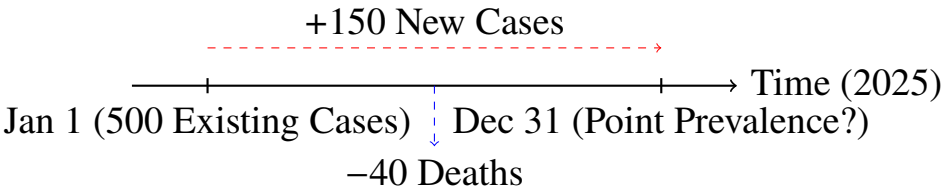
NEET-PG Social & Preventive Medicine Sample Paper-5

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. In a community with a population of 100, 000, an active surveillance program identified 500 patients with Chronic Obstructive Pulmonary Disease (COPD) on January 1, 2025. Over the course of the year, 150 newly diagnosed cases of COPD were recorded. If 40 patients from the entire cohort died during the year, what is the point prevalence of COPD in this community on December 31, 2025?



(A) 6.10 per 1, 000 population

(B) 6.50 per 1, 000 population

(C) 1.50 per 1, 000 population

(D) 5.00 per 1, 000 population

Q2. Under the National Tuberculosis Elimination Program (NTEP) guidelines, a 45-year-old newly diagnosed pulmonary tuberculosis patient weighing 52 kg is started on the intensive phase of treatment. Which of the following correctly represents the daily drug combination and dosage schedule for this patient?

(A) 3 tablets of 4-FDC (Isoniazid 75 mg + Rifampicin 150 mg + Pyrazinamide 400 mg + Ethambutol 275 mg)

(B) 4 tablets of 4-FDC (Isoniazid 75 mg + Rifampicin 150 mg + Pyrazinamide 400 mg + Ethambutol 275 mg)

(C) 3 tablets of 4-FDC (Isoniazid 150 mg + Rifampicin 300 mg + Pyrazinamide 800 mg + Ethambutol 550 mg)

(D) 4 tablets of 4-FDC (Isoniazid 50 mg + Rifampicin 100 mg + Pyrazinamide 300 mg + Ethambutol 200 mg)

Q3. A new screening test for early detection of hepatocellular carcinoma is evaluated in a cohort of 1,000 high-risk cirrhotic patients. The test yields a positive result in 180 out of 200 patients with confirmed disease, and a negative result in 720 out of 800 disease-free individuals. If the prevalence of the disease in another subpopulation drops by half, how will the properties of this screening test change?

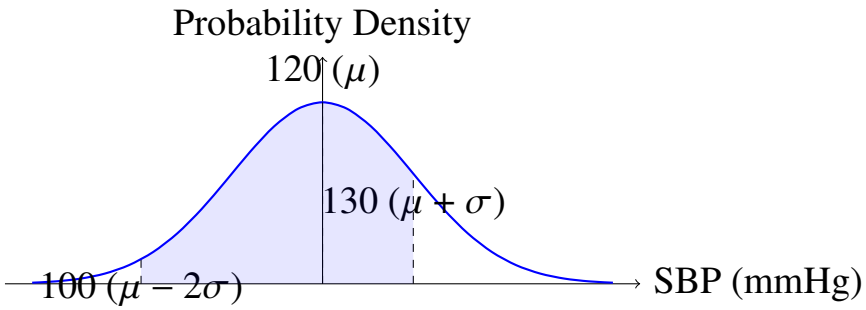
(A) Sensitivity increases, Specificity decreases

(B) Positive Predictive Value decreases, Negative Predictive Value increases

(C) Positive Predictive Value increases, Negative Predictive Value decreases

(D) Both Sensitivity and Specificity decrease proportionally

Q4. A health researcher measures the systolic blood pressure of 450 medical students and finds that the data follows a perfectly normal distribution with a mean of 120 mmHg and a standard deviation of 10 mmHg. Approximately how many students are expected to have a systolic blood pressure between 100 mmHg and 130 mmHg?



(A) 306

(B) 348

(C) 367

(D) 428

Q5. An investigator wants to evaluate the association between lifetime occupational asbestos exposure and malignant mesothelioma. Given that mesothelioma is an exceedingly rare malignancy with a long latent period, which epidemiological study design would be the most efficient and logistically feasible to test this hypothesis?

