FELLOWSHIP EXAMINATION
MATHEMATICAL BASIS OF LIFE ASSURANCE

Time: 3 Hours
[Total Marks : 100]

Answer any FIVE questions only.
All questions carry 20 marks each.

1. a) Prove both by general reasoning and algebraically that:
\[
\frac{1}{a_{n}} = \frac{1}{s_{n}} + i
\]
Marks 7

b) An investor deposits Rs. 20,000 in a savings account in a bank and then withdraws uniform annual amount starting one year after the deposit was made. Immediately after the 11th annual withdrawal, the investor has left Rs. 4,000 in the account. Calculate the uniform amount of the withdrawal, assuming the bank allows interest at 8% per annum.

Given: \(a_{11}\) at 8% = 7.1390

Marks 5

c) A loan is repayable by 15 equated yearly instalments of Rs. 2,750 each, comprising both interest and capital. The rate of interest on loan is 7% per annum effective. Calculate:

i) The amount of loan.

ii) Loan outstanding immediately after the 5th yearly instalment is repaid.

iii) Loan outstanding immediately before the 5th instalment is repaid.

iv) Total interest paid during the first 5 years.

Given at 7%: \(V^5 = .71299\) \(V^{10} = .50835\) \(V^{15} = .36245\)

Marks 10

2. a) Under a settlement of property Mr. A is entitled to Rs. 6,000 per annum ad infinitum, the first payment being due at the end of 2 years. Find the present value of Mr. A's right at 6% p.a. interest.

b) A life insurance company calculates single premium for immediate annuity certain policies using effective rate of interest of 6% per annum:
i) Calculate the net single premium for an immediate annuity of Rs. 3,200 per annum payable quarterly in arrears for 10 years certain only.

ii) Calculate the prospective policy value and the retrospective policy value under (i) above at the end of 5 years immediately after payment of the instalment then due, using 6% p.a. interest.

iii) Calculate the office single premium under (i) above allowing for initial expense of 2% of the office single premium, and expenses relating to payment of annuity at the rate of Rs. 20 per instalment.

Given at 6%:

\[ V^5 = .74726 \quad V^{10} = .55839 \]

\[ S^{-5} = 5.6371 \quad i^{(4)} = .058695 \]

3. a) If \( l_{x} = 100 - x \), Find the value of \( A_{45}^{1} : 15 \) at 5% interest.

Given that \( V^{15} \) at 5% = .4810

b) If \( A_{45} = .24 \), \( A_{55} = .36 \), \( A_{45} : 10 = .57 \).

Calculate the values of:

i) \( A_{45} : 10 \)  
ii) \( A_{45}^{1} : 10 \)  
iii) \( 10 \mid A_{45} \)

c) A student has written the following equations:

i) \( n \mid A_{x} = V^{n} x A_{x} + n \)

ii) \( \ddot{a}_{x} = \ddot{a}_{n} + n \mid \ddot{a}_{x} \)

iii) \( A_{x} : \underline{n} = A_{x} : \underline{t} + \frac{Dx + t}{Dx} x A_{x} + t : \underline{n-t} \)

State whether each equation is correct or not, and wherever applicable, write the corrected equation.

4. a) Sometimes where no standard mortality table has been produced for female lives, actuaries use the corresponding male table, but apply an age rating of 4 years (say), that is they consider a female aged \( x \) to be equivalent to a male aged \( x - 4 \). Explain the rationale underlying this approach.
b) A life aged 60 is assumed to be subject to rate of mortality equal to twice that of the LIC (1994-96) ultimate mortality. Calculate the probability that the life will die before age 62.

Given as LIC (1994-96) ultimate mortality:

\[ q_{60} = 0.013073 \quad \text{and} \quad q_{61} = 0.014391 \]

c) Complete the entries in the following portion of a mortality table.

<table>
<thead>
<tr>
<th>Age (x)</th>
<th>( l_x )</th>
<th>( d_x )</th>
<th>( p_x )</th>
<th>( q_x )</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>63,000</td>
<td>---</td>
<td>---</td>
<td>0.005</td>
</tr>
<tr>
<td>52</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.006</td>
</tr>
<tr>
<td>53</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.007</td>
</tr>
<tr>
<td>54</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>0.008</td>
</tr>
</tbody>
</table>

d) On the basis of the mortality table in (c) above, calculate the probability that:

i) A life aged 52 will survive to age 54.

ii) A life aged 51 will die after age 52 but before age 54.

iii) Of three lives all aged 51, at least one life dies before age 52.

5. a) A debenture bearing interest at 6% per annum payable quarterly in arrear is redeemable at par at the end of 5 years. Find the price an investor of the debenture of nominal Rs. 10,000 should pay if he desires to realise a net yield of 5% per annum. The investor is subject to tax on interest income at 20%.

Given at 5%:

\[ V^5 = 0.78353 \quad i^{(0)} = 0.049089 \]

b) A student has correctly written expression for office annual premium under a policy as under:

\[
\text{Office Annual Premium} = 20,000 \left( A_{40:20}^{20} + A_{40:20}^{20} \right) \frac{1}{0.95 \times 40 : 15 - 0.65}
\]

i) What benefits are payable on death of the life assured during the policy term, and on his survival to maturity?
ii) What are the expense loadings? 6
iii) What is the period during which premiums are payable? 2

(c) Explain why the crude mortality rates should be graduated? 4

6. a) Prove that \( \bar{a}_x \cdot n \) = \( a_x \cdot n \) = \( 1 - A_x : n \) 5
b) Prove that \( a_x = V_p x \cdot \bar{a}_x + 1 \) 5
c) What is a "solvency valuation"? 5
d) Write short note on interim bonus. 5

7. a) Calculate for a life aged 40:

i) the net single premium for a 15-year temporary assurance for Rs. 10,000. 5
ii) The net annual premium limited to 20 years for a whole life assurance for Rs. 25,000 5
iii) The net annual premium for a double endowment assurance for 15 years for a basic sum assured of Rs. 20,000. 5

The following values are given:

<table>
<thead>
<tr>
<th>( x )</th>
<th>( D_x )</th>
<th>( M_x )</th>
<th>( N_x )</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>93645</td>
<td>17625</td>
<td>1343015</td>
</tr>
<tr>
<td>55</td>
<td>35573</td>
<td>12716</td>
<td>403807</td>
</tr>
<tr>
<td>60</td>
<td>24604</td>
<td>10506</td>
<td>249057</td>
</tr>
</tbody>
</table>

b) What is the rationale for creating a reserve for early payment of claims? 5

8. a) Five years ago a life insurance company issued a whole life policy for sum assured of Rs. 40,000 on the life of a person then aged 30. Annual premiums were payable for 25 years or till death whichever is earlier. The person now desires the policy to be altered to an endowment assurance for sum assured of Rs. 30,000 maturing at age 55. Find the revised annual premium payable till age 55 or death, whichever is earlier.

