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**THE OPEN UNIVERSITY OF SRI LANKA**
**FACULTY OF ENGINEERING TECHNOLOGY**
**BACHELOR OF TECHNOLOGY-LEVEL 5**
**FINAL EXAMINATION 2010/2011**
**MEM5336 - MANAGEMENT FOR ENGINEERS**
**DATE : 14TH MARCH 2011**
**TIME : 0930 – 1230 HRS**
**DURATION : THREE HOURS**

**This question paper has two sections, Section A and Section B. Answer any Five Parts from Section A and any Five Questions from Section B.**

## SECTION A

(a) What are the four categories of principles that Fredrick Taylor identified?

(b) Briefly explain how you would apply SWOT analysis to improve the productivity of an organization.

(c) Explain what you understand by functional organizational structure and matrix structure.

(d) What are the types of "Marketing variables"? Explain them briefly.

(e) Explain the methods of Break even analysis in decision making.

(f) Compare and contrast between production and productivity.

(g) What are the different types of maintenance? Explain each type with examples.

**(20 marks)**

## SECTION B

1. (a) What is meant by motivation referred to in an organization? Why is motivation important in a workplace? **(08 marks)**

   (b) Discuss how you would relate the content theories and the process theories of motivation for management behaviour. **(08 marks)**

2. (a) Identify and describe the main components of Human Resource Management (HRM) process. **(08 marks)**

   (b) Why do selection interview sometimes fail?
   What precautions can be taken by interviewers to make failure rate less likely?
   **(08 marks)**

3. (a) Explain the following terms.
   (i) Fixed cost
   (ii) Variable cost
   (iii) Break even point
   (iv) Margin of safety

**(06 marks)**

(b) A factory manufacturing fans has the capacity of 250 fans per month. The variable cost of a fan is Rs 4,000/- which is sold for Rs. 5,000/-. Fixed overhead cost is Rs 120,000/- per month. Find the following.
   (i) Contribution
   (ii) Break even point

**(05 marks)**

(c) If the number of fans sold is 90% of the capacity, what would be the profit? Also find the margin of safety.

**(05 marks)**

4. (a) Explain the methods used for evaluating a capital project. **(04 marks)**

(b) A machine used for making steel nails cost Rs 100,000/- (inclusive of installation). Cash flow during lifetime of the machine is as follows.

| Year | Net cash flow (Rs) |
|---|---|
| 1 | 5,000 |
| 2 | 10,000 |
| 3 | 30,000 |
| 4 | 40,000 |
| 5 | 40,000 |
| 6 | 25,000 |
| 7 | 20,000 |
| 8 | 15,000 |

Scrap value of the Machine is Rs. 10,000/-. Capital required for the project was raised at discount factor of 15%. Evaluate the feasibility of the project.

**(08 marks)**

(c) Apart from evaluating techniques, what are the other factors that one should consider in deciding the location of a project, prior to its implementation?

**(04 marks)**

5. (a) Mention the reasons for implementing an inventory system. **(04 marks)**

(b) Explain the following types of cost involved in an Inventory control system.

(i) Purchase cost
(ii) Administration cost
(iii) Stock holding cost
(iv) Penalty cost **(04 marks)**

(c) What is meant by an economic lot size?
Write expressions for the optimum lot size and its cost in terms of administrative and inventory costs and demand rate. **(04 marks)**

(d) An electric company produces 2,000 air conditioners per year, for which it needs equal number of compressors. Each compressor cost Rs.1,000/- and the cost to hold the compressor in stock is Rs 240/- per year. Set up cost is Rs.15,000/-. What would be the economic order quantity? **(04 marks)**

6. (a) Explain the objectives of "Transportation Model".
What are the conditions that should be satisfied when finding a basic solution in a transportation problem? **(06 marks)**

(b) A company has three warehouses $W_1$, $W_2$ and $W_3$. It is required to deliver a product from these warehouses to three customers A, B and C. The warehouses have the following units in stock:

| Warehouse | $W_1$ | $W_2$ | $W_3$ |
|---|---|---|---|
| No. of units | 65 | 42 | 43 |

The customer requirements are:

| Customer | A | B | C |
|---|---|---|---|
| No of units | 70 | 30 | 50 |

The table below shows the costs of transporting one unit from each warehouse to each customer:

| Warehouse / Customer | $W_1$ | $W_2$ | $W_3$ |
|---|---|---|---|
| A | 5 | 7 | 8 |
| B | 4 | 4 | 6 |
| C | 6 | 7 | 7 |