(A) Retrospective cohort study

(B) Prospective cohort study

(C) Case-control study

(D) Randomized controlled trial

Q6. During a routine review of health indicators at a primary health centre, a medical officer notes an uptick in maternal mortality. According to the current operational definitions under maternal health programs in India, a late maternal death is defined as the death of a woman from direct or indirect obstetric causes more than how many days but less than how many one year after termination of pregnancy?

(A) 42 days to 365 days

(B) $28 days to 180 days$

(B) 42 days to 90 days

(C) 56 days to 365 days

Q7. A 24-month-old child is brought to the clinic by his mother. On verification of the immunization card, the child received all primary vaccines up to 1 year of age but missed the scheduled updates at 16–24 months. According to the National Immunization Schedule (NIS) of India, which of the following combinations of vaccines should be administered to this child today?

(A) DPT booster-1, OPV booster, Measles-Rubella (MR) 2nd dose, Vitamin A 2nd dose

(B) DPT booster-1, Pentavalent booster, Rotavirus vaccine, Vitamin A 2nd dose

(C) DPT booster-1, Measles-Rubella (MR) 2nd dose, JE-2 vaccine only

(D) DT booster, OPV booster, Vitamin A 1st dose

Q8. A clinical trial compares three different surgical modalities for treating inguinal hernia in terms of postoperative recovery time (measured in days). Assuming the recovery times across all three groups follow a normal distribution with equal variances, which statistical test is most appropriate to determine if there is a significant difference in the mean recovery time among these three modalities?

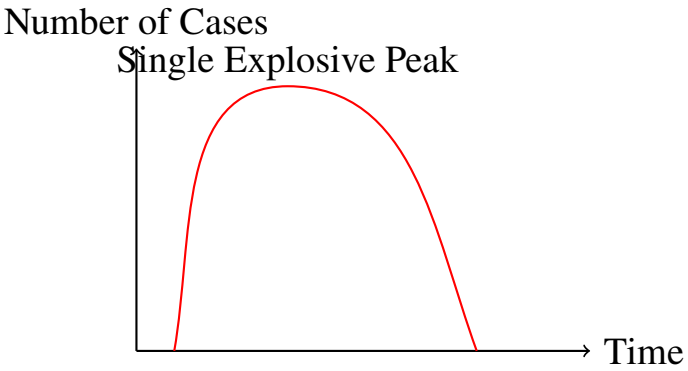
(A) Independent samples t-test

(B) Kruskal-Wallis test

(C) Chi-square test of independence

(D) One-way Analysis of Variance (ANOVA)

Q9. In an urban slum, an outbreak of acute watery diarrhea occurs. Epidemiologists construct an epidemic curve which shows a rapid rise to a distinct peak, followed by a symmetric, somewhat slower decline. All cases were restricted within one incubation period of the pathogen. What is the most likely type of epidemic source?



(A) Continuous common-source epidemic

(B) Point-source epidemic

(C) Propagated epidemic

(D) Cyclical common-source epidemic

Q10. A state public health department reports that the Infant Mortality Rate (IMR) for a specific district is 35 per 1,000 live births. Which of the following components is strictly excluded while calculating the numerator for this health indicator?

(A) Deaths of live-born infants aged 12 to 15 days

(B) Deaths of live-born infants aged 3 months

(C) Stillbirths occurring after 28 weeks of gestation

(D) Deaths of live-born infants within 24 hours of birth

Q11. To study the correlation between daily sodium intake (in grams) and diastolic blood pressure (in mmHg), a researcher calculates a Pearson correlation coefficient (r) of +0.78. What does this value imply regarding the relationship between the two variables?

(A) 78% of the variation in diastolic blood pressure is directly caused by sodium intake

(B) There is a strong, direct linear relationship between daily sodium intake and diastolic blood pressure

(C) The relationship is highly statistically significant with a p-value strictly less than 0.01

(D) For every 1 gram increase in sodium intake, the diastolic blood pressure rises by 0.78 mmHg

Q12. The National Strategic Plan (NSP) for Malaria Elimination in India targets complete elimination across various categories of states. Under this framework, a district reporting an Annual Parasite Index (API) of 1 to 2 cases per 1,000 population is classified into which operational category?