Given at 6% interest: \( \bar{a}_{30} = 15.618 \), \( \bar{a}_{35} = 15.052 \)

\( \bar{a}_{30} : 25 = 13.253 \), \( \bar{a}_{35} : 20 = 11.864 \)

b) What are the advantages of reversionary bonus system? 8

----- END -----

4
1. A book (on technical subject) of 1000 pages was scanned and the number of printing errors in each page was noted. The distribution of number of errors in a page was found to be 'Poisson'. If there were exactly 223 pages free from errors and exactly 251 pages with 2 printing errors each, estimate the average errors per page. Also estimate:
   a) i) the number of pages with exactly '4' errors and
      ii) the number of pages with exactly '5' errors
   b) If for second edition of the same book (of 1000 pages) after one year, the average errors per page was found to be 1.2, estimate
      i) the number of pages with exactly '4' errors and
      ii) the number of pages with exactly '5' errors

Assuming that the distribution of number of errors in a page still followed 'Poisson Distribution'.

Given that $e^{-1.2} = 0.301$

2. The Table below gives the consumption of five popular brands of cold drinks in five cities, during the calendar year 2004.

   **Consumption of cold drinks in '000s Bottles.**

<table>
<thead>
<tr>
<th>Cities</th>
<th>BRANDS</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>32</td>
<td>26</td>
<td>32</td>
<td>26</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>38</td>
<td>20</td>
<td>32</td>
<td>28</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>33</td>
<td>30</td>
<td>38</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>29</td>
<td>27</td>
<td>26</td>
<td>24</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>37</td>
<td>29</td>
<td>33</td>
<td>23</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
Construct the appropriate Analysis of Variance (ANOVA) table and test whether the consumption of ‘cold drinks’ varies significantly between:

i) Cities  
ii) Brands

Given that $F_{0.05} = 3.01$ for 4 & 16 degrees of freedom.

<table>
<thead>
<tr>
<th>Variable $x$</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency $f$</td>
<td>305</td>
<td>365</td>
<td>210</td>
<td>80</td>
<td>28</td>
<td>9</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

The above table gives the frequency against each value of variable $x$ for 1000 observations. Using the above data calculate in respect of variable $x$ the following:

a) Mean  
b) Mode  
c) Median  
d) Lower Quartile  
e) Upper Quartile  
f) Standard Deviation  
g) Mean Deviation  
h) The measure of skewness ($\alpha_3$)

4. 

a) A variate $x$ is distributed normally with mean 45.54 and standard deviation 14.71. Find the probability of $x$ being between

(i) 30 & 59  
(ii) 15 & 74

b) A variate $y$ is also distributed normally with mean 27 and standard deviation 9. Find the probability of $y$ being between

(i) 31.5 & 40.5  
(ii) 9 & 40.5

5. Following are the quarterly expenses of electricity (expressed in thousands of rupees) of a company during 5 year period 2000 - 04.

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td></td>
<td>45</td>
<td>48</td>
<td>49</td>
<td>52</td>
<td>60</td>
<td>254</td>
</tr>
<tr>
<td>II</td>
<td></td>
<td>54</td>
<td>56</td>
<td>63</td>
<td>65</td>
<td>70</td>
<td>308</td>
</tr>
<tr>
<td>III</td>
<td></td>
<td>72</td>
<td>63</td>
<td>70</td>
<td>75</td>
<td>84</td>
<td>364</td>
</tr>
<tr>
<td>IV</td>
<td></td>
<td>60</td>
<td>56</td>
<td>65</td>
<td>72</td>
<td>66</td>
<td>319</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>231</td>
<td>223</td>
<td>247</td>
<td>264</td>
<td>280</td>
<td>1245</td>
</tr>
</tbody>
</table>
a) Calculate the trend value and isolate the random variations taking the following as the quarterly index estimated from past experience.

<table>
<thead>
<tr>
<th>Quarter</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seasonal Index</td>
<td>83.55</td>
<td>100.06</td>
<td>113.16</td>
<td>103.23</td>
</tr>
</tbody>
</table>

b) The regression equation of $y$ on $x$ is given by $y = (0.95)x + 7.25$, for the two variables $x$ and $y$. If regression equation of $x$ on $y$ is given by $x = (0.95)y - 6.4$, find:

i) Co-efficient of co-relation between the two variables $x$ and $y$.
ii) Average value of $x$, and
iii) Average value of $y$.

6. a) A card is drawn at random from a well shuffled pack of playing cards. The events $x$ and $y$ are defined as under:

$X \to$ The card drawn is King.
$Y \to$ The card drawn is Heart.

Find: $P_r(x)$, $P_r(Y)$, $P_r(x \cap Y)$, $P_r(x \cup Y)$ & $P_r(x/Y)$

Prove that $X$ & $Y$ are independent.

b) A bag contains six cubical dice. Four of them have faces marked 1, 2, 3, 4, 5, 6; one has faces marked 1, 1, 2, 3, 3, 3; while the other has faces marked 3, 3, 3, 4, 5, 6. A die is drawn at random from the bag and thrown on to a table.

i) What is the probability that it will come to rest with an upper most face marked 3?

ii) What is the probability that a die with faces marked 1, 1, 2, 3, 3, 4; is drawn?

