

# NEET PG Social & Preventive Medicine Sample Paper-7

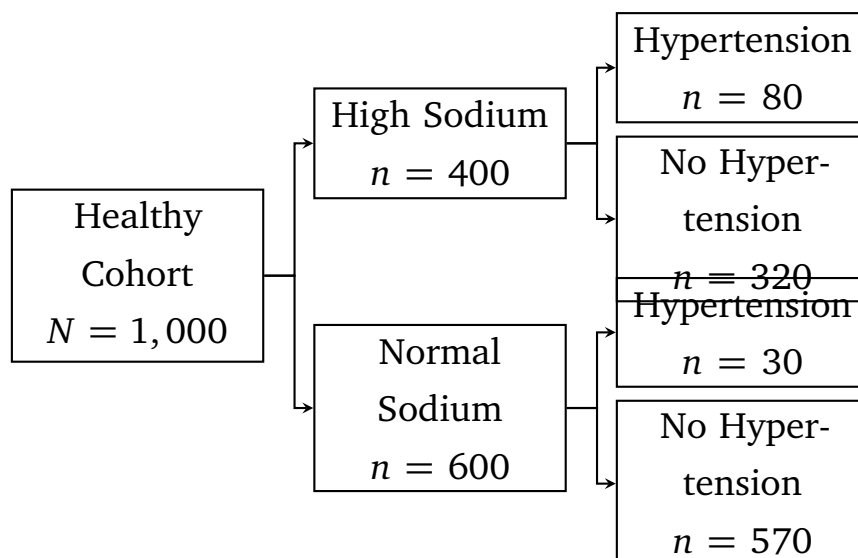
Duration: 20 Minutes

Maximum Marks: 100

## Instructions

- This paper contains **25** Multiple Choice Questions.
- Each correct answer carries **+4** mark. Incorrect answer: **-1** marks. Only **one** correct option.
- Unattempted questions carry **0** marks.
- Use of mobile phones, smartwatches, or any electronic gadgets is strictly prohibited.

**Q1.** An investigator wants to evaluate the association between a high-salt diet and the development of essential hypertension. He recruits 1,000 disease-free individuals, categorizes them based on their daily sodium intake, and follows them over a 10-year period to monitor the incidence of hypertension, as illustrated in the study design scheme below:

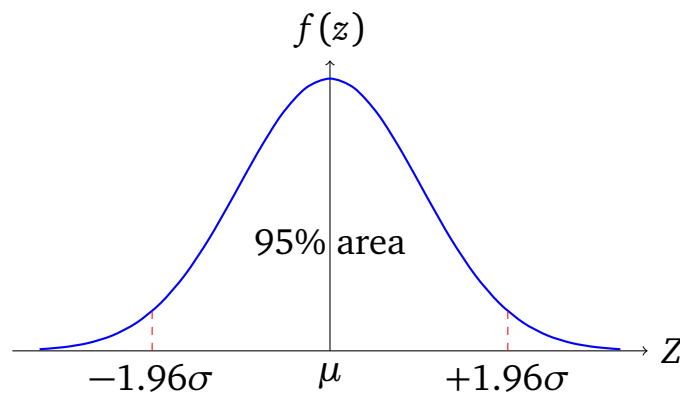


Based on this study structure and the observed outcomes, what is the Relative Risk (RR) of developing hypertension in the exposed group compared to the unexposed group?



- (A) 2.0
- (B) 4.0
- (C) 2.67
- (D) 0.25

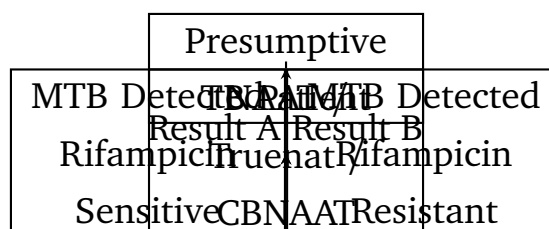
**Q2.** A clinical trial evaluates a new antihypertensive drug across a large sample size. The blood pressure reduction follows a perfectly symmetrical normal distribution. A statistician plots the distribution curve and highlights specific regions under the curve, as shown below:



If the mean reduction ( $\mu$ ) is 15 mmHg with a standard deviation ( $\sigma$ ) of 5 mmHg, within which interval will approximately 95% of the patient population’s blood pressure reduction fall?

- (A) 10 to 20 mmHg
- (B) 5 to 25 mmHg
- (C) 0 to 30 mmHg
- (D) 7.5 to 22.5 mmHg

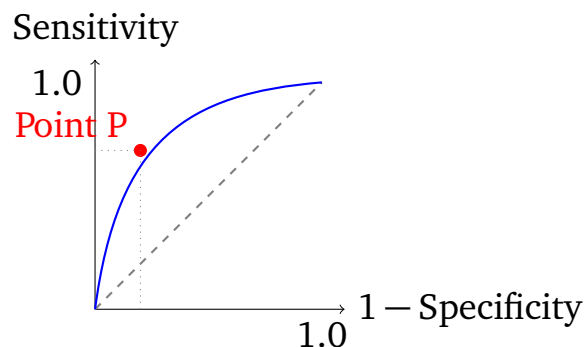
**Q3.** Under the National Tuberculosis Elimination Program (NTEP), diagnostic algorithms rely heavily on rapid molecular testing. Consider the schematic triage process workflow depicted below:



For a patient identified under "Result B" (MTB Detected, Rifampicin Resistant), which of the following is the immediate next mandatory step recommended by the latest NTEP guidelines?