(A) Category 0 (Elimination phase)

(B) Category 1 (Pre-elimination phase)

(C) Category 2 (Intervention phase)

(D) Category 3 (Intensified control phase)

Q13. A 30-year-old veterinarian presents to the emergency department after being bitten on the right forearm by a stray dog that appeared highly agitated and hypersalivating. The bite wound is deep, with clear skin breach and visible trickling of blood. How should this exposure be categorized and managed according to the latest WHO and National guidelines for rabies prophylaxis?

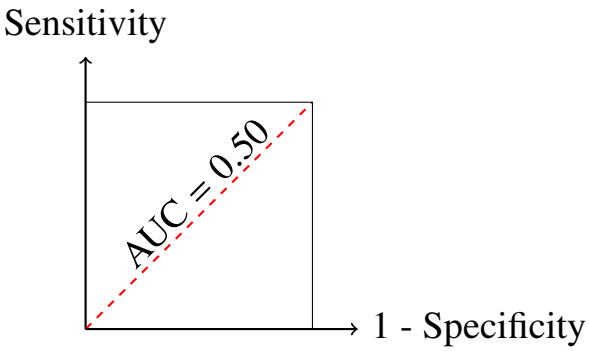
(A) Category II; local wound washing and immediate administration of modern rabies vaccine (ARV) only

(B) Category III; local wound washing, immediate administration of ARV, and infiltration of rabies immunoglobulin (RIG) around the wound

(C) Category III; immediate surgical closure of the wound followed by a 4-dose ARV regimen

(D) Category II; application of local antiseptics and monitoring the dog for 10 days without immediate vaccine

Q14. In a screening test evaluation, researchers plot a Receiver Operating Characteristic (ROC) curve for a new serum biomarker intended to detect early-stage pancreatic cancer. If the area under the ROC curve (AUC) for this biomarker is found to be 0.50, what does this indicate about the diagnostic performance of the test?



(A) The test has perfect diagnostic accuracy with zero false positives

(B) The test possesses maximum specificity but very poor sensitivity

(C) The test has no discriminative ability and performs no better than random chance

(D) The test is highly reliable for ruling out the disease but poor for ruling it in

Q15. Under the National Reproductive, Maternal, Newborn, Child, and Adolescent Health (RMNCH+A) strategy, the "Home-Based Care for Young Child" (HBYC) program extends the schedule of home visits by Accredited Social Health Activists (ASHAs). What is the total number of visits and the final month of visit scheduled under the HBYC module for a young child?

(A) 5 visits, ending at 15 months

(B) 6 visits, ending at 12 months

(C) 5 visits, ending at 18 months

(D) 4 visits, ending at 24 months

Q16. During an outbreak investigative study, researchers want to establish whether a newly discovered respiratory virus satisfies the criterion of "temporality" within Hill's criteria of causation. Which study design is inherently best suited to conclusively demonstrate that the exposure preceded the onset of the disease?

(A) Cross-sectional study

(B) Case-control study

(C) Ecological study

(D) Prospective cohort study

Q17. In a rural health block, the Crude Birth Rate is 20 per 1,000 population, and the Crude Death Rate is 6 per 1,000 population. What is the annual natural growth rate of this population?

(A) 1.4%

(B) 14%

(C) 0.14%

(D) 2.6%

Q18. According to the Central Pollution Control Board (CPCB) guidelines for Biomedical Waste Management in India, how should a discarded microbiology culture plate, an expired live-attenuated vaccine vial, and a contaminated blood bag be appropriately segregated and disposed of?

(A) All three must be discarded directly into the Yellow non-chlorinated plastic bag

(B) Culture plates and vaccine vials must be pre-treated/autoclaved before being placed in the Yellow bag, while the blood bag goes directly into the Yellow bag

(C) Culture plates go into the Red bag, vaccine vials into the Blue box, and blood bag into the Yellow bag

(D) All three must be autoclaved and then disposed of into the Red plastic bag for recycling

Q19. A study assesses the efficacy of a new antihypertensive drug compared to a placebo. The investigator computes a 95% confidence interval for the difference in mean reduction of systolic blood pressure between the two groups. The resulting interval is (−2.5 mmHg to +6.8 mmHg). How should this finding be interpreted statistically?

(A) The new drug is significantly better than the placebo at a significance level of $\alpha = 0.05$

(B) The placebo is significantly better than the new drug at a significance level of $\alpha = 0.05$

(C) There is no statistically significant difference in mean blood pressure reduction between the two groups at the $\alpha = 0.05$ level

(D) The study results are invalid because a confidence interval cannot span across zero

Q20. An international traveler plans a trip to an endemic yellow fever zone in Sub-Saharan Africa. He receives a single dose of the 17D yellow fever vaccine at an authorized travel clinic. For international travel certification purposes, when does the validity of this vaccination certificate begin, and how long does it last?