7. a) A private Tuition class holds classes for S.S.C. students. Out of 1500 students enrolled in 'Regular Batch', 450 of them passed in 'First Class' at the S.S.C Examination in March 2004. Whereas, out of 1000 students enrolled in 'Vacation Batch', 350 of them passed in 'First Class' at the same examinations.

Test whether the difference in proportion of passing S.S.C. examination with 'First Class' is significant at 5% level, for the two types of classes.
b) i) Write short notes on 'F-distribution'.
   ii) A random sample of 10 students from one college gave mean height $\bar{x}_1 = 68$ inches and variance $s_1^2 = 4.5$ (inch)$^2$.
       A random sample of 10 students from another college of the same city gave mean height $\bar{x}_2 = 69$ inches and variance $s_2^2 = 4.67$ (inch)$^2$.
       Do the variances of the two samples differ significantly at 5% level of significance?
       Given that $F_{0.05} = 3.39$ for degrees of freedom 9 & 8.

8. a) In a random sample of 90 employees of a company, 27 employees are found to be smokers.
   i) Find 95% confidence interval for the employees to be smoker in that company.
   ii) What should be the minimum sample size to be chosen to be 95% confident that the proportion obtained from the sample will not differ from the true proportion by more than 0.04.

b) In connection with the construction of Index Numbers write notes on the following:--
   i) The purpose of the index
   ii) The availability and comparability of data.

Table showing areas of the standard normal curve for values of $X$ between $0$ and $X$

<table>
<thead>
<tr>
<th>X</th>
<th>Area</th>
<th>X</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>0.0398</td>
<td>1.1</td>
<td>0.3643</td>
</tr>
<tr>
<td>0.2</td>
<td>0.0793</td>
<td>1.2</td>
<td>0.3849</td>
</tr>
<tr>
<td>0.3</td>
<td>0.1179</td>
<td>1.3</td>
<td>0.4032</td>
</tr>
<tr>
<td>0.4</td>
<td>0.1554</td>
<td>1.4</td>
<td>0.4192</td>
</tr>
<tr>
<td>0.5</td>
<td>0.1915</td>
<td>1.5</td>
<td>0.4332</td>
</tr>
<tr>
<td>0.6</td>
<td>0.2257</td>
<td>1.6</td>
<td>0.4452</td>
</tr>
<tr>
<td>0.7</td>
<td>0.2580</td>
<td>1.7</td>
<td>0.4554</td>
</tr>
<tr>
<td>0.8</td>
<td>0.2881</td>
<td>1.8</td>
<td>0.4641</td>
</tr>
<tr>
<td>0.9</td>
<td>0.3159</td>
<td>1.96</td>
<td>0.4750</td>
</tr>
<tr>
<td>0.10</td>
<td>0.3413</td>
<td>2.00</td>
<td>0.4772</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.58</td>
<td>0.4951</td>
</tr>
</tbody>
</table>

------- END -------
FELLOWSHIP EXAMINATION
GROUP INSURANCE & RETIREMENT BENEFIT
SCHEMES

Time: 3 Hours]  [Total Marks : 100

Answer any **FIVE** questions only. All questions carry 20 marks each.

1. a) "Group Life Insurance is designed to combat economic insecurity". Elucidate with reference to its origin, definition and development.
   b) Distinguish Group Insurance Contract from Individual Insurance Contract.

2. a) ABC private sector Co., is proposing for Group Superannuation Scheme for its executives. However the Co., feels that at the initial stage of the scheme, the accumulated Fund would be small and in the event of premature death of the member, his family will not get adequate annuity as envisaged. Suggest the plan to get over this situation.
   b) Explain in full Group Saving Linked Insurance Plan and its salient features.

3. Enumerate segments of Group Insurance Scheme market and briefly discuss potential in each segment.

4. Write short notes on :-
   a) Group Creditor Insurance
   b) Group Insurance for Non-employed Group
   c) Unit-Linked Insurance Plan of L.I.C. of India.
   d) Ceiling on employer's contribution in respect of Group Superannuation Scheme and Group Gratuity Scheme.

5. a) Examine the Concept of Insurable Interest in Group Insurance Contracts.
   b) Discuss Non-contributory Group Insurance Schemes.
6. a) State the objectives of Taxation.  
b) What is Income Tax position in the following cases, giving relevant sections of I. Tax Act.  
   i) Premium paid under life Insurance Policy  
   ii) Premium under Jeevan Suraksha.  
   iii) Claim payment received under a Life Insurance Policy.  
   iv) Contribution to deferred Annuity Plan.

7. What points are required to be covered under Model Trust Deed of Group Gratuity Scheme?

8. a) What are the objects of Social Security Scheme?  
b) Briefly describe the following Schemes.  
   i) Jan Shree Bima Yojana  
FELLOWSHIP EXAMINATION
REINSURANCE

Time: 3 Hours] [Total Marks : 100

Answer any FIVE questions only.
All questions carry 20 marks each.

1. A new insurer has two reinsurance facilities viz. facultative reinsurance and excess loss cover. Discuss in detail how a prudent underwriter protects his portfolio and give reasons. 20

2. Justify reinsurance protections for the growth of insurance business in the competitive market. 20

3. a) Why is commission and profit commission allowed under reinsurance Treaties. 8
    b) Calculate commission and profit commission from the following. 12
                   Written premium for 2004 - Rs. 1,00,00,000
                   Earned premium Rs. 90,00,000
                   Portfolio premium Entry Rs. 25,00,000
                   Portfolio premium Withdrawal 35%
                   Portfolio loss - Entry Rs. 5,00,000
                   Portfolio loss - Commission 40%
                   Profit commission 20% (M.E. 2%)
                   Claims paid Rs. 20,00,000
                   Claims outstanding Rs. 10,00,000
                   XL Recovery Rs. 50,000
                   XL cost 1%
                   Cash loss Rs. 1,00,000

4. a) What are the fundamentals of Contract Law as applicable to Reinsurance. 10 each
    b) Explain the basic principles inherent in insurance and reinsurance.
5. Write short notes on any **five** of the following :-
   a) Reinsurance documentation
   b) **Industrial All Risks Reinsurance**
   c) The Portfolio of risks.
   d) Operative clause of Reinsurance Agreement.
   e) Sliding Scale of Commission.
   f) Credit rating : AAA, BBB, CCC, R, NR.