- (A) Initiate a standard 6-month first-line regimen (2HZE/4HE)
- (B) Perform Second-Line Line Probe Assay (SL-LPA) to check for fluoroquinolone resistance
- (C) Repeat the sputum microscopy three times to confirm the diagnosis
- (D) Refer the patient exclusively to a tertiary private hospital without registration

**Q4.** A new screening test for an aggressive variant of pancreatic cancer is evaluated in a validation study. The relationship between the screening sensitivity and specificity across varying cut-off thresholds is mapped using a Receiver Operating Characteristic (ROC) curve as illustrated below:



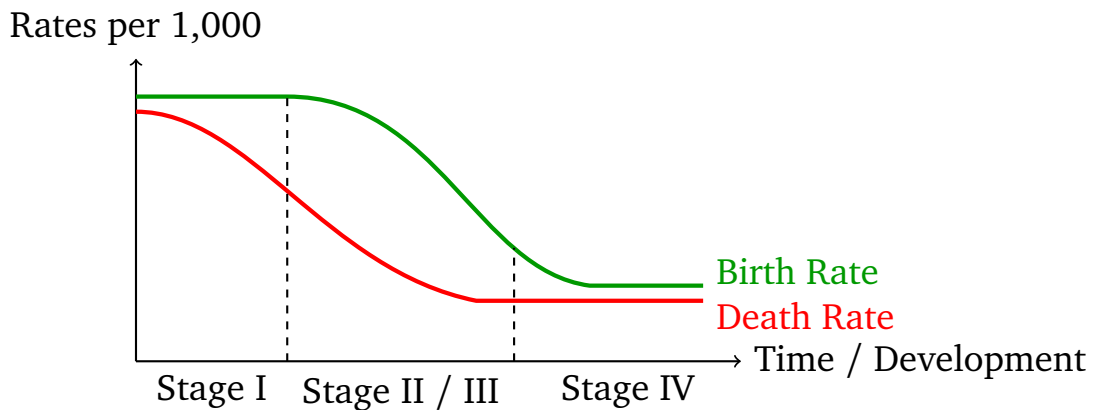
What does the diagonal dashed line represent, and what is the significance of optimizing a screening tool to move Point P closer to the top-left corner?

- (A) The diagonal line represents a perfect test; moving toward the top-left corner reduces test sensitivity.
- (B) The diagonal line represents a test with zero diagnostic value (pure chance); moving toward the top-left corner simultaneously maximizes both sensitivity and specificity.
- (C) The diagonal line represents 100% accuracy; moving toward the top-left corner increases false positive rates.



(D) The diagonal line represents a deterministic gold standard; moving toward the top-left corner shifts the test into a confirmatory diagnostic phase.

**Q5.** The transition of health and disease states within human populations over historical timeframes is captured by conceptual frameworks. Consider the demographic trend timeline below:



During the transition from Stage I to Stage II/III, India experienced a significant widening of the gap between birth and death rates. Which of the following epidemiological terms best matches the population dynamics observed in the intermediate expansion phase?

- (A) Demographic equilibrium
- (B) Demographic explosion
- (C) Negative population growth
- (D) High stationary phase

**Q6.** An epidemiologist tracks a foodborne disease outbreak following a community festival. Among 120 individuals who ate the suspected vanilla custard, 90 fell ill within 36 hours. Among 80 individuals who did not consume the vanilla custard, only 8 developed similar gastrointestinal symptoms. What is the secondary attack rate of this outbreak?

- (A) 75%
- (B) 10%



- (C) This scenario does not describe a secondary attack rate; it describes a primary food-specific attack rate.
- (D) 68.3%

**Q7.** A study was performed to assess whether a relationship exists between smoking intensity and the risk of developing lung carcinoma. The investigators reported an odds ratio (OR) of 8.5 with a 95% confidence interval (CI) of [4.2, 17.1] for heavy smokers compared to non-smokers. Which statement correctly interprets this finding?

- (A) Heavy smokers have exactly 8.5 times higher probability of being cured of lung cancer.
- (B) The finding is statistically significant at the 5% level because the 95% confidence interval does not include the null value of 1.
- (C) The wide confidence interval proves that the sample size was too large to make any valid epidemiological inference.
- (D) The odds of developing lung cancer are 8.5 times lower in the heavy smoking cohort.

**Q8.** A diagnostic screening test with a sensitivity of 90% and a specificity of 80% is applied to two distinct populations. Population X has a disease prevalence of 10%, while Population Y has a disease prevalence of 1%. How will the Positive Predictive Value (PPV) behave when shifting from Population X to Population Y?

- (A) The PPV will remain exactly the same because sensitivity and specificity are intrinsic properties of a test.
- (B) The PPV will increase in Population Y because lower prevalence minimizes the number of false positives.
- (C) The PPV will significantly decrease in Population Y because false positives outnumber true positives when prevalence falls.
- (D) The PPV will drop to zero in both populations due to high background noise.



