | 8·745 | 8·244 | 7·786 | 7·367 | 14 |
| 15 | 13·87 | 12·85 | 11·94 | 11·12 | 10·38 | 9·712 | 9·108 | 8·559 | 8·061 | 7·606 | 15 |

| (n) | 11% | 12% | 13% | 14% | 15% | 16% | 17% | 18% | 19% | 20% | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0·901 | 0·893 | 0·885 | 0·877 | 0·870 | 0·862 | 0·855 | 0·847 | 0·840 | 0·833 | 1 |
| 2 | 1·713 | 1·690 | 1·668 | 1·647 | 1·626 | 1·605 | 1·585 | 1·566 | 1·547 | 1·528 | 2 |
| 3 | 2·444 | 2·402 | 2·361 | 2·322 | 2·283 | 2·246 | 2·210 | 2·174 | 2·140 | 2·106 | 3 |
| 4 | 3·102 | 3·037 | 2·974 | 2·914 | 2·855 | 2·798 | 2·743 | 2·690 | 2·639 | 2·589 | 4 |
| 5 | 3·696 | 3·605 | 3·517 | 3·433 | 3·352 | 3·274 | 3·199 | 3·127 | 3·058 | 2·991 | 5 |
| 6 | 4·231 | 4·111 | 3·998 | 3·889 | 3·784 | 3·685 | 3·589 | 3·498 | 3·410 | 3·326 | 6 |
| 7 | 4·712 | 4·564 | 4·423 | 4·288 | 4·160 | 4·039 | 3·922 | 3·812 | 3·706 | 3·605 | 7 |
| 8 | 5·146 | 4·968 | 4·799 | 4·639 | 4·487 | 4·344 | 4·207 | 4·078 | 3·954 | 3·837 | 8 |
| 9 | 5·537 | 5·328 | 5·132 | 4·946 | 4·772 | 4·607 | 4·451 | 4·303 | 4·163 | 4·031 | 9 |
| 10 | 5·889 | 5·650 | 5·426 | 5·216 | 5·019 | 4·833 | 4·659 | 4·494 | 4·339 | 4·192 | 10 |
| 11 | 6·207 | 5·938 | 5·687 | 5·453 | 5·234 | 5·029 | 4·836 | 4·656 | 4·486 | 4·327 | 11 |
| 12 | 6·492 | 6·194 | 5·918 | 5·660 | 5·421 | 5·197 | 4·988 | 4·793 | 4·611 | 4·439 | 12 |
| 13 | 6·750 | 6·424 | 6·122 | 5·842 | 5·583 | 5·342 | 5·118 | 4·910 | 4·715 | 4·533 | 13 |
| 14 | 6·982 | 6·628 | 6·302 | 6·002 | 5·724 | 5·468 | 5·229 | 5·008 | 4·802 | 4·611 | 14 |
| 15 | 7·191 | 6·811 | 6·462 | 6·142 | 5·847 | 5·575 | 5·324 | 5·092 | 4·876 | 4·675 | 15 |