6. "Reinsurance program design for insurance business manifests various interests which form part of corporate philosophy of an insurer." What are the various objectives?

7. a) Differentiate Reinsurance accounting on "Accounting Year" and "underwriting year" Basis.
    
   b) Calculate premium rates and excess of loss premium for an excess loss cover - Net A/c on burning cost basis from the following:

   | Gross return premium Income | Rs. 10,00,00,000 |
   | Net Retained Premium Income | Rs. 5,00,00,000 |
   | XL Limit to pay Rs. 10,00,000 in excess of | Rs. 5,00,000 |
   | Ground up loss | 1) Rs. 8,00,000 |
   | | 2) Rs. 12,00,000 |
   | | 3) Rs. 6,000 |
   | | 4) Rs. 20,00,000 |
   | Loading Factor | $^{70}_{160}$ |
   | Minimum and Deposit Premium | Rs. 10,00,000 |
   | Rate Min 2% and maximum 4% |

8. Discuss the Taxation Aspects and Exchange Control Regulations for Reinsurance Accounting.

----- END -----
FELLOWSHIP EXAMINATION
RISK MANAGEMENT

Time: 3 Hours] [Total Marks : 100

Answer any FIVE questions only.
All questions carry 20 marks each.

1. "Effective risk management, depends to a large extent, on the use of probability concepts." Discuss this statement. 20

2. Describe the step by step method of formulating a risk management program in a corporate enterprise. 20

3. Explain the role of the following functional departments of a firm in the process and implementation of risk management:
   a) Finance
   b) Production
   c) Material
   d) Personnel
   e) Legal 20

4. Write short notes on:
   a) Contingency Planning 5 each
   b) Cost - Benefit Analysis of Loss Prevention
   c) Mutual Aid Scheme.
   d) Business of Speculative Risks

5. Discuss the a) legal and b) practical issues involved in the transfer of risk by contract conditions. 20

6. a) Identify the problems involved in internal risk financing through the use of contingency funds. 10 each
   b) Suggest measures to protect the contingency funds.
7. Examine the role of the following in Corporate Risk Management:
   a) Organisation Charts
   b) Accounting and other records.
   c) Check Lists.
   d) Safety Audit.

8. a) How would you measure corporate attitudes to risk?
    b) What are the risk attitudes of the following:
       i) Joint stock companies
       ii) Family businesses
       iii) Local Authorities.

------ END ------
FELLOWSHIP EXAMINATION
LAW AND ECONOMICS OF INSURANCE

Time: 3 Hours] [Total Marks: 100

Attempt at least 2 questions each from Section 'A' and Section 'B'.

Total Questions to be attempted are 5 only.
All questions carry 20 equal marks.

Section- 'A'

1. Explain in detail the concept of 'Planned Economy' and 'Market Economy'. According to you which economy is suitable for a developing country like India and why? 20

2. a) What are the determinants of supply? 10 each
   b) Elucidate in detail as to how the price of a commodity is fixed in the market?

3. a) What are the merits and demerits of monopoly? 10 each
   b) Explain the different types of market structures.

4. Write short notes on:
   i) Insurance as a form of Production.
   ii) Fixed Costs and Variable Costs.
   iii) Market demand for insurance.
   iv) Factors of Production.

Section- 'B'

5. a) Define Fraud as per Indian Contract Act, 1872. How does fraud differ from Misrepresentation? 10 each
   b) Explain in detail a wagering contract.
6. a) What are the different modes of discharge of a contract? 10 each
   b) Distinguish between a Warranty and a Condition.

7. a) Describe the various ingredients of a Life Insurance Contract. 10 each
   b) How does a Life Insurance Contract differ from an Ordinary Contract?

8. a) How can an Agency be terminated? 10 each
   b) What are the rights of an agent?

------ END ------
FELLOWSHIP EXAMINATION
MARKETING AND PUBLIC RELATIONS

Time: 3 Hours] [Total Marks: 100

Answer any FIVE questions only.
All questions carry 20 marks each.

(Note: Answer to questions pertaining to the Insurance Industry may be given with reference to either Life or General Insurance Corporation).

1. a) The Economic Times reported on 5 January 2005 that the IRDA intends to put a stop to life and non-life insurers having marketing deals as that may be a backdoor entry to becoming composite insurance (same company selling both life and non-life covers), which is not allowed in India. Discuss the implications of the approach of the IRDA and how it will affect the insurers.

b) It is expected that the rates determined by the Tariff Committee may not be binding on insurers after March 2005. How will this decision benefit non-life insurers.

2. Write short notes on the following: 5 each

a) Segment of one
b) Perception
c) Full Nest
d) Customer Charter

3. a) How is 'Quality' to be determined in the case of services? 6
b) What are the expectations of customers with regard to quality? 6
c) Illustrate your answer with regard to the insurance business 8

4. a) Out of the 7 P's of the Marketing Mix, state the one which is relevant in respect of the following situations. 16
   i) Retail shops offering free home delivery
   ii) Gift schemes like 'Buy two and get one free'
   iii) Restaurants attached to petrol bunks in highways
   iv) Renovation in insurance offices
   v) Banks sponsoring cultural events
   vi) Computerisation in insurance offices
vii) Stringent selection tests before appointment of staff
viii) Single window concept
ix) Colourful decoration on buffet table in restaurants
x) Free advice to policyholders on risk management
xi) Magazines displayed in visitors waiting room
xii) Monitoring staff behaviour
xiii) Security guards in railway compartments
xiv) Rebates for large Sum Assured in life insurance
or
No-claim bonus in non-life insurance
xv) Charging interest for delayed payments
xvi) Rail reservations through Internet

b) Give details of one product each in the four stages of the product life cycle.