- Q9.** The crude death rate of a developing region is lower than that of a highly developed country with an aging population structure. To make a valid cross-regional comparison of mortality patterns unconfounded by age distribution variations, which of the following methodological steps should be taken?
- (A) Calculate the age-specific fertility rate instead
  - (B) Perform direct or indirect age standardization using a standard reference population
  - (C) Rely completely on the proportional mortality rate of infants
  - (D) Compute the crude birth rate and subtract it from the crude death rate
- Q10.** A double-blind randomized controlled trial is conducted to test the efficacy of a new vaccine against a respiratory virus. Out of 10,000 vaccine recipients, 20 contract the infection. Out of 10,000 placebo recipients, 100 contract the infection. What is the Vaccine Efficacy (VE) of this candidate vaccine?
- (A) 20%
  - (B) 50%
  - (C) 80%
  - (D) 95%
- Q11.** A researcher gathers plasma cholesterol values from 500 healthy adult males. The data is found to be heavily skewed to the right. Which of the following measures of central tendency and dispersion is most robust and appropriate to summarize this data set?
- (A) Mean and Standard Deviation
  - (B) Median and Interquartile Range (IQR)
  - (C) Mode and Range
  - (D) Geometric Mean and Variance
- Q12.** A study seeks to compare the mean reduction in HbA1c values achieved by three distinct classes of oral hypoglycemic agents (Drug A, Drug B, and Drug C) in a group of Type 2 Diabetes mellitus patients. Assuming the data within



each group is normally distributed and variances are equal, which statistical test is most appropriate for this analysis?

- (A) Paired t-test
- (B) Chi-square test of independence
- (C) One-way Analysis of Variance (ANOVA)
- (D) Wilcoxon signed-rank test

**Q13.** In a cross-sectional assessment of a urban health center's records, a researcher calculates a correlation coefficient ( $r$ ) of  $-0.78$  between the maternal literacy rate in a locality and the infant mortality rate. How should this correlation value be interpreted?

- (A) There is a strong positive linear relationship; as maternal literacy rises, infant mortality increases rapidly.
- (B) There is a weak relationship that can be disregarded for public health planning.
- (C) There is a strong negative linear association; higher maternal literacy is correlated with lower infant mortality rates.
- (D) Maternal literacy explains exactly 78% of the absolute biological causes of infant deaths.

**Q14.** Under the current guidelines of the National Nutritional Anemia Prophylaxis Program, weekly iron and folic acid supplementation (WIFS) is mandated for school-going adolescents. What is the precise elemental iron and folic acid dose composition distributed to adolescents via this school-based initiative?

- (A) 100 mg elemental iron + 500  $\mu\text{g}$  folic acid, weekly
- (B) 60 mg elemental iron + 100  $\mu\text{g}$  folic acid, daily
- (C) 30 mg elemental iron + 250  $\mu\text{g}$  folic acid, monthly
- (D) 100 mg elemental iron + 100  $\mu\text{g}$  folic acid, weekly

**Q15.** A primary health center team is executing activities under India's National Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH+A)



strategy. The strategy emphasizes a "continuum of care". Which of the following interventions represents a crucial link during the early intrapartum and immediate postpartum period?

- (A) Premarital genetic counseling for thalassemia prevention
- (B) Skilled birth attendance at birth and regular monitoring via a simplified partograph
- (C) Visual inspection with acetic acid (VIA) screening for cervical dysplasia
- (D) Distribution of standard multi-drug therapy for adult leprosy cases

**Q16.** The National Vector Borne Disease Control Programme (NVBDCP) incorporates multiple strategies to manage vector densities. The introduction of larvivorous fish like *Gambusia affinis* into stagnant fresh water bodies is categorized under which level or arm of integrated vector management?

- (A) Chemical vector control
- (B) Biological vector control
- (C) Environmental modification through engineering
- (D) Individual personal protection

**Q17.** Under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), sub-centers and primary health centers focus on opportunistic screening. Which age cutoff and screening modalities are primarily deployed at the ground level for cervical cancer screening in public facilities?

- (A) Annual Pap smear for women aged 18 to 65 years
- (B) Visual Inspection with Acetic Acid (VIA) for women aged 30 to 65 years
- (C) Liquid-based cytology for women aged 45 to 70 years
- (D) High-throughput HPV DNA PCR testing at all Sub-Centers

**Q18.** According to India's National Immunization Schedule (NIS), at what age and via which route should the Measles-Rubella (MR) 1st dose and the Vitamin A 1st dose be co-administered to an infant?



- (A) At birth; MR intramuscularly and Vitamin A orally
- (B) 6 weeks; MR subcutaneously and Vitamin A intramuscularly
- (C) 9 completed months up to 12 months; MR subcutaneously and Vitamin A orally
- (D) 16–24 months; MR orally and Vitamin A subcutaneously

**Q19.** A primary healthcare worker checks the Vaccine Vial Monitor (VVM) on a batch of Oral Polio Vaccine (OPV) vials during a pulse polio immunization drive. The inner square of the VVM has darkened significantly and matches the color density of the outer circle exactly. What is the correct administrative action to take?

- (A) Use the vaccine immediately before it degrades further.
- (B) Keep the vial back in the deep freezer for 24 hours to reverse the color change.
- (C) Discard the vaccine vial immediately as it has reached its discard point due to heat exposure.
- (D) Dilute the vaccine with normal saline to make it safe for administration.

**Q20.** An outbreak of a highly contagious viral disease is reported in a densely populated district. The basic reproduction number ( $R_0$ ) of this strain is estimated to be 4. What is the critical herd immunity threshold ( $H_c$ ) required to effectively interrupt transmission and halt the outbreak within this community?

- (A) 25
- (B) 50
- (C) 75
- (D) 90

**Q21.** In biomedical waste management rules in India, human anatomical waste, soiled cotton swabs, and anatomical tissues must be segregated into color-coded bags for subsequent treatment. Which bag color and treatment modality is legally required for this specific waste stream?