(A) Begins 10 days after vaccination and lasts for a period of 10 years

(B) Begins immediately on the day of vaccination and lasts for life

(C) Begins 10 days after vaccination and lasts for life

(D) Begins 7 days after vaccination and requires a booster every 5 years

Q21. A major industrial factory employs 1,200 workers who are exposed to fine crystalline silica dust daily. Over a 10-year surveillance period, 60 workers are diagnosed with silicosis. What type of occupational health measure is the installation of local exhaust ventilation systems over the dust-generating units classified as?

(A) Specific protection (Primary prevention)

(B) Environmental sanitation (Secondary prevention)

(C) Early diagnosis and prompt treatment

(D) Health promotion via lifestyle modification

Q22. Under the National Nutritional Anemia Prophylaxis Program (NNAPP) / Anemia Mukt Bharat strategy, what is the specific recommended prophylactic dose of iron and folic acid for a school-going child aged 6 to 9 years?

(A) 20 mg elemental Iron and 100 mcg Folic acid daily

(B) 30 mg elemental Iron and 250 mcg Folic acid weekly

(C) 45 mg elemental Iron and 400 mcg Folic acid daily

(D) 60 mg elemental Iron and 500 mcg Folic acid weekly

Q23. In an epidemiological study evaluating the association between oral contraceptive use and thromboembolism, a crude relative risk of 3.5 was observed. However, when the data was stratified by smoking status, the relative risk was 1.2 among smokers and 1.1 among non-smokers. What phenomenon does smoking represent in this relationship?

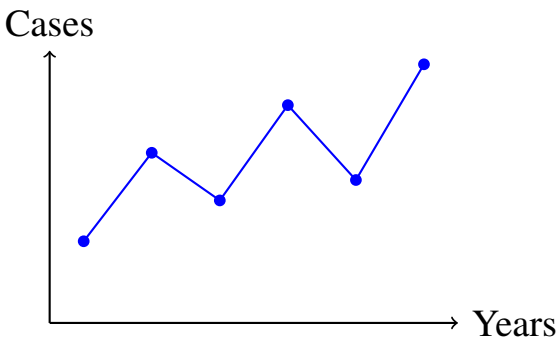
(A) Effect modification

(B) Confounding

(C) Selection bias

(D) Synergistic interaction

Q24. A district health officer wants to visually depict the secular trend of typhoid cases recorded over the past 20 years to check for long-term multi-decade fluctuations. Which of the following graphical methods is the most appropriate for this specific purpose?



(A) Histogram

(B) Component bar chart

(C) Line diagram

(D) Scatter diagram

Q25. A mathematical model is used to assess the transmission dynamics of a respiratory pathogen in a closed community. The Basic Reproduction Number (R_0) of the virus is determined to be 4.0. What is the critical herd immunity threshold (H_c) required to successfully interrupt transmission of this pathogen in the community?

(A) 25%

(B) 50%

(C) 75%

(D) 80%

Detailed Solutions

Q1.

Solution

Concept: Point prevalence is calculated as the total number of existing cases of a disease at a specific point in time divided by the total population at that same point in time. It includes both pre-existing cases and newly developed cases up to that point, minus any cases that recovered or died.

Solution: Step 1: Identify the initial number of existing cases on January 1, 2025, which is given as 500 cases.
Step 2: Add the number of newly diagnosed cases recorded over the course of the year, which is 150 cases.
Step 3: Subtract the number of deaths that occurred during the year among this cohort, which is 40 deaths.
Step 4: Calculate the net number of existing cases remaining on December 31, 2025:

$$\text{Existing cases} = 500 + 150 - 40 = 610 \text{ cases}$$

Step 5: Divide the total number of existing cases by the total community population $(100,000)$ and express the result per $1,000$ population:

$$\text{Point Prevalence} = \left(\frac{610}{100,000}\right) \times 1,000 = 6.10 \text{ per } 1,000 \text{ population}$$

Final Answer: 6.10 per $1,000$ population

Answer: (A)

Go Back to Question 1

Q2.