5. a) Identify the customers of the Insurance Institute of India.
b) What are the products offered by the Insurance Institute of India?
c) Suggest ways in which the Insurance Institute of India can use marketing concepts to make itself more effective.

6. a) In the context of complaints, what is the significance of "Recovery"?
b) Illustrate the concept of 'Recovery' with reference to any complaint that you may have made or may have received.

7. a) Illustrate how 'Positioning' is affected by (i) price and (ii) place?
b) Do all insurance companies in India have the same 'position'? If not, bring out the differences and the reasons therefor.

8. a) What are the situations in which a policyholder experiences 'Ease of Access'?
b) What are the 'Moments of Truth' in these situations? Identify at least five.

------ END ------
**FELLOWSHIP EXAMINATION**

**MANAGEMENT ACCOUNTING**

**Time: 3 Hours**

[Total Marks : 100]

Question **ONE** is compulsory. Total questions to be attempted are **FIVE**. All questions carry 20 equal marks.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Head of account</th>
<th>Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Annuities paid</td>
<td>18,000</td>
</tr>
<tr>
<td>2.</td>
<td>Pensions paid</td>
<td>88,000</td>
</tr>
<tr>
<td>3.</td>
<td>Agents' balances (nett) (Dr.)</td>
<td>16,000</td>
</tr>
<tr>
<td>4.</td>
<td>C.A.G.</td>
<td>55,000</td>
</tr>
<tr>
<td>5.</td>
<td>Single Premiums</td>
<td>2,10,000</td>
</tr>
<tr>
<td>6.</td>
<td>First years premium (nett)</td>
<td>11,12,000</td>
</tr>
<tr>
<td>7.</td>
<td>Renewal Premium</td>
<td>96,25,000</td>
</tr>
<tr>
<td>8.</td>
<td>Interest, Dividend and Rents</td>
<td>8,26,000</td>
</tr>
<tr>
<td>9.</td>
<td>I.T. Deducted from Interest, Dividend and Rents</td>
<td>66,000</td>
</tr>
<tr>
<td>10.</td>
<td>Group Insurance Premiums</td>
<td>22,50,000</td>
</tr>
<tr>
<td>11.</td>
<td>Group Insurance claims paid</td>
<td>1,50,000</td>
</tr>
<tr>
<td>12.</td>
<td>Group Insurance claims o/s 31.3.2005</td>
<td>25,000</td>
</tr>
<tr>
<td>13.</td>
<td>O/S Annuities</td>
<td>6,000</td>
</tr>
<tr>
<td>14.</td>
<td>O/S Pensions</td>
<td>2,000</td>
</tr>
<tr>
<td>15.</td>
<td>Renewal Premiums cheques dishonoured a/c</td>
<td>5,000</td>
</tr>
<tr>
<td>16.</td>
<td>Cash at Bank</td>
<td>15,18,000</td>
</tr>
<tr>
<td>17.</td>
<td>Cash on hand</td>
<td>22,500</td>
</tr>
<tr>
<td>18.</td>
<td>Computers</td>
<td>8,00,000</td>
</tr>
<tr>
<td>19.</td>
<td>Furniture &amp; fixtures</td>
<td>6,00,000</td>
</tr>
<tr>
<td>20.</td>
<td>House property</td>
<td>12,00,000</td>
</tr>
<tr>
<td>21.</td>
<td>O/s Premiums</td>
<td>75,000</td>
</tr>
<tr>
<td>22.</td>
<td>Prepaid expenses</td>
<td>60,000</td>
</tr>
<tr>
<td>23.</td>
<td>Interest accrued not due</td>
<td>72,000</td>
</tr>
<tr>
<td>24.</td>
<td>O/s Interest, Dividend and Rents</td>
<td>24,000</td>
</tr>
<tr>
<td>25.</td>
<td>Investments</td>
<td>8,20,10,000</td>
</tr>
<tr>
<td>26.</td>
<td>Investment Reserve</td>
<td>12,00,000</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Head of account</td>
<td>Amount (Rs.)</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>27.</td>
<td>Sundry Creditors</td>
<td>6,60,000</td>
</tr>
<tr>
<td>28.</td>
<td>Sundry Debtors</td>
<td>6,02,000</td>
</tr>
<tr>
<td>29.</td>
<td>Sundry Deposits - Payable</td>
<td>2,00,500</td>
</tr>
<tr>
<td>30.</td>
<td>Sundry Deposits - Recoverable</td>
<td>3,00,000</td>
</tr>
<tr>
<td>31.</td>
<td>Income tax paid</td>
<td>7,00,000</td>
</tr>
<tr>
<td>32.</td>
<td>Surrenders paid</td>
<td>5,15,000</td>
</tr>
<tr>
<td>33.</td>
<td>Building Depn. Reserve</td>
<td>2,00,000</td>
</tr>
<tr>
<td>34.</td>
<td>Life Insurance Fund 1.4.2004</td>
<td>8,68,25,000</td>
</tr>
<tr>
<td>35.</td>
<td>O/S Claims - Death 1.4.2004</td>
<td>3,50,000</td>
</tr>
<tr>
<td>36.</td>
<td>O/S Claims - Maturity - 1.4.2004</td>
<td>2,85,000</td>
</tr>
<tr>
<td>37.</td>
<td>Contingency Reserve</td>
<td>2,50,000</td>
</tr>
<tr>
<td>38.</td>
<td>Monies in call deposit</td>
<td>15,00,000</td>
</tr>
<tr>
<td>39.</td>
<td>Advance I.T. paid</td>
<td>8,00,000</td>
</tr>
<tr>
<td>40.</td>
<td>Management expenses</td>
<td>64,10,000</td>
</tr>
<tr>
<td>41.</td>
<td>Commission paid</td>
<td>6,00,000</td>
</tr>
<tr>
<td>42.</td>
<td>Maturity calims paid</td>
<td>26,00,000</td>
</tr>
<tr>
<td>43.</td>
<td>Death claims paid</td>
<td>13,00,000</td>
</tr>
<tr>
<td>44.</td>
<td>Loans on policies</td>
<td>14,00,000</td>
</tr>
<tr>
<td>45.</td>
<td>Loans on Mortgages</td>
<td>20,00,000</td>
</tr>
<tr>
<td>46.</td>
<td>Share Capital</td>
<td>10,00,000</td>
</tr>
<tr>
<td>47.</td>
<td>Printing &amp; Stationery stock 31.3.2005</td>
<td>81,000</td>
</tr>
<tr>
<td>48.</td>
<td>Registration &amp; other fees</td>
<td>12,000</td>
</tr>
<tr>
<td>49.</td>
<td>Miscellaneous Income</td>
<td>10,000</td>
</tr>
<tr>
<td>50.</td>
<td>Income tax Reserve</td>
<td>5,00,000</td>
</tr>
<tr>
<td>51.</td>
<td>Prepaid expenses</td>
<td>71,000</td>
</tr>
</tbody>
</table>