- (A) Red bag; Autoclaving and shredding
- (B) Yellow bag; Incineration or deep burial
- (C) Blue container; Microwaving and glass crushing
- (D) Translucent container; Sodium hypochlorite treatment

**Q22.** A medical officer wants to present the month-wise trends of dengue fever cases reported to a district hospital over the past five calendar years. Which of the following data visualization techniques is best suited to display these continuous chronological changes?

- (A) Simple Bar Chart
- (B) Pie Diagram
- (C) Line Diagram / Trend Line
- (D) Scatter Plot

**Q23.** The World Health Organization's Sustainable Development Goal 3 (SDG 3) outlines global targets for health by 2030. What is the target global Maternal Mortality Ratio (MMR) that countries are striving to achieve under this framework?

- (A) Less than 70 per 100,000 live births
- (B) Less than 10 per 1,000 live births
- (C) Zero maternal deaths globally
- (D) Less than 140 per 100,000 live births

**Q24.** An industrial worker at a lead battery manufacturing plant presents with colicky abdominal pain, a distinct bluish line along the gums, and microcytic hypochromic anemia with basophilic stippling on peripheral blood smear. Which diagnostic test is the gold standard indicator for monitoring current occupational lead exposure levels in this employee?

- (A) Urinary coproporphyrin levels
- (B) Blood lead level (BLL) estimation



- (C) Hair lead content analysis
- (D) X-ray of long bones

**Q25.** Under the Integrated Disease Surveillance Programme (IDSP), health data is actively collected at different levels of the health system using distinct reporting formats. Weekly surveillance data compiled by a trained laboratory technician at a functional public health laboratory is reported under which specific form or category?

- (A) Form S (Syndromic)
- (B) Form P (Presumptive)
- (C) Form L (Laboratory confirmed)
- (D) Form R (Referral)



**Detailed Solutions**

Q1.

**Solution**

**Concept:** The Relative Risk (RR) measures the association between an exposure and an outcome. It is computed as the incidence of disease among the exposed group divided by the incidence of disease among the unexposed group.

**Solution:**

- (a) Identify the total number of individuals in the exposed high-sodium group, which is  $n = 400$ . Within this group, the number of individuals who developed hypertension is  $n = 80$ .
- (b) Calculate the incidence of hypertension in the exposed group by dividing the affected individuals by the total exposed population:  $80/400 = 0.20$  or 20%.
- (c) Identify the total number of individuals in the unexposed normal-sodium group, which is  $n = 600$ . Within this group, the number of individuals who developed hypertension is  $n = 30$ .
- (d) Calculate the incidence of hypertension in the unexposed group by dividing the affected individuals by the total unexposed population:  $30/600 = 0.05$  or 5%.
- (e) Determine the Relative Risk (RR) by taking the ratio of the incidence in the exposed group to the incidence in the unexposed group:  $0.20/0.05 = 4.0$ . This signifies that the exposed group has 4 times the risk.

**Final Answer:****Answer: (B)**[Go Back to Question 1](#)

Q2.

**Solution**

**Concept:** For data following a perfectly symmetrical normal distribution, the empirical rule states that specific percentages of the values fall within defined standard deviation boundaries around the mean ( $\mu$ ).

**Solution:**

- (a) According to standard statistical properties of a normal distribution curve, approximately 95% of the total area under the curve lies within  $\pm 1.96$  standard deviations ( $\sigma$ ) from the mean.
- (b) The mathematical expression to calculate this 95% confidence interval boundary for the patient population is defined by the formula:  $\mu \pm 1.96\sigma$ .
- (c) Substitute the given clinical trial parameters into the formula, where the mean reduction  $\mu = 15$  mmHg and the standard deviation  $\sigma = 5$  mmHg.
- (d) Calculate the lower limit of the distribution interval:  $15 - 1.96(5) = 15 - 9.8 = 5.2$  mmHg. For rough estimation using the empirical rule ( $\pm 2\sigma$ ),  $15 - 10 = 5$  mmHg.
- (e) Calculate the upper limit of the distribution interval:  $15 + 1.96(5) = 15 + 9.8 = 24.8$  mmHg. For rough estimation using the empirical rule ( $\pm 2\sigma$ ),  $15 + 10 = 25$  mmHg. This closely yields the interval 5 to 25 mmHg.

**Final Answer:**

**Answer: (B)**

[Go Back to Question 2](#)



Q3.

**Solution**

**Concept:** The National Tuberculosis Elimination Program (NTEP) diagnostic algorithm aims to rapidly identify drug-resistant tuberculosis cases to halt transmission and initiate appropriate drug regimens.

**Solution:**

- (a) Under current public health protocols, initial screening using Nucleic Acid Amplification Test (NAAT) platforms quickly detects Mycobacterium tuberculosis (MTB) along with genetic markers for rifampicin resistance.
- (b) Result B confirms that the patient has rifampicin-resistant tuberculosis (RR-TB). Rifampicin resistance is a strong surrogate marker for multi-drug resistant tuberculosis (MDR-TB).
- (c) Before initiating an intensive drug-resistant regimen, it is mandatory to evaluate resistance to second-line medications, particularly fluoroquinolones, which form the backbone of drug-resistant treatment.
- (d) The recommended tool for this assessment is the Second-Line Line Probe Assay (SL-LPA). This molecular test detects mutations conferring resistance to fluoroquinolones and second-line injectable drugs.
- (e) This step guides clinicians on whether to initiate a shorter oral bedaquiline-containing regimen or an all-oral longer regimen, preventing the amplification of additional drug resistance.