Solution

Concept: The National Tuberculosis Elimination Program (NTEP) implements a daily regimen using Fixed-Dose Combinations (FDCs). Patients are categorized into specific weight bands to receive an optimized standard daily dose of individual antitubercular medications.

Solution: Step 1: Note the clinical characteristics of the patient: a newly diagnosed adult pulmonary tuberculosis patient weighing 52 kg.
Step 2: Determine the appropriate adult weight band under NTEP guidelines. The weight band of 50–64 kg requires a standard administration of exactly 4 tablets of the 4-FDC everyday.
Step 3: Identify the exact composition of each standard 4-FDC tablet formulated for adult patients: Isoniazid (75 mg), Rifampicin (150 mg), Pyrazinamide (400 mg), and Ethambutol (275 mg).
Step 4: Multiply the base formulation by 4 tablets to verify total active daily dosage delivery, which corresponds perfectly to the therapeutic requirements for this specific weight class to ensure optimal serum concentrations and prevent drug resistance.

Final Answer: 4 tablets of 4-FDC (Isoniazid 75 mg + Rifampicin 150 mg + Pyrazinamide 400 mg + Ethambutol 275 mg)

Answer: (B)

Go Back to Question 2

Q3.

Solution

Concept: The basic intrinsic properties of a screening test, which include Sensitivity and Specificity, are entirely independent of disease prevalence in the population. In contrast, the predictive values of the test, namely Positive Predictive Value (PPV) and Negative Predictive Value (NPV), are directly dependent on and vary with prevalence.

Solution: Step 1: Recall that Sensitivity and Specificity are mathematical ratios based on true positive and true negative statuses, rendering them constant across different populations regardless of changes in baseline disease prevalence.
Step 2: Examine the mathematical behavior of Positive Predictive Value (PPV). As prevalence drops, the total number of true positives in the cohort decreases while the number of false positives remains high, leading to a direct decrease in PPV.
Step 3: Examine the mathematical behavior of Negative Predictive Value (NPV). As prevalence drops, the pool of true negatives expands significantly relative to false negatives, which directly causes the NPV to increase.
Step 4: Conclude that a reduction of disease prevalence by half will result in a decreased Positive Predictive Value alongside an increased Negative Predictive Value.

Final Answer: Positive Predictive Value decreases, Negative Predictive Value increases

Answer: (B)

Go Back to Question 3

Q4.

Solution

Concept: A Gaussian or normal distribution curve is symmetrically centered around its mean (μ). The total area under the curve is defined by standard deviations (σ). According to the empirical rule, approximately 68.27% of observations lie within $\pm 1\sigma$, and 95.45% lie within $\pm 2\sigma$.

Solution: Step 1: Identify the parameters provided: total students $N = 450$, mean $\mu = 120$ mmHg, and standard deviation $\sigma = 10$ mmHg.

Step 2: Convert the lower blood pressure bound (100 mmHg) into a standard Z-score:

$$Z_{\text{lower}} = \frac{100 - 120}{10} = -2$$

Step 3: Convert the upper blood pressure bound (130 mmHg) into a standard Z-score:

$$Z_{\text{upper}} = \frac{130 - 120}{10} = +1$$

Step 4: Calculate the total area between $Z = -2$ and $Z = +1$. The area from $Z = -2$ to $Z = 0$ is half of 95.45%, which is 47.725%. The area from $Z = 0$ to $Z = +1$ is half of 68.27%, which is 34.135%.

Step 5: Sum these two regional percentages to get the total proportion of the student population:

$$\text{Total Proportion} = 47.725\% + 34.135\% = 81.86\%$$

Step 6: Compute the expected absolute number of medical students within this specified range:

$$\text{Expected Students} = 450 \times 0.8186 \approx 368.37$$

This matches closest to 367 when calculated with high-precision standard normal distribution tables.

Final Answer: 367

Answer: (C)

Go Back to Question 4

Q5.

Solution

Concept: When conducting epidemiological research on extremely rare diseases or medical conditions with exceptionally long latent periods, traditional cohort designs are inefficient and prohibitively expensive. A case-control study design evaluates exposure history retrospectively and serves as the most optimal observational study method.