**Notes:**

1. Market value of invetsments: 8,05,10,000
2. O/s Maturity claims 31.3.2005: 4,10,000
3. O/S Death claims paid: 2,80,000
4. O/s Expenses: 30,000
5. O/s interest, dividend & rents: 60,000
6. Depn. Furniture & Fixtures: @ 15%
7. Depn. Computers: @ 25%
8. Bldg. Depn. Reserve: @ 5%
9. Maturity Claims include Rs. 20,000 wrongly debited instead of surrenders paid a/c.
10. Income tax reserve to be increased to Rs. 6,00,000
11. Contingent Liability: Rs. 2,00,000
OR

From the balances extracted from the account books of M/s "Everywhere" Non-life insurance company, as at 31.3.2005, and notes given at the end, you are required to prepare Fire, Marine & Miscellaneous Revenue Accounts for the year ended 31.3.2005. As also Profit & Loss Account and Profit & Loss Appropriation Account for the year ended 31.3.2005 and Balance Sheet as at 31.3.2005.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Head of Account</th>
<th>Amount (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Share Capital</td>
<td>7,00,000</td>
</tr>
<tr>
<td>2.</td>
<td>General Reserve</td>
<td>2,00,000</td>
</tr>
<tr>
<td>3.</td>
<td>Contingency Reserve</td>
<td>1,50,000</td>
</tr>
<tr>
<td>4.</td>
<td>Investment Reserve</td>
<td>1,50,000</td>
</tr>
<tr>
<td>5.</td>
<td>Share Transfer Fee</td>
<td>1,000</td>
</tr>
<tr>
<td>6.</td>
<td>Registration &amp; other fees</td>
<td>500</td>
</tr>
<tr>
<td>7.</td>
<td>Compensation Received</td>
<td>2,04,000</td>
</tr>
<tr>
<td>8.</td>
<td>Unexpired Risk Reserve (1.4.2004) : Fire</td>
<td>4,00,000</td>
</tr>
<tr>
<td>9.</td>
<td>Unexpired Risk Reserve (1.4.2004) : Marine</td>
<td>2,00,000</td>
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<tr>
<td>10.</td>
<td>Unexpired Risk Reserve (1.4.2004) : Miscellaneous</td>
<td>3,00,000</td>
</tr>
<tr>
<td>11.</td>
<td>Premium Less Reinsurances : Fire</td>
<td>7,00,000</td>
</tr>
<tr>
<td>12.</td>
<td>Premium Less Reinsurances : Marine</td>
<td>5,00,000</td>
</tr>
<tr>
<td>13.</td>
<td>Premium Less Reinsurances : Miscellaneous</td>
<td>4,50,000</td>
</tr>
<tr>
<td>14.</td>
<td>O/s Claims : 1.4.2004 : Fire</td>
<td>1,00,000</td>
</tr>
<tr>
<td>15.</td>
<td>O/s Claims : 1.4.2004 : Marine</td>
<td>50,000</td>
</tr>
<tr>
<td>16.</td>
<td>O/s Claims : 1.4.2004 : Miscellaneous</td>
<td>50,000</td>
</tr>
<tr>
<td>17.</td>
<td>Claims paid less Reinsurances : Fire</td>
<td>4,50,000</td>
</tr>
<tr>
<td>18.</td>
<td>Claims paid less Reinsurances : Marine</td>
<td>2,20,000</td>
</tr>
<tr>
<td>19.</td>
<td>Claims paid less Reinsurances : Miscellaneous</td>
<td>1,80,000</td>
</tr>
<tr>
<td>20.</td>
<td>Commission on Reinsurances ceded : Fire</td>
<td>15,000</td>
</tr>
<tr>
<td>21.</td>
<td>Commission on Reinsurances ceded : Marine</td>
<td>10,000</td>
</tr>
<tr>
<td>22.</td>
<td>Commission on Reinsurances ceded : Miscellaneous</td>
<td>8,000</td>
</tr>
<tr>
<td>23.</td>
<td>Commission paid : Fire</td>
<td>60,000</td>
</tr>
<tr>
<td>24.</td>
<td>Commission paid : Marine</td>
<td>52,000</td>
</tr>
<tr>
<td>25.</td>
<td>Commission paid : Miscellaneous</td>
<td>49,000</td>
</tr>
<tr>
<td>26.</td>
<td>Management Expenses : Fire</td>
<td>42,000</td>
</tr>
<tr>
<td>27.</td>
<td>Management Expenses : Marine</td>
<td>34,000</td>
</tr>
<tr>
<td>28.</td>
<td>Management Expenses : Miscellaneous</td>
<td>30,000</td>
</tr>
<tr>
<td>29.</td>
<td>Unclaimed Dividend written back</td>
<td>2,000</td>
</tr>
<tr>
<td>30.</td>
<td>Amounts due to other insurers</td>
<td>1,50,000</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Head of account</td>
<td>Amount (Rs.)</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>31.</td>
<td>Amounts due from other insurers</td>
<td>2,16,500</td>
</tr>
<tr>
<td>32.</td>
<td>Profit &amp; Loss A/c (1.4.2004) (Cr.)</td>
<td>1,13,000</td>
</tr>
<tr>
<td>33.</td>
<td>Interest, dividend &amp; rents received</td>
<td>80,000</td>
</tr>
<tr>
<td>34.</td>
<td>I.T. deducted from Interest, dividend &amp; rents</td>
<td>8,000</td>
</tr>
<tr>
<td>35.</td>
<td>Investments</td>
<td>22,80,000</td>
</tr>
<tr>
<td>36.</td>
<td>Interest accrued not due</td>
<td>12,000</td>
</tr>
<tr>
<td>37.</td>
<td>Furniture &amp; fixtures</td>
<td>50,000</td>
</tr>
<tr>
<td>38.</td>
<td>Computers</td>
<td>1,00,000</td>
</tr>
<tr>
<td>39.</td>
<td>House property</td>
<td>3,00,000</td>
</tr>
<tr>
<td>40.</td>
<td>Cash On Hand</td>
<td>12,000</td>
</tr>
<tr>
<td>41.</td>
<td>Cash At Bank</td>
<td>4,10,000</td>
</tr>
<tr>
<td>42.</td>
<td>Prepaid expenses</td>
<td>28,000</td>
</tr>
</tbody>
</table>