**Final Answer:****Answer: (B)**[Go Back to Question 3](#)

Q4.

**Solution**

**Concept:** A Receiver Operating Characteristic (ROC) curve plots the true positive rate (Sensitivity) against the false positive rate ( $1 - \text{Specificity}$ ) across all possible cut-off thresholds for a diagnostic test.

**Solution:**

- (a) The diagonal reference line running from (0, 0) to (1, 1) represents a test with an Area Under the Curve (AUC) of 0.5. This performance is equivalent to pure random guessing.
- (b) A perfect screening or diagnostic tool would form a curve that passes directly through the upper-left corner coordinates (0, 1), representing 100% sensitivity and 100% specificity.
- (c) Moving Point P along the curve closer to the top-left corner maximizes the vertical height (true positives) while minimizing the horizontal distance (false positives).

**Final Answer:**

Answer: (B)

[Go Back to Question 4](#)

Q5.

**Solution**

**Concept:** The Demographic Transition Model describes historical shifts in birth and death rates as countries undergo economic development and public health industrialization.

**Solution:**

- (a) Stage I (High Stationary Phase) is characterized by both high birth rates and high death rates, resulting in a stable but slow-growing population structure.
- (b) Transitioning into Stage II and early Stage III features a dramatic decline in death rates due to improved sanitation, vaccines, and food supply, while birth rates remain high.
- (c) The widening vertical gap between a high birth rate and a plunging death rate creates a massive natural population increase, epidemiologically termed a demographic explosion.

**Final Answer:**

Answer: (B)

[Go Back to Question 5](#)



Q6.

**Solution**

**Concept:** Epidemiological outbreak metrics distinguish between primary exposures and secondary transmissions. Attack rates evaluate the proportion of an at-risk population that develops illness during a specified timeframe.

**Solution:**

- (a) The scenario describes individuals tracking a sudden foodborne outbreak stemming from a single shared exposure source at a community festival, rather than serial person-to-person spread.
- (b) A primary food-specific attack rate measures the incidence of disease among individuals who directly consumed a suspected item during the primary exposure event.
- (c) Secondary attack rates quantify the spread of an infectious disease from primary cases to contacts within a closed environment, which does not apply to this acute vehicle-borne scenario.

**Final Answer:**

**Answer: (C)**

[Go Back to Question 6](#)

Q7.

**Solution**

**Concept:** The Odds Ratio (OR) measures association strength between an exposure and an outcome. The accompanying 95% Confidence Interval (CI) evaluates the statistical precision and significance of that estimate.

**Solution:**

- (a) An OR of 8.5 indicates that the odds of having the disease are 8.5 times higher among the exposed heavy smokers compared to the unexposed non-smokers.
- (b) The null hypothesis value for relative measures of association (like OR or Relative Risk) is 1.0, which indicates completely equal odds between groups.
- (c) Because the calculated 95% confidence interval of [4.2, 17.1] does not include the null value of 1.0, the association is considered statistically significant at the standard 5% level ( $p < 0.05$ ).

**Final Answer:**

**Answer: (B)**

[Go Back to Question 7](#)



Q8.

**Solution**

**Concept:** Predictive values are heavily dependent on the background prevalence of the disease within the target population, unlike sensitivity and specificity which remain relatively constant.

**Solution:**

- (a) Positive Predictive Value (PPV) represents the mathematical probability that a patient truly has the disease given that their screening test result returned positive.
- (b) When a screening test is applied to a population with low disease prevalence, the absolute number of true clinical cases drops drastically.
- (c) Consequently, even with high specificity, the false positive results generated from the healthy majority will outnumber the true positives, causing the PPV to drop significantly.

**Final Answer:**

Answer: (C)

[Go Back to Question 8](#)

Q9.

**Solution**

**Concept:** Crude mortality metrics are heavily confounded by differences in population demographics, particularly age distributions, making direct cross-regional comparisons misleading.

**Solution:**

- (a) Developed nations often exhibit higher crude death rates compared to developing nations simply due to a larger proportion of elderly individuals who naturally experience higher mortality.
- (b) To remove the confounding effect of age, epidemiologists apply age-standardization techniques to adjust the observed rates.
- (c) This method applies age-specific death rates to a standardized reference population structure, enabling a fair and unconfounded epidemiological comparison between the regions.

**Final Answer:**

Answer: (B)

[Go Back to Question 9](#)



Q10.

**Solution**

**Concept:** Vaccine Efficacy (VE) measures the proportionate reduction in disease attack rates among vaccinated cohorts compared to unvaccinated cohorts under ideal clinical trial conditions.

**Solution:**

- (a) Compute the attack rate in the unvaccinated placebo cohort ( $AR_u$ ):  $100/10,000 = 0.01$  or 1%. Next, compute the attack rate in the vaccinated cohort ( $AR_v$ ):  $20/10,000 = 0.002$  or 0.2%.
- (b) Calculate the Relative Risk (RR) by taking the ratio of the two attack rates:  $RR = AR_v/AR_u = 0.002/0.01 = 0.20$ .
- (c) Calculate Vaccine Efficacy using the standard public health formula:  $VE = (1 - RR) \times 100\%$ . Substituting the calculated value yields:  $VE = (1 - 0.20) \times 100\% = 80\%$ .

