PACK 2

SECTION A — BIOSTATISTICS

Q1. Dataset: Measures of Central Tendency and Dispersion

Question
The systolic blood pressure values (mmHg) of 14 adults are:

$$118,\ 124,\ 130,\ 126,\ 140,\ 132,\ 128,\ 122,\ 136,\ 144,\ 138,\ 134,\ 146,\ 120$$

Compute:

a) Mean
b) Median
c) Mode
d) Range
e) Q1, Q3, and Interquartile Range (IQR)
f) Sample variance (shortcut formula may be used)
g) Sample standard deviation
h) Coefficient of variation (CV%)

Q2. Normal Distribution and Z-score

Question
In a population of adults, fasting blood glucose levels are normally distributed with:

- Mean = 92 mg/dL
- Standard deviation = 10 mg/dL

An individual has a fasting blood glucose level of **71 mg/dL**.

You are given the following extract from the standard normal (Z) table (showing (P(Z < z))):

Z	**0.00**	**0.01**	**0.02**	**0.03**	**0.04**
−2.3	0.0107	0.0104	0.0102	0.0099	0.0096
−2.2	0.0139	0.0136	0.0132	0.0129	0.0125
−2.1	0.0179	0.0174	0.0170	0.0166	0.0162
−2.0	0.0228	0.0222	0.0217	0.0212	0.0207
−1.9	0.0287	0.0281	0.0274	0.0268	0.0262

Tasks:

a) Calculate the Z-score for this individual.
b) Using the table, estimate the proportion of adults with fasting glucose **below 71 mg/dL**.
c) Interpret the result.

Q3. Interpretation Question (Single Dataset)

Question
A laboratory test shows the following summary statistics:

- Mean = 50 units
- Standard deviation = 5 units
- Interquartile range (IQR) = 6 units
- Coefficient of variation = 10%

Interpret these results with respect to **variability and consistency** of the measurements.

SECTION B — DEMOGRAPHY

Q4. Fertility Indicators

Question
In District A during 2023:

- Live births = 6,300
- Mid-year population = 420,000
- Women aged 15–49 years = 98,000
- Women aged 25–29 years = 21,000
- Live births to women aged 25–29 years = 1,575

Compute:

a) Crude Birth Rate (CBR)
b) General Fertility Rate (GFR)
c) Age-Specific Fertility Rate (ASFR) for 25–29 years

Q5. Total Fertility Rate (TFR)

Question
The following ASFRs (per 1,000 women) are observed:

Age group	ASFR
15–19	25
20–24	105
25–29	150
30–34	90
35–39	30

Calculate the Total Fertility Rate (TFR).

Q6. Dependency Ratios

Question
A population has:

- Children (0–14 years) = 18,000
- Working-age population (15–59 years) = 46,000
- Elderly (60+ years) = 16,000

Compute:

a) Young dependency ratio
b) Old dependency ratio
c) Total dependency ratio

SECTION C — VITAL STATISTICS

Q7. Infant, Neonatal, and Perinatal Mortality

Question
District B reports:

- Live births = 12,000
- Infant deaths = 300
- Neonatal deaths = 190
- Early neonatal deaths = 120
- Stillbirths = 160

Compute:

a) Infant Mortality Rate (IMR)
b) Neonatal Mortality Rate (NMR)
c) Perinatal Mortality Rate (PMR)

Q8. Maternal Mortality Ratio (MMR)

Question

- Maternal deaths = 12
- Live births = 18,000

Compute the Maternal Mortality Ratio (MMR).

Q9. Attack Rate

Question
At a wedding reception:

- 220 guests consumed a particular dessert
- 44 of them developed acute gastroenteritis

Compute the attack rate and interpret the finding.

Q10. Standardized Mortality Ratio (SMR)

Question
In an industrial workforce:

- Observed deaths = 28
- Expected deaths (based on standard population rates) = 35

Compute the SMR and interpret the result.