



HOME ASSIGNMENT - (2016-17)

B.Sc. Actuarial Science (V96)

Instructions for the Students:

- 1) All Questions are compulsory.
- 2) Each Sub-question carries 5 marks.
- 3) Each Sub-question should be answered between 75 to 100 words. Write every question's answer on separate page.

S64121 :financial math I

- 1
 - i) A sum of ₹10,000 is borrowed, to be repaid in 3 years' time by a payment of ₹12,000. Calculate the corresponding effective rate of discount. [1]
 - ii) Calculate the effective annual rate of interest for a transaction in which ₹20,000 is invested for 18 months to give ₹35,000. [1]
 - iii) Calculate the accumulated value of an investment of ₹1000 for 6 months at a rate of interest of 5% *pa* convertible monthly. [1]
 - iv) Calculate the discounted present value of ₹7800 due in six years if the force of interest per annum is 6%. [1]
 - v) An investor must make a payment of ₹30,000 in 10 years' time. The investor wishes to make provision for this payment by investing a single sum now in a deposit account that pays nominal rate of discount of 9.68% *pa* convertible quarterly. How much should the initial investment be? [1]

- 2 The force of interest, $\delta(t)$, is a function of time and at any time t (measured in years) is given by:

$$\begin{aligned}\delta(t) &= 0.03 && \text{for } 0 \leq t \leq 10 \\ &= at && \text{for } 10 < t \leq 20 \\ &= bt && \text{for } t > 20\end{aligned}$$

where a and b are constants.

The present value of 100 units due at time 20 is 50 units and present value of 100 units due at time 28 is 40 units. Calculate a and b . [5]

- 3 Calculate the present value of an annuity payable annually in advance for a term of 20 years such that the payment is £5000 in year 1, £5500 in year 2, £6000 in year 3 etc. Assume a rate of interest of 5% *pa* for the first twelve years and 7% *pa* thereafter. [5]
- 4 A loan of £100,000 is repaid over a five-year period by level monthly repayments in arrears of £2500. Calculate:
- i) Flat rate of interest per annum [2]
- ii) APR on the transaction. [3]
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S67131 :actuarial statistics I

Q1 The stem and leaf plot below gives the sum assured values (to the nearest 100,000) of 49 endowment assurance. The stem unit is 1000,000 and the leaf unit is 100,000.

1	001
2	01123556
3	0134555699
4	000555555
5	00000555
6	02448
7	244
8	05
9	2

- (i) Calculate the mean, median and mode from the given data. [**Warning** Do not form class-intervals.] [4]
- (ii) Without calculating any measure, comment on the skewness. [1]
- Q2 (a) If cards are drawn from a pack of well-shuffled cards – one after another – without replacement, state maximum number of cards that you can draw.
Find the probability that the second card drawn is an Ace. [2]

(b) If a uniform die is tossed 6 times, find the probability of getting a multiple of 3 on at least two occasions. [3]

Q3 (a) A continuous random variable has its probability density function as under:

$$f(x) = \begin{cases} k \cdot x^2 & 0 < x < 10 \\ 0 & \text{otherwise} \end{cases}$$

Calculate $P(X < 8 | X < 4)$. [2]

(b) If X and Y are two independent random variables with

$$E(X) = 10, V(X) = 100; E(Y) = 25 \text{ and } V(Y) = 400$$

Calculate $E(XY)$ and $V(XY)$ [3]

Q4 (a) If a distribution has mean=25 and variance = 400 and all other cumulants=0, state its cumulant generating function (using C.G.F. as an expansion involving cumulants). Hence state its moment generating function and identify the distribution. [2]

(b) If Lifespan of an electronic tube is exponentially distributed, show that the mean life of a new tube and further lifespan of a tube that has lasted for 1000 hours should be equal.

[3]

S71141 :basics of finance

1 A company's external auditor has warned that the next audit report might be qualified unless the financial statements are amended prior to publication. Explain the significance of a qualified audit report. [5]

2 The following balances have been extracted from the books of JK plc, as at 31 August 2005:-

	£000
Advertising	90
Cash at bank	8
Creditors	52
Debtors	134
Directors remuneration	85
Head office running costs	200
Interest on long term loans	9
Investment income	20
Investments (long term)	450

Long term loans	400
Materials and other manufacturing costs	800
Ordinary dividend paid	60
Ordinary share capital	900
Plant and machinery cost	250
Plant and machinery depreciation at 31 August 2004	100
Premises cost	1,200
Premises depreciation at 31 August 2004	15
Profit and loss at 31 August 2004	374
Sales	2,200
Stock at 31 August 2004	210
Wages and salaries administrative staff	110
Wages and salaries manufacturing staff	400
Wages and salaries sales staff	55

Additional information:

1. Premises are to be depreciated at the rate of 2% on cost and plant and machinery at 20% reducing balance.
2. Stock at 31 August 2005 was £180,000.

Calculate **Operating profit** of JK plc for the year ended 31st August, 2005. [5]

3 (i) List all circumstances under which companies may be considered to be group companies, and explain why shareholders will be interested in consolidated accounts. [3]

(ii) Explain the consolidation process of income statements and statements of financial position of the individual group member. [2]

4 Construct the balance sheet of SURPRISE Industries as on 31st March 2016 based on the information provided below –

- Asset Cover = 1.6
- Asset Gearing Ratio = 0.5
- Quick Ratio = 0.75
- Current Ratio = 2

Other information as on 31st March 2016 –

1. Current Liabilities is Rs. 60,000/-
2. 10% unsecured loan stock is Rs. 1,50,000/-
3. Intangible assets is Rs. 60,000/-
4. Current assets comprises of only cash and inventories
5. Loan capital and equity share capital constitutes equal proportion of balance sheet [5]