**Final Answer:**

Answer: (C)

[Go Back to Question 10](#)



Q11.

**Solution**

**Concept:** The choice of appropriate descriptive statistics depends fundamentally on the underlying distribution shape of the dataset. When medical data distributions deviate significantly from a normal bell-shaped curve, standard parametric parameters like the mean lose mathematical reliability due to heavy tail biases.

**Solution:**

- (a) Analyze the distribution characteristics provided by the researcher, noting that the plasma cholesterol values from the 500 healthy adult males are heavily skewed to the right rather than symmetrically balanced.
- (b) In right-skewed data, a few extremely high outlier values pull the arithmetic mean upward, making it uncharacteristically high and unrepresentative of the central bulk of the study population.
- (c) The median represents the exact 50th percentile mark of ordered data, making it highly robust because its positional calculation remains completely unaffected by the magnitude of extreme trailing outliers.
- (d) Similarly, the standard deviation relies directly on squared differences from the skewed mean, causing it to artificially inflate when dispersion is asymmetric.
- (e) The interquartile range measures the distance between the 25th and 75th percentiles, capturing the central 50% of the data robustly. Thus, median and interquartile range form the ideal descriptive pair.

**Final Answer:****Answer: (B)**[Go Back to Question 11](#)

Q12.

**Solution**

**Concept:** Selecting an appropriate inferential statistical test depends on the scale of measurement of the dependent variable, the number of experimental groups being evaluated, and whether the distribution satisfies parametric baseline assumptions.

**Solution:**

- (a) Identify the primary objective of the study, which is to compare the mean reduction of a continuous quantitative clinical variable (HbA1c percentages) across distinct patient cohorts.
- (b) Determine the total number of independent study groups under evaluation. Here, the trial investigates three separate classes of oral hypoglycemic medications, designated as Drug A, Drug B, and Drug C.
- (c) Evaluate the explicit baseline assumptions noted in the scenario, which state that the dataset within each group follows a normal distribution and maintains homogenous, equal variances.
- (d) A student t-test is mathematically restricted to comparing a maximum of two groups. Running multiple pairwise t-tests across three groups increases the family-wise Type I error rate dramatically.
- (e) The One-Way Analysis of Variance is designed exactly to compare continuous, normally distributed means across three or more independent groups by assessing between-group versus within-group variance.

**Final Answer:****Answer: (C)**[Go Back to Question 12](#)

Q13.

**Solution**

**Concept:** The Pearson correlation coefficient ( $r$ ) quantifies both the directional orientation and the linear strength of an association between two continuous variables, ranging from a perfect negative association to a perfect positive association.

**Solution:**

- (a) Examine the numerical value and mathematical sign of the calculated correlation coefficient, which is given by the investigator as  $r = -0.78$  between the two targeted public health markers.
- (b) The negative algebraic sign indicates an inverse linear relationship. This implies that as the independent variable (maternal literacy rate) increases, the dependent outcome variable (infant mortality rate) decreases.
- (c) Evaluate the magnitude of the absolute value,  $|-0.78| = 0.78$ . On the standard correlation scale, values between 0.70 and 0.89 indicate a strong linear bond between variables.
- (d) Avoid the common pitfall of assuming correlation equals absolute biological causation. The value does not mean literacy directly terminates exactly 78% of medical infant mortality conditions.
- (e) Conclude that the metric signifies a strong negative linear association where higher community-level maternal literacy rates are dynamically tied to decreased rates of infant death.

**Final Answer:**

**Answer: (C)**

[Go Back to Question 13](#)



Q14.

**Solution**

**Concept:** The Weekly Iron and Folic Acid Supplementation (WIFS) initiative is a core directive under the Anaemia Mukht Bharat strategy designed to reduce nutritional iron deficiency anemia across high-risk adolescent demographics.

**Solution:**

- (a) Review the programmatic structural guidelines of India's National Nutritional Anemia Prophylaxis Program regarding preventative interventions for school-going boys and girls in public educational setups.
- (b) Recognize that adolescents experience rapid physiological growth spurts and high iron requirements, necessitating a higher preventative dose profile compared to younger pediatric cohorts.
- (c) Identify the administrative frequency mandated by the program's title, which dictates that supervised consumption must occur on a fixed day every single week throughout the calendar year.
- (d) Recall the exact pharmacological formulation engineered for this public health cohort, which comprises 100 mg of elemental iron paired with 500  $\mu\text{g}$  of systemic folic acid.
- (e) Differentiate this regular high-dose adolescent weekly schedule from the lower pediatric doses or the daily schedules reserved for treating active clinical anemia.

**Final Answer:****Answer: (A)**[Go Back to Question 14](#)

Q15.

**Solution**

**Concept:** The Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH+A) framework emphasizes a life-cycle approach, linking health interventions seamlessly across critical physiological transition periods.

**Solution:**

- (a) Analyze the strategic term "continuum of care," which demands that health services be delivered uninterrupted across time (adolescence to childhood) and place (home to clinical facility).
- (b) Identify the specific timeline requested in the clinical prompt, which isolates the narrow window of early intrapartum (during labor) and immediate postpartum (right after childbirth).
- (c) Evaluate the interventions provided in the options to see which matches this acute obstetric timeline. Genetic counseling is pre-conceptual, and cervical screening is generic adult care.
- (d) Skilled birth attendance directly addresses intrapartum tracking, utilizing a simplified partograph to graphically monitor cervical dilation and fetal heart rates in real-time.
- (e) This immediate clinical oversight during labor ensures rapid detection of obstructed delivery or postpartum hemorrhage, representing the vital link preserving maternal and newborn survival.

