Arab Republic of Egypt
Damietta University
Faculty of commerce
The Course: insurance and its mathematics
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جامعة دمياط
Damietta University

Time: 2 hours (from 9 to 11 A.M.)
The year: second year (English)
The Department: Applied Statistics
Date of Exam: Wednesday (14/5/2025).
The study term: The second.
Prof. Mohamed Abo Raya.

Model (1) (final exam).

Answer the following questions:

The first question:

choose the correct answer:

❖ if $p_{40} = 0.97$, $p_{41} = 0.96$ and $l_{40} - l_{42} = 120$, then

1) The probability that a person aged (40) will live to reach age (42) is.
a) 0.8312 b) 0.9312 c) 0.7312 (d) other answer.

2) a probability that a person aged (40) will live to reach age (43) is.
a) 0.8671 b) 0.6671 c) 0.7671 (d) other answer.

3) the number of livings at exactly age 40 (l_{40}) equals to.....
a) 1644 b) 1544 c) 1744 (d) other answer.

4) the number of livings at exactly age 41 (l_{41}) equals to.....
a) 1792 b) 1592 c) 1692 (d) other answer.

5) the number of livings at exactly age 42 (l_{42}) equals to.....
a) 1624 b) 1724 c) 1524 (d) other answer.

6) the number of deaths at the age 42 (d_{42}) equals to.....
a) 212 b) 112 c) 312 (d) other answer.

7) Probability that a person aged (40) will die at age (43) year.
a) 0.0641 b) 0.0541 c) 0.0441 (d) other answer.

8) Probability of dying of a person 40 years old between the age 41 and age 43 exactly.
a) 0.1229 b) 0.1129 c) 0.1029 (d) other answer.

9) the number of deaths at the age 40 (d_{40}) equals to.....
a) 55 b) 52 c) 56 (d) other answer.

10) the number of deaths at the age 41 (d_{41}) equals to.....
a) 62 b) 61 c) 68 (d) other answer.

11) The probability that a person aged (40) will live to reach age (44) is.
a) 0.8671 b) greater than 0.8671 c) less than 0.8671 (d) other answer.

12) The probability that a person aged (40) dies before age (44) is.
a) 0.2531 b) 0.1531 c) 0.3531 (d) other answer.

13) The probability that a person aged (40) dies before age (45) is.
a) 0.20 b) greater than 0.20 c) less than 0.20 (d) other answer.

❖ A person aged 35 wishes to purchase life annuity that will pay $1 at the age of

14) 36 and the same amount at the end of each year thereafter for life. The net single premium is .....
a) $\frac{N_{37}+D_{36}}{D_{35}}$ b) $\frac{N_{35}+D_{35}}{D_{35}} - 2$ c) $\frac{N_{35}-N_{36}}{D_{35}}$ d) other answer.

15) 35 and the same amount each year thereafter for life. The net single premium is .....
a) $\frac{N_{36}-D_{35}}{D_{35}}$ b) $\frac{N_{35}-N_{36}}{D_{35}} - 1$ c) $\frac{N_{36}+D_{35}}{D_{35}}$ d) other answer.

16) 40 and the same amount each year thereafter for life. The net single premium is .....
a) $\frac{N_{40}}{D_{35}}$ b) $\frac{N_{40}+D_{40}}{D_{35}}$ c) $\frac{N_{40}-D_{40}}{D_{35}}$ d) other answer.

17) 36 and the same amount each year for 5 years only. The net single premium is .....
a) $\frac{N_{35}-N_{41}+D_{36}}{D_{35}}$ b) $\frac{N_{36}-N_{41}+D_{35}}{D_{35}} + 1$ c) $\frac{N_{36}-N_{41}}{D_{35}}$ d) other answer.

18) 35 and the same amount each year for 10 years. The net single premium is .....
a) $\frac{N_{35}-N_{45}+2D_{35}}{D_{35}} - 2$ b) $\frac{N_{35}+N_{45}+D_{35}}{D_{35}}$ c) $\frac{N_{36}}{D_{35}}$ d) other answer.