Find the optimum transportation cost. **(10 marks)**

7. (a) Explain the following terms.
   (i) Double entry system
   (ii) Trading and Profit and loss account
   (iii) Balance sheet **(04 marks)**

   (b) Simon has been in business for many years. His account has extracted the following trial balance from his books of account as at 31st March 2007.

| | Rs. ('00) | Rs.('00) |
|---|---|---|
| Bank | 1,200 | |
| Capital | | 33,000 |
| Cash | 300 | |
| Drawings | 6,000 | |
| Insurance | 2,000 | |
| Office expenses | 15,000 | |
| Office furniture at cost | 5,000 | |
| Office furniture; accumulated depreciation at 1st April 2006 | | 2,000 |
| Provision for bad and doubtful debts at 1st April 2006 | | 500 |
| Purchases | 55,000 | |
| Salaries | 25,000 | |
| Sales | | 100,000 |
| Stock at 1st April 2006 | 10000 | |
| Trade creditors | | 4,000 |
| Trade debtors | 20,000 | |
| | Rs.139,500 | Rs.139,500 |

Notes : The following additional information is to be taken into account.

1. Stock at 31st March 2007 was valued at Rs. 1,500,000
2. The insurance included Rs.50,000 worth of cover which related to the year 31st March 2008.
3. Depreciation is charged on office furniture at 10% per annum of its original cost ( it is assumed not to have any residual value).
4. A bad debt of Rs. 100,000 included in the trade debtors' balance of Rs. 2,000,000 is to be written off.
5. The provision for bad and doubtful debts is to be maintained at a level of 5% of outstanding trade debtors as at 31st March 2007. i.e. after excluding the bad debt referred in note 4 above.
6. At 31st March 2007 there was an amount owing for salaries of Rs.100,000.

Prepare the following.

(i) Simon's trading and profit and loss account for the year 31st March 2007. **(06 marks)**

(ii) Balance sheet as at 31st March 2007. **(06 marks)**

8. (a) Explain the terms,
   (i) Project Management
   (ii) Critical Path Method (CPM)
   (iii) Programme Evaluation and Review Technique (PERT) **(06 marks)**

   (b) The following activities are part of a project to be scheduled using CPM.

| Activity | Immediate Predecessor | Time (weeks) |
|---|---|---|
| A | - | 6 |
| B | A | 3 |
| C | A | 7 |
| D | C | 2 |
| E | B,D | 4 |
| F | D | 3 |
| G | E,F | 7 |

   (i) Draw the network.
   (ii) Show the critical path in the above network.
   (iii) How many weeks will it take to complete the project?
   (iv) How much slack does activity B have? **(10 marks)**