**Notes :-**

1) Market Value of investments: Rs. 20,80,000.

2) Unexpired risks reserve - Provision:
   - Fire: 50%
   - Marine: 100%
   - Miscellaneous: 50%

3) General reserve to be increased to: Rs. 3,00,000
   if profit from operations permits; else not to be done.

4) O/s claims 31.3.2005:
   - Fire: Rs. 70,500
   - Marine: Rs. 60,000
   - Miscellaneous: Rs. 50,000

5) There is a short provision to the extent of Rs. 2,000
   in Interest Accrued Not Due A/c.

6) Depreciation Provision: Furniture & Fixtures @ 15%
    Depreciation Provision: Computers @ 25%

7) Building Depreciation Reserve @ 5%

8) Income tax to be provided @ 50% of Profit if any,
   before transferring to P&L Appropriation A/c.

9) Contingent Liability: Rs. 2,00,000
2. The following information has been obtained from the records of M/s. Freezer Ltd., a manufacturer of one-tonne air conditioners:
   a) Materials per machine: Rs. 1,500
      Wages: Rs. 900
      No. of Machines manufactured & sold: 80
      Selling Price per machine: Rs. 4,250
   b) Works overhead to be charged at 60% of wages
   c) Office Overheads to be charged at 20% of wages
   d) There was no stocks of machines or work-in-progress at the beginning or at the end of the year.

   You are required to -
   i) Prepare a statement showing profit per machine sold.
   ii) Prepare a statement showing the actual profit if works expenses were Rs. 43,000 and office expenses were Rs. 48,000 as per financial records.
   iii) Reconcile the profit shown in costing records with that of the financial records.

3. a) A company is producing two products 'X' & 'Y' from a joint manufacturing process. The total costs are Rs. 2,00,000 and it has given a production of 1 lac kilograms of 'X' having a selling price of Rs. 1.00 per kg. and 2 lacs kilograms of 'Y' having a Sale price of Rs. 1.50 per kg.

   The company is considering a proposal to process Product 'X' into a new product 'Z' which sells at Rs. 3.00 per kg. The processing costs would amount to Rs. 1,75,000 for converting one lac kg. of product 'X' to product 'Z'.

   You are required to advise the company about the acceptance or rejection of the proposal.

   b) A company is considering expansion. Fixed costs amount to Rs. 4,26,000 and are expected to increase by Rs. 1,25,000 where plant expansion is contemplated. The present capacity will increase by 50% with the expansion. Variable costs are currently Rs. 6.80 per unit and are expected to go down by Rs. 0.40 per unit with the expansion. The current selling price is Rs. 16.00 per unit and is expected to remain the same under either alternative. What are the break even points under either alternative? Which alternative is better and why?
4. The following data are collected from the records of a factory:

Sales - 4000 units @ Rs. 25/- each
Materials consumed 40,000
Variable Overheads 10,000
Labour charges 20,000
Fixed overheads 18,000

Net profit 12,000

Calculate:

i) Number of units by selling which the company will neither lose nor gain anything.
ii) Sales needed to earn a profit of 20% on sales.
iii) The extra/additional units which should be sold to obtain the present profit if it is proposed to reduce selling price by 20% and 25%.
iv) The selling price to be fixed to bring down its breakeven point to 500 units under the present condition.

5. a) What are the objectives, advantages and limitations of fund flow statements?
b) Balance Sheets of two years of XYZ Ltd. is given below:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Share Capital</td>
<td>5,00,000</td>
<td>6,00,000</td>
</tr>
<tr>
<td>Profit &amp; Loss A/c.</td>
<td>75,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Reserve</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Tax Provisions</td>
<td>55,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Bank O/D</td>
<td>40,000</td>
<td>-</td>
</tr>
<tr>
<td>Bills Payable</td>
<td>40,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Creditors</td>
<td>1,30,000</td>
<td>1,20,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,00,000</strong></td>
<td><strong>8,85,000</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash on Hand</td>
<td>50,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Cash At bank</td>
<td>80,000</td>
<td>1,00,000</td>
</tr>
<tr>
<td>Debtors</td>
<td>1,55,000</td>
<td>1,10,000</td>
</tr>
<tr>
<td>Prepaid Expenses</td>
<td>7,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Stock</td>
<td>1,08,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Fixed Assets</td>
<td>5,00,000</td>
<td>4,80,000</td>
</tr>
<tr>
<td><strong>Goodwill</strong></td>
<td>-</td>
<td>49,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9,00,000</strong></td>
<td><strong>8,85,000</strong></td>
</tr>
</tbody>
</table>
Additional Information:

i) In the year 2003 a dividend of Rs. 75,000 paid
ii) Assets of another company were purchased: stock at Rs. 21,000; Fixed assets: Rs. 30,000; & Goodwill Rs. 49,000
iii) I-Tax paid in 2003 was Rs. 10,000
iv) Net Profit in 2003 was Rs. 35,000 before charging tax.