19) 40 and the same amount each year for 15 years. The net single premium is .....
a) $\frac{N_{39}+N_{55}+D_{40}}{D_{35}}$ b) $\frac{N_{39}-N_{55}+D_{40}}{D_{35}}$ c) $\frac{N_{41}-N_{55}+D_{35}}{D_{35}}$ d) other answer.

❖ $10 whole life policy is issued to a man aged 25.

20) the net single premium is .....
a) $10 \times \frac{M_{26}}{D_{25}}$ b) $10 \times \frac{M_{25}}{N_{25}-N_{26}}$ c) $10 \times \frac{M_{25}}{D_{26}}$ d) other answer.

21) if the policy is straight life policy, the net annual premium is .....

a) $10 \times \frac{M_{25}}{N_{26}}$ b) $10 \times \frac{N_{25}}{N_{25}+D_{25}}$ c) $10 \times \frac{M_{25}}{N_{26}+D_{25}}$ d) other answer.

22) if the policy is a 20-payment life policy, the net annual premium is .....

a) $10 \times \frac{M_{25}}{N_{26}-N_{45}+D_{25}}$ b) $10 \times \frac{M_{25}}{N_{25}-D_{45}}$ c) $10 \times \frac{M_{25}}{N_{26}-N_{45}}$ d) other answer.

❖ A $1 20-year endowment insurance policy was bought by someone aged 40.

23) the net single premium is .....

a) $\frac{M_{60}-M_{40}+D_{60}}{D_{40}}$ b) $\frac{M_{40}-M_{60}+D_{60}}{N_{40}-N_{41}}$ c) $\frac{M_{60}-M_{40}+D_{60}}{D_{60}}$ d) other answer.

24) the net annual premium is .....

a) $\frac{M_{60}-M_{40}-D_{60}}{N_{60}-N_{40}}$ b) $\frac{M_{40}-M_{60}-D_{60}}{N_{40}-N_{60}}$ c) $\frac{M_{60}-M_{40}+D_{60}}{N_{40}-N_{20}}$ d) other answer.

25) assume that the net annual premium is payable in 15 equal annual payments, the size of the annual premium payment is .....

a) $\frac{M_{60}-M_{40}-D_{60}}{N_{55}-N_{40}}$ b) $\frac{M_{40}-M_{60}-D_{60}}{N_{40}-N_{55}}$ c) $\frac{M_{60}-M_{40}+D_{60}}{N_{40}-N_{55}}$ d) other answer.

The second question:

Using the only computation symbol (N)without (M) or (D), find the net single premium for life annuities:

(a) A five- year life annuity of 10$ per year for a person aged 20 if first payment is to pay made at age 21.

(b) A five- year life annuity of 10$ per year for a person aged 20 if first payment is due now.

(c) A five- year life annuity of 10$ per year for a person aged 20 if first payment is due at age 40.

(d) A life annuity of 10 $ for a person aged 21 and the same amount at the end of each year thereafter for life.

(e) A life annuity of 10 $ for a person aged 20 and the same amount at the end of each year thereafter for life.

The third question:

Using the only computation symbols $(N)$and (M) for life insurance policy:

(a) $10 whole life policy is issued to a man aged 25. Find the net single premium.

(b) $10 whole life policy is issued to a man aged 25, if the policy is straight life policy, find the net annual premium.

(c) $10 whole life policy is issued to a man aged 25, if the policy is a 20-payment life policy, find the net annual premium.

(d) A $100 20-year endowment insurance policy was bought by someone aged 40. Find the net single premium.

(e) A $100 20-year endowment insurance policy was bought by someone aged 40. Find the net annual premium.

(f) A $100 20-year endowment insurance policy was bought by someone aged 40 and assumes that the net annual premium is payable in 15 equal annual payments, Find the net annual premium.

Finish of the exam