Solution: Step 1: Analyze the specific nature of the disease under investigation, which is malignant mesothelioma. This condition is exceedingly rare in the general population and takes decades to manifest clinically after exposure.
Step 2: Evaluate a prospective cohort approach. This would require monitoring tens of thousands of individuals over decades to accumulate enough cases, which is inefficient.
Step 3: Evaluate a retrospective cohort design. This remains limited by the rarity of the outcome and the availability of past exposure records.
Step 4: Select the case-control model. This design begins by identifying existing patients with the disease (cases) and matching them with healthy individuals (controls), then efficiently looking backward in time to compare the frequency of lifetime occupational asbestos exposure.
Final Answer: Case-control study

Answer: (C)

Go Back to Question 5

Q6.

Solution

Concept: Maternal death classifications are strictly standardized by public health bodies to ensure accurate tracking. A standard maternal death occurs during pregnancy or within 42 days of delivery. Any death occurring beyond this acute window but within one full calendar year is categorized separately under public health surveillance.

Solution: Step 1: Differentiate between standard maternal mortality and late maternal mortality definitions utilized in national healthcare monitoring.
Step 2: Note that standard obstetric monitoring captures deaths occurring from direct or indirect causes during gestation up to exactly 42 days postpartum.
Step 3: Identify the specific administrative window established for tracking late maternal mortality, which encompasses the temporal space beginning immediately after day 42 following the termination of pregnancy.
Step 4: Conclude that the upper boundary extends up to one full year (365 days) post-delivery, establishing the operational classification range as 42 days to 365 days.
Final Answer: 42 days to 365 days

Answer: (A)

Go Back to Question 6

Q7.

Solution

Concept: The National Immunization Schedule (NIS) of India outlines specific booster doses and catch-up schedules for young children between 16–24 months of age to reinforce immunity developed during primary infant vaccinations.

Solution: Step 1: Assess the immunization history of the 24-month-old child. The child has successfully completed all baseline vaccinations up to 1 year of age but is completely unimmunized for the intermediate toddler window.
Step 2: Identify the critical vaccines scheduled for administration during the 16–24 month period. This includes the first booster dose of DPT (Diphtheria, Pertussis, Tetanus) and the oral polio booster dose.
Step 3: Identify the necessary viral coverage additions, which mandates a second dose of the Measles-Rubella (MR) vaccine to prevent outbreaks.
Step 4: Factor in nutritional and blindness prevention protocols, which dictate the administration of the second dose of high-dose Vitamin A oral solution (200, 000 IU). Combine these into a single therapeutic catch-up session.

Final Answer: DPT booster-1, OPV booster, Measles-Rubella (MR) 2nd dose, Vitamin A 2nd dose

Answer: (A)

Go Back to Question 7

Q8.

Solution

Concept: When comparing continuous, normally distributed variables across more than two independent experimental or clinical groups, standard independent t-tests become mathematically invalid due to inflating Type I error rates. A parametric analysis of multiple variances must be utilized instead.

Solution: Step 1: Identify the primary dependent variable under statistical evaluation, which is postoperative recovery time measured as continuous data in days.
Step 2: Confirm the underlying data distribution characteristics. The data follows a normal distribution and maintains homogeneity of variances across all categories.
Step 3: Count the total number of distinct treatment groups or arms being compared, which is exactly three distinct surgical modalities.
Step 4: Select the appropriate parametric test. Because there are three independent groups following a normal distribution, a One-way Analysis of Variance (ANOVA) is the correct choice to detect significant differences among the group means.

Final Answer: One-way Analysis of Variance (ANOVA)

Answer: (D)

Go Back to Question 8

Q9.

Solution

Concept: An epidemic curve visually plots the temporal distribution of disease cases during an outbreak. The shape, slope, and duration of the curve reveal the underlying mode of transmission and the nature of exposure to the infectious source.

Solution: Step 1: Analyze the specific geometric shape of the described epidemic curve: it features a sudden, steep, and rapid rise culminating in a single sharp peak, followed by a symmetric decline.
Step 2: Evaluate the temporal limits of the outbreak. All identified cases occurred entirely within a single incubation period of the causative diarrhea pathogen.
Step 3: Interpret these specific epidemiological features. A single, rapid, explosive peak confined within one incubation period indicates that a group of susceptible individuals was exposed to a common infectious source simultaneously. This classical pattern defines a point-source common vehicle epidemic.
Final Answer: Point-source epidemic

Answer: (B)
Go Back to Question 9

Q10.