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00201

TABLE A—PRESENT VALUE OF ONE UNIT—VALUE OF MONEY

| Years Hence | 1% | 2% | 4% | 6% | 8% | 10% | 12% | 14% | 15% | 16% | 18% | 20% | 22% | 24% | 25% | 26% | 28% | 30% | 35% | 40% | 45% | 50% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0·990 | 0·980 | 0·962 | 0·943 | 0·926 | 0·909 | 0·893 | 0·877 | 0·870 | 0·862 | 0·847 | 0·833 | 0·820 | 0·806 | 0·800 | 0·794 | 0·781 | 0·769 | 0·741 | 0·714 | 0·690 | 0·667 |
| 2 | 0·980 | 0·961 | 0·925 | 0·890 | 0·857 | 0·826 | 0·797 | 0·769 | 0·756 | 0·743 | 0·718 | 0·694 | 0·672 | 0·650 | 0·640 | 0·630 | 0·610 | 0·592 | 0·549 | 0·510 | 0·476 | 0·444 |
| 3 | 0·971 | 0·942 | 0·889 | 0·840 | 0·794 | 0·751 | 0·712 | 0·675 | 0·658 | 0·641 | 0·609 | 0·579 | 0·551 | 0·524 | 0·512 | 0·500 | 0·477 | 0·455 | 0·406 | 0·364 | 0·328 | 0·296 |
| 4 | 0·961 | 0·924 | 0·855 | 0·792 | 0·735 | 0·683 | 0·636 | 0·592 | 0·572 | 0·552 | 0·516 | 0·482 | 0·451 | 0·423 | 0·410 | 0·397 | 0·373 | 0·350 | 0·301 | 0·260 | 0·226 | 0·198 |
| 5 | 0·951 | 0·906 | 0·822 | 0·747 | 0·681 | 0·621 | 0·567 | 0·519 | 0·497 | 0·476 | 0·437 | 0·402 | 0·370 | 0·341 | 0·328 | 0·315 | 0·291 | 0·269 | 0·223 | 0·186 | 0·156 | 0·132 |
| 6 | 0·942 | 0·888 | 0·790 | 0·705 | 0·630 | 0·564 | 0·507 | 0·456 | 0·432 | 0·410 | 0·370 | 0·335 | 0·303 | 0·275 | 0·262 | 0·250 | 0·227 | 0·207 | 0·165 | 0·133 | 0·108 | 0·088 |
| 7 | 0·933 | 0·871 | 0·760 | 0·665 | 0·583 | 0·513 | 0·452 | 0·400 | 0·376 | 0·354 | 0·314 | 0·279 | 0·249 | 0·222 | 0·210 | 0·198 | 0·178 | 0·159 | 0·122 | 0·095 | 0·074 | 0·059 |
| 8 | 0·923 | 0·853 | 0·731 | 0·627 | 0·540 | 0·467 | 0·404 | 0·351 | 0·327 | 0·305 | 0·266 | 0·233 | 0·204 | 0·179 | 0·168 | 0·157 | 0·139 | 0·123 | 0·091 | 0·068 | 0·051 | 0·039 |
| 9 | 0·914 | 0·837 | 0·703 | 0·592 | 0·500 | 0·424 | 0·361 | 0·308 | 0·284 | 0·263 | 0·225 | 0·194 | 0·167 | 0·144 | 0·134 | 0·125 | 0·108 | 0·094 | 0·067 | 0·048 | 0·035 | 0·026 |
| 10 | 0·905 | 0·820 | 0·676 | 0·558 | 0·463 | 0·386 | 0·322 | 0·270 | 0·247 | 0·227 | 0·191 | 0·162 | 0·137 | 0·116 | 0·107 | 0·099 | 0·085 | 0·073 | 0·050 | 0·035 | 0·024 | 0·017 |
| 11 | 0·896 | 0·804 | 0·650 | 0·527 | 0·429 | 0·350 | 0·287 | 0·237 | 0·215 | 0·195 | 0·162 | 0·135 | 0·112 | 0·094 | 0·086 | 0·079 | 0·066 | 0·056 | 0·037 | 0·025 | 0·017 | 0·012 |
| 12 | 0·887 | 0·788 | 0·625 | 0·497 | 0·397 | 0·319 | 0·257 | 0·208 | 0·187 | 0·168 | 0·137 | 0·112 | 0·092 | 0·076 | 0·069 | 0·062 | 0·052 | 0·043 | 0·027 | 0·018 | 0·012 | 0·008 |
| 13 | 0·879 | 0·773 | 0·601 | 0·469 | 0·368 | 0·290 | 0·229 | 0·182 | 0·163 | 0·145 | 0·116 | 0·093 | 0·075 | 0·061 | 0·055 | 0·050 | 0·040 | 0·033 | 0·020 | 0·013 | 0·008 | 0·005 |
| 14 | 0·870 | 0·758 | 0·577 | 0·442 | 0·340 | 0·263 | 0·205 | 0·160 | 0·141 | 0·125 | 0·099 | 0·078 | 0·062 | 0·049 | 0·044 | 0·039 | 0·032 | 0·025 | 0·015 | 0·009 | 0·006 | 0·003 |