**Final Answer:****Answer: (B)**[Go Back to Question 15](#)

Q16.

**Solution**

**Concept:** Integrated Vector Management (IVM) under the National Vector Borne Disease Control Programme utilizes a mix of approaches to suppress vector populations, categorized into chemical, biological, and environmental types.

**Solution:**

- (a) Assess the operational mechanism of introducing larvivorous fish species, such as *Gambusia affinis* or *Poecilia reticulata*, into stagnant freshwater bodies where disease vectors breed.
- (b) These fish function as natural predators that seek out and consume vector larvae and pupae before they can mature into flying adult mosquitoes capable of transmitting pathogens.
- (c) Chemical vector control relies on synthetic compounds like indoor residual sprays or larvicidal oils, which is distinct from using living organisms.
- (d) Environmental modification involves physical engineering infrastructure like draining wetlands or filling ditches to permanently eliminate breeding habitats.
- (e) Because this specific intervention harnesses a living biological organism to prey upon and control the population of another species, it falls directly under biological vector control.

**Final Answer:****Answer: (B)**[Go Back to Question 16](#)

Q17.

**Solution**

**Concept:** Ground-level operational guidelines under public health programs are tailored to resource availability, balancing maximum diagnostic yield against realistic technical infrastructure limitations at primary health centers.

**Solution:**

- (a) Review the cervical cancer screening guidelines designated under the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS).
- (b) Recognize that high-end diagnostic modalities like liquid-based cytology or automated HPV DNA PCR tests require specialized laboratory equipment not routinely operational at rural sub-centers.
- (c) Traditional cytological Pap smears require cytotechnologists and pathologists, limiting their feasibility for rapid mass screening in peripheral community clinics.
- (d) Public health guidelines mandate Visual Inspection with Acetic Acid (VIA) as the primary ground-level screening method due to its low cost and immediate, real-time results.
- (e) The recommended target demographic for this opportunistic screening consists of women aged 30 to 65 years, optimizing the detection of precancerous lesions during peak risk windows.

**Final Answer:****Answer: (B)**[Go Back to Question 17](#)

Q18.

**Solution**

**Concept:** India's National Immunization Schedule (NIS) sets specific chronological ages and anatomical delivery routes for infant vaccinations to optimize immunological protection and minimize interference between antigens.

**Solution:**

- (a) Recall the timeline for primary measles protection under public health mandates. The first dose of the Measles-Rubella (MR) combined vaccine is delivered upon completion of 9 full months of life.
- (b) Administering the MR vaccine before 9 months is avoided because circulating maternal antibodies can neutralize the live attenuated viral particles, reducing vaccine efficacy.
- (c) Identify the specific anatomical administration route designated for the lyophilized live-attenuated MR vaccine, which is given via a subcutaneous injection, typically into the right upper arm.
- (d) Review the concurrent administration of high-dose Vitamin A. The first dose (1 lakh International Units) is given simultaneously at 9 months to prevent childhood blindness and reduce measles mortality.
- (e) Contrast the parenteral route of the MR vaccine with the oral liquid administration route of Vitamin A, confirming they are co-administered at 9 months using distinct delivery methods.

**Final Answer:****Answer: (C)**[Go Back to Question 18](#)

Q19.

**Solution**

**Concept:** A Vaccine Vial Monitor (VVM) is a heat-sensitive chemical label applied to vaccine vials that undergoes a gradual, irreversible color change when exposed to cumulative heat over time.

**Solution:**

- (a) Analyze the structural design of a standard VVM, which consists of an inner heat-sensitive square surrounded by a darker reference outer circle.
- (b) Understand the clinical interpretation stages: if the inner square is lighter than the outer circle, the vaccine remains safe and potent for administration.
- (c) Note the critical turning point described in the scenario, where the inner square has darkened significantly and matches the color density of the outer circle exactly.
- (d) This exact color match indicates that the vaccine vial has reached its absolute discard point due to excessive heat exposure, indicating that the vaccine potency has dropped below acceptable limits.
- (e) Freezing or diluting cannot restore the degraded viral antigens. Therefore, the medical officer must immediately discard the vial to avoid administering an ineffective vaccine.

**Final Answer:****Answer: (C)**[Go Back to Question 19](#)

Q20.

**Solution**

**Concept:** The basic reproduction number ( $R_0$ ) defines the average number of secondary infectious cases generated by a single primary case in a completely susceptible population, directly determining the herd immunity threshold.

**Solution:**

- (a) The critical herd immunity threshold ( $H_c$ ) represents the minimum proportion of a community that must possess active immunity to interrupt sustained transmission of a pathogen.
- (b) Recall the standard mathematical formula used in infectious disease epidemiology to calculate this threshold:  $H_c = 1 - (1/R_0)$ .
- (c) Substitute the specific epidemiological parameter provided in the text into the mathematical equation, where the basic reproduction number ( $R_0$ ) is estimated to be 4.
- (d) Perform the fractional calculation:  $1/4 = 0.25$ . Subtract this value from the whole integer to find the target proportion:  $H_c = 1 - 0.25 = 0.75$ .
- (e) Convert this decimal proportion into a standard percentage:  $0.75 \times 100\% = 75\%$ . This indicates that at least 75% of the population must be immune to halt outbreaks of this strain.

**Final Answer:**

**Answer: (C)**

[Go Back to Question 20](#)



Q21.