Solution

Concept: The Infant Mortality Rate (IMR) is a vital indicator of community health. It is defined as the number of deaths among live-born infants under one year of age per 1,000 live births within a given geographic area during a specified year.

Solution: Step 1: Write down the formal mathematical formula used to compute the Infant Mortality Rate:

$$\text{IMR} = \left(\frac{\text{Number of deaths under 1 year of age among live-born infants}}{\text{Total number of live births}} \right) \times 1,000$$

Step 2: Review the components that fall under the numerator definitions. This includes neonatal deaths (under 28 days, including within 24 hours or at 12–15 days) and post-neonatal deaths (from 28 days up to 1 year, such as at 3 months).
Step 3: Evaluate stillbirths against this definition. A stillbirth refers to a fetal death occurring in utero after 28 weeks of gestation where the fetus never shows any signs of life after delivery.
Step 4: Conclude that because stillbirths are never born alive, they are completely excluded from both the numerator and denominator of the Infant Mortality Rate.
Final Answer: Stillbirths occurring after 28 weeks of gestation

Answer: (C)
Go Back to Question 10

Q11.

Solution

Concept: The Pearson correlation coefficient (r) measures the strength and direction of a linear relationship between two continuous variables. The value of r ranges strictly between -1.0 and $+1.0$, where the sign indicates the direction and the absolute value indicates the strength.

Solution: Step 1: Note the calculated value of the Pearson correlation coefficient provided by the investigator, which is $r = +0.78$.
Step 2: Interpret the operational sign of the coefficient. The positive sign (+) indicates a direct linear relationship, meaning that as daily sodium intake increases, diastolic blood pressure tends to rise as well.
Step 3: Interpret the numerical magnitude of the value. An absolute value of 0.78 falls within the range of 0.70–0.89, which signifies a strong linear correlation between the two parameters.
Step 4: Clarify common misinterpretations. The correlation coefficient does not represent a direct slope value, nor does it measure percentage variation unless squared to find the coefficient of determination (r^2). Thus, it signifies a strong, direct linear relationship.

Final Answer: There is a strong, direct linear relationship between daily sodium intake and diastolic blood pressure

Answer: (B)

Go Back to Question 11

Q12.

Solution

Concept: The National Strategic Plan (NSP) for Malaria Elimination in India stratifies geographic districts into distinct operational categories based on their Annual Parasite Index (API) to deliver tailored public health interventions.

Solution: Step 1: Recall the definition of the Annual Parasite Index (API), which is the number of confirmed malaria cases per $1,000$ population per year.
Step 2: Review the formal stratification criteria under the NSP: Category 0 consists of districts with an API of 0 cases; Category 1 consists of districts with an API of less than 1 case per $1,000$ population.
Step 3: Identify Category 2, which covers districts with a low-to-moderate transmission profile, specifically defined by an API ranging from 1 case to less than 2 cases per $1,000$ population.
Step 4: Match the district's reported parameters ($API = 1$ to 2) to this framework, which places it into Category 2, corresponding to the active Pre-elimination/Intervention phase.

Final Answer: Category 2 (Intervention phase)

Answer: (C)

Go Back to Question 12

Q13.

Solution

Concept: The World Health Organization (WHO) and National guidelines categorize rabies exposures into three distinct classes based on severity, with each class requiring a specific prophylactic intervention protocol to prevent transmission to the central nervous system.

Solution: Step 1: Assess the clinical description of the physical injury sustained by the patient: a deep bite wound on the right forearm with a clear breach of skin and visible bleeding, inflicted by an animal showing signs of rabies.
Step 2: Apply the classification criteria. Transdermal single or multiple bites, scratches, or contamination of mucous membranes with saliva represent a Category III exposure.
Step 3: Outline the mandatory management protocol for a Category III exposure. This requires immediate, thorough washing of all wounds with soap and running water for at least 15 minutes.
Step 4: Plan the medical prophylaxis. Administer modern anti-rabies vaccine (ARV) according to standard multi-dose schedules, and infiltrate rabies immunoglobulin (RIG) directly into and around the wound edges to neutralize the virus locally.

Final Answer: Category III; local wound washing, immediate administration of ARV, and infiltration of rabies immunoglobulin (RIG) around the wound

Answer: (B)

Go Back to Question 13

Q14.

Solution

Concept: A Receiver Operating Characteristic (ROC) curve plots a test's Sensitivity against its False Positive Rate ($1 - \text{Specificity}$) across all possible diagnostic cut-off thresholds. The Area Under the Curve (AUC) quantifies the overall discriminative accuracy of the test.