| 15 | 0·861 | 0·743 | 0·555 | 0·417 | 0·315 | 0·239 | 0·183 | 0·140 | 0·123 | 0·108 | 0·084 | 0·065 | 0·051 | 0·040 | 0·035 | 0·031 | 0·025 | 0·020 | 0·011 | 0·006 | 0·004 | 0·002 |
| 16 | 0·853 | 0·728 | 0·534 | 0·394 | 0·292 | 0·218 | 0·163 | 0·123 | 0·107 | 0·093 | 0·071 | 0·054 | 0·042 | 0·032 | 0·028 | 0·025 | 0·019 | 0·015 | 0·008 | 0·005 | 0·003 | 0·002 |
| 17 | 0·844 | 0·714 | 0·513 | 0·371 | 0·270 | 0·198 | 0·146 | 0·108 | 0·093 | 0·080 | 0·060 | 0·045 | 0·034 | 0·026 | 0·023 | 0·020 | 0·015 | 0·012 | 0·006 | 0·003 | 0·002 | 0·001 |
| 18 | 0·836 | 0·700 | 0·494 | 0·350 | 0·250 | 0·180 | 0·130 | 0·095 | 0·081 | 0·069 | 0·051 | 0·038 | 0·028 | 0·021 | 0·018 | 0·016 | 0·012 | 0·009 | 0·005 | 0·002 | 0·001 | 0·001 |
| 19 | 0·828 | 0·686 | 0·475 | 0·331 | 0·232 | 0·164 | 0·116 | 0·083 | 0·070 | 0·060 | 0·043 | 0·031 | 0·023 | 0·017 | 0·014 | 0·012 | 0·010 | 0·007 | 0·003 | 0·002 | 0·001 | |
| 20 | 0·820 | 0·673 | 0·456 | 0·312 | 0·215 | 0·149 | 0·104 | 0·073 | 0·061 | 0·051 | 0·037 | 0·026 | 0·019 | 0·014 | 0·012 | 0·010 | 0·007 | 0·005 | 0·002 | 0·001 | 0·001 | |
| 21 | 0·811 | 0·660 | 0·439 | 0·294 | 0·199 | 0·135 | 0·093 | 0·064 | 0·053 | 0·044 | 0·031 | 0·022 | 0·015 | 0·011 | 0·009 | 0·008 | 0·006 | 0·004 | 0·002 | 0·001 | | |
| 22 | 0·803 | 0·647 | 0·422 | 0·278 | 0·184 | 0·123 | 0·083 | 0·056 | 0·046 | 0·038 | 0·026 | 0·018 | 0·013 | 0·009 | 0·007 | 0·006 | 0·004 | 0·003 | 0·001 | | | |
| 23 | 0·795 | 0·634 | 0·406 | 0·262 | 0·170 | 0·112 | 0·074 | 0·049 | 0·040 | 0·033 | 0·022 | 0·015 | 0·010 | 0·007 | 0·006 | 0·005 | 0·003 | 0·002 | 0·001 | | | |
| 24 | 0·788 | 0·622 | 0·390 | 0·247 | 0·158 | 0·102 | 0·066 | 0·043 | 0·035 | 0·028 | 0·019 | 0·013 | 0·008 | 0·006 | 0·005 | 0·004 | 0·003 | 0·002 | 0·001 | | | |
| 25 | 0·780 | 0·610 | 0·375 | 0·233 | 0·146 | 0·092 | 0·059 | 0·038 | 0·030 | 0·024 | 0·016 | 0·010 | 0·007 | 0·005 | 0·004 | 0·003 | 0·002 | 0·002 | 0·001 | | | |
| 26 | 0·772 | 0·598 | 0·361 | 0·220 | 0·135 | 0·084 | 0·053 | 0·033 | 0·026 | 0·021 | 0·014 | 0·009 | 0·006 | 0·004 | 0·003 | 0·002 | 0·002 | 0·001 | | | | |
| 27 | 0·764 | 0·586 | 0·347 | 0·207 | 0·125 | 0·076 | 0·047 | 0·029 | 0·023 | 0·018 | 0·011 | 0·007 | 0·005 | 0·003 | 0·002 | 0·002 | 0·001 | 0·001 | | | | |
| 28 | 0·757 | 0·574 | 0·333 | 0·196 | 0·116 | 0·069 | 0·042 | 0·026 | 0·020 | 0·016 | 0·010 | 0·006 | 0·004 | 0·002 | 0·002 | 0·002 | 0·001 | 0·001 | | | | |
| 29 | 0·749 | 0·563 | 0·321 | 0·185 | 0·107 | 0·063 | 0·037 | 0·022 | 0·017 | 0·014 | 0·008 | 0·005 | 0·003 | 0·002 | 0·002 | 0·002 | 0·001 | 0·001 | | | | |
| 30 | 0·742 | 0·552 | 0·308 | 0·174 | 0·099 | 0·057 | 0·033 | 0·020 | 0·015 | 0·012 | 0·007 | 0·004 | 0·003 | 0·002 | 0·001 | 0·001 | 0·001 | | | | | |
| 40 | 0·672 | 0·453 | 0·208 | 0·097 | 0·046 | 0·022 | 0·011 | 0·005 | 0·004 | 0·003 | 0·001 | 0·001 | | | | | | | | | | |
| 50 | 0·608 | 0·372 | 0·141 | 0·054 | 0·021 | 0·009 | 0·003 | 0·001 | 0·001 | 0·001 | | | | | | | | | | | | |