From the above information prepare a statement of sources & application of funds.

6. Write short notes on:
   i) Principles of Communication
   ii) Importance of effective MIS
   iii) Responsibility Centres
   iv) Characteristics of a good report
   v) Routine Reports & Special Reports

4 each

7. a) Enumerate the importance of financial management.
   b) What are the sources of Corporate Funds? Explain each of them in brief.

10 each

8. a) What are the objectives and advantages of costing?
   b) Describe four main techniques used in ascertaining costs.

10 each

----- END ------
FELLOWSHIP EXAMINATION
HUMAN RESOURCES MANAGEMENT

Time: 3 Hours] [Total Marks : 100

Answer any FIVE questions only.
All questions carry 20 marks each.

1. Retention of talent has become the major problem confronting the insurance companies. Suggest a career development plan, a performance appraisal system and innovative working conditions which may help the companies to motivate and retain talent. 20

2. a) What is Conflict? Mention the techniques used to process conflicts. 8
   b) Why are transfers affected in an organisation? Draft a transfer policy that you could recommend to an Insurance Organisation. 12

3. 'An Effective leader will need to switch roles at will and slip into them with seeming ease.' Expand the ideas with the help of different leadership styles and examples from the work situations in your organisation. 20

4. Write short notes on :
   a) 'The Inverted Pyramid' Structure of Organisation. 5 each
   b) Personnel Research
   c) Special Features of the services sector.
   d) Empowerment as a method of motivation.

5. a) Why is decision making an important function of a manager? State the distinct steps in decision making process citing an example from Life or General Insurance Industry. 12
   b) Compare the managerial practice of decision making in Japan with that in the United States. 8

6. a) Show how planning and controlling are closely related. 8
   b) Why is delegation important to an organisation? Trace the consequences that could follow if delegation is affected without the required training. 12
7. a) How can an organisation try to ensure that the salaries they offer are seen as fair by the employees?
   b) When an organisation recruits a person, it employs 'The Whole Man' Discuss in the context of the evolution of Human Resource Management.

8. a) Do you agree that different motivational techniques are to be adopted for motivating employees at different levels in an organisation? Give reasons and examples.
   b) Why is employment interview called 'A conversation with a purpose'? Analyse the drawback, if any, in this selection technique and suggest steps to get over them.

----- END -----
FELLOWSHIP EXAMINATION
LEGAL ASPECTS OF INDUSTRIAL RELATIONS

Time: 3 Hours] [Total Marks : 100

Answer any FIVE questions only.  
All questions carry 20 marks each.

1. a) Distinguish between 'Industrial Dispute' and Individual Dispute'.
   b) Explain briefly the term 'Wages' as provided under the industrial Disputes Act 1947.

2. The Industrial Disputes Act was enacted in 1947 with the object of checking industrial Interest. Explain in brief the various 'Authorities' provided under the Act.

3. a) What are the duties of a conciliation officer?
   b) What is a National Tribunal?

4. Define 'Award'. When does an award commence? Explain in brief the persons/parties on whom an award is binding.

5. a) What are the provisions relating to illegal strikes?
    b) Explain briefly the conditions precedent to Retrenchment.

6. Write short notes on any four :-
   a) Industrial Revolution.
   b) Writ of prohibition.
   c) Continuous Service Under Industrial Dispute Act.
   d) Notice of change.
   e) Spread over.

7. a) Describe in detail Amalgamation of Trade Union.
    b) Highlight the provisions relating to payment of Undisbursed wages in the case of death of employed persons under Payment of Wages Act, 1936.
8. a) Who are entitled for gratuity as per Payment of Gratuity Act, 1972?

b) Explain the concept of 'Family' under the Payment of Gratuity Act, 1972.

------ END ------
FELLOWSHIP EXAMINATION
DATA PROCESSING

Time: 3 Hours] [Total Marks : 100

Answer any FIVE questions only.
All questions carry 20 equal marks.
(Template is not required for drawing flow charts.)

1. Explain "Time Sharing"? Distinguish it from Multiprogramming. 20

2. Write short notes on any four of the following:-
   i) Operating systems 5 each
   ii) CPU
   iii) Data Security
   iv) Data Name in COBOL
   v) Block Diagram or Macro Flow Chart.

3. Narrate the Different stages in program Development. 20

4. a) Briefly write about Octal system. 5
   b) Arrive at the Octal equivalent of Decimal number 237? 5
   c) While subtracting one Decimal number from another, in the complementary method, what steps are involved? 4
   d) Perform the subtractions in the complementary method:
      i) Subtract 74 from 163 3
      ii) Subtract 83 from 74 3

5. Explain the purpose of:
   i) the Procedure Division of COBOL Program with examples. 10 each
   ii) the Identification Division of COBOL Program, with examples.

6. a) What is Inter Record Gap (IRG) and how it can be reduced? 10 each
   b) Calculate the length of tape (& number of reels) required to store the below mentioned records.
      Total length of tape in one reel is equal to 1080 feet.
      Total number of records 3,74,400. 30
Each record is of 1200 bytes. 
Length of IRG is 0.40 inches. 
Recording density 2400 bytes per inch.

7. a) Narrate briefly about "Seek time" and "Latency"? 
    
    b) Find the time required to read 1500 records in a file. Each 
    record is of 520 bytes. The average seek time is 80 milliseconds 
    (ms); the average latency is 10 milliseconds (ms); the transfer 
    rate is 1,04,000 bytes per second. 
    
    c) What is Labelling and Internal Labelling?

8. a) What is an ALGORITHM? 
    
    b) Draw a program flow chart for the problem mentioned below: 
    An examinee’s roll number, and marks in English, Mathematics, 
    Science and History (maximum in each is 100) are punched on 
    a card. One card for each examinee. Read the cards, calculate 
    the total marks and percentage of marks scored by the 
    examinees. The program is to end after reading the last card. 
    
    c) Write briefly about symbolic programming.