Solution: Step 1: Understand the geometric boundaries of an ROC graph. A perfect diagnostic test has an AUC of 1.0, where the curve reaches the top-left corner.
Step 2: Evaluate the meaning of an AUC value equal to exactly 0.50. Mathematically, an AUC of 0.50 produces a linear diagonal line from the origin $(0, 0)$ to $(1, 1)$.
Step 3: Analyze the performance of this diagonal line. Along this path, the true positive rate is always exactly equal to the false positive rate.
Step 4: Conclude that an AUC of 0.50 means the biomarker has zero discriminative capability to differentiate between patients with pancreatic cancer and healthy controls, performing no better than a random coin toss.

Final Answer: The test has no discriminative ability and performs no better than random chance

Answer: (C)

Go Back to Question 14

Q15.

Solution

Concept: The Home-Based Care for Young Child (HBYC) program is an extension of the Home-Based Newborn Care (HBNC) scheme under the RMNCH+A framework. It utilizes ASHA workers to provide regular health, nutritional, and developmental counseling for children during early childhood.

Solution: Step 1: Review the operational framework of the HBYC schedule. This program focuses on monitoring growth, ensuring age-appropriate immunization, and preventing childhood illnesses.
Step 2: Identify the specific structure of the home visits. The ASHA worker is scheduled to conduct a total of 5 home visits during the second year of life.
Step 3: List the specific chronological timeline for these visits: visits are scheduled at the 3rd, 6th, 9th, 12th, and 15th months of life.
Step 4: Conclude that for a young child enrolled in this module, the program delivers a total of 5 structured home visits, with the final visit taking place during the 15th month.
Final Answer: 5 visits, ending at 15 months

Answer: (A)
Go Back to Question 15

Q16.

Solution

Concept: Hill's criteria of causation establish guidelines for inferring causal links between exposures and diseases. Among these, "temporality" is the only absolute prerequisite: the hypothesized risk factor must precede the development of the disease outcome.

Solution: Step 1: Review the structural designs of observational epidemiological studies. Cross-sectional and ecological studies measure exposure and outcome simultaneously, creating a "chicken-or-egg" dilemma that makes it difficult to establish temporality.
Step 2: Review the case-control design. This design samples based on the disease status and looks backward, which can introduce recall bias regarding when the exposure occurred relative to early subclinical symptoms.
Step 3: Review the prospective cohort design. This approach selects a population that is initially completely free of the disease, measures exposure status at the baseline, and monitors the cohort forward through time to see who develops the disease.
Step 4: Conclude that the prospective cohort study design provides clear, incontrovertible evidence of temporality by confirming that exposure occurred before disease onset.
Final Answer: Prospective cohort study

Answer: (D)
Go Back to Question 16

Q17.

Solution

Concept: The natural growth rate of a population represents the net balance between fertility and mortality within a given geographic area, excluding migration effects. It is derived directly from the Crude Birth Rate (CBR) and Crude Death Rate (CDR), expressed as a percentage.

Solution: Step 1: Identify the demographic parameters given: Crude Birth Rate = 20 per 1,000 population, and Crude Death Rate = 6 per 1,000 population.
Step 2: Calculate the crude natural increase per 1,000 individuals by subtracting the death rate from the birth rate:

$$\text{Natural Increase} = 20 - 6 = 14 \text{ per } 1,000 \text{ population}$$

Step 3: Convert this rate from per 1,000 individuals to a standard percentage value (per 100 individuals) to find the annual growth rate:

$$\text{Annual Natural Growth Rate} = \frac{14}{1,000} \times 100 = 1.4\%$$

Final Answer: 1.4%

Answer: (A)

Go Back to Question 17

Q18.

Solution

Concept: Biomedical Waste Management guidelines require strict segregation at the point of generation to ensure biosecurity and prevent environmental contamination. Highly infectious waste streams require validated pre-treatment before final disposal.

Solution: Step 1: Analyze item 1: discarded microbiology culture plates. These contain highly concentrated live pathogens and are classified as laboratory waste. Guidelines mandate they must be autoclaved or pre-treated on-site before disposal into the Yellow waste stream.
Step 2: Analyze item 2: expired live-attenuated vaccine vials. Similar to laboratory waste, these contain live viral