**Solution**

**Concept:** Biomedical waste management requires systematic segregation at the point of generation to avoid environmental contamination and cross-infection. In India, statutory guidelines categorize waste streams into color-coded containment units linked to dedicated treatment options.

**Solution:**

- (a) Identify the specific waste category described in the medical scenario, which encompasses human anatomical waste, pathological items, contaminated cotton swabs, and organic tissues.
- (b) According to statutory Biomedical Waste Management Rules, highly infectious bio-organic items must be isolated completely from plastics or sharp instruments to optimize specialized disposal streams.
- (c) Yellow-colored non-chlorinated plastic bags or containers are legally designated to hold human anatomical tissues and items soiled with blood or physiological body fluids.
- (d) Evaluate the mandated definitive treatment modality for yellow bag contents. This highly infectious organic matter is subjected to high-temperature thermal destruction via modern industrial incineration.
- (e) For deep rural districts lacking proximate access to centralized incineration facilities, deep burial within secure, regulated containment pits serves as the approved local alternative.

**Final Answer:****Answer: (B)**[Go Back to Question 21](#)

Q22.

**Solution**

**Concept:** Data visualization techniques must be chosen based on the underlying scale of measurement and whether the analytical objective is to display categorical comparisons, percentage parts of a whole, or continuous temporal patterns.

**Solution:**

- (a) Analyze the specific presentation goal specified by the medical officer, which is to illustrate month-wise trends of dengue fever cases reported to a hospital across five consecutive years.
- (b) The independent chronological variable (time sequenced by months and years) is structurally continuous, meaning each data point is connected sequentially to the adjacent time interval.
- (c) Simple bar charts are ideal for discrete categorical comparisons rather than highlighting seamless fluid transitions, while pie charts exclusively illustrate static proportional distributions at a single point in time.
- (d) A line diagram plots coordinates across sequential data points and links them using linear segments, highlighting the operational trajectory of the disease.
- (e) This trend line format allows clinicians to quickly identify recurring seasonal spikes, peak epidemiological months, and long-term multi-year variations in transmission behavior.

**Final Answer:****Answer: (C)**[Go Back to Question 22](#)

Q23.

**Solution**

**Concept:** The United Nations Sustainable Development Goals establish standardized global metrics to improve maternal health equity and drastically minimize preventable pregnancy-related mortality by the target year of 2030.

**Solution:**

- (a) Review the specific monitoring metrics utilized for global tracking. The Maternal Mortality Ratio (MMR) computes maternal deaths per 100,000 live births, serving as a key indicator of health system performance.
- (b) Examine the specific targets established under Sustainable Development Goal 3, which focuses on ensuring healthy lives and promoting well-being for individuals across all age brackets.
- (c) Target 3.1 sets the quantitative goal for maternal survival, mandating a reduction in the global maternal mortality ratio to a standardized ceiling value.
- (d) The exact quantitative goal threshold established within this official international framework is to push the global MMR below 70 deaths per 100,000 live births.
- (e) Differentiate this global goal from individual national targets, which may vary depending on the baseline epidemiological parameters of a country.

**Final Answer:****Answer: (A)**[Go Back to Question 23](#)

Q24.

**Solution**

**Concept:** Occupational toxicology monitoring tracks heavy metal exposure using clinical biomarkers that reflect either immediate systemic absorption or long-term biological accumulation within skeletal tissues.

**Solution:**

- (a) Analyze the clinical presentation of the worker, who exhibits classic signs of plumbism including intestinal colic, a lead line along the gingival margin, and basophilic stippling on a blood smear.
- (b) Industrial medicine relies on monitoring protocols to assess current occupational exposure and ensure safety limits are not breached during manufacturing processes.
- (c) Urinary coproporphyrin serves as an indirect qualitative screening marker for disrupted heme synthesis but lacks the necessary diagnostic precision to guide critical regulatory enforcement.
- (d) Blood lead level estimation via atomic absorption spectroscopy measures circulating lead, reflecting recent absorption over the preceding few weeks.
- (e) Because BLL provides a highly precise measurement of current systemic exposure, it serves as the definitive tool for occupational health tracking.

**Final Answer:****Answer: (B)**[Go Back to Question 24](#)

Q25.

**Solution**

**Concept:** The Integrated Disease Surveillance Programme operates a structured data collection network using specialized reporting formats that correspond to the technical capacity of the reporting cadre.

**Solution:**

- (a) Review the centralized information collection channels established under public health guidelines, which utilize three distinct weekly reporting formats designated as Form S, Form P, and Form L.
- (b) Form S (Syndromic) relies on symptom-based tracking managed by grassroots community workers like ASHAs or ANMs when laboratory verification is completely unavailable.
- (c) Form P (Presumptive) captures clinical diagnoses recorded by medical officers based on typical signs and symptoms, before receiving laboratory confirmation.
- (d) Form L (Laboratory) is reserved for data generated by trained laboratory technicians at functional public health facilities, indicating definitive confirmation of infectious pathogens.
- (e) Conclude that because the data in the scenario is gathered and compiled by a trained technician using definitive laboratory results, it must be submitted using Form L.

**Final Answer:****Answer: (C)**[Go Back to Question 25](#)

**Answer Key**

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	B	3	B	4	B	5	B
6	C	7	B	8	C	9	B	10	C
11	B	12	C	13	C	14	A	15	B
16	B	17	B	18	C	19	C	20	C
21	B	22	C	23	A	24	B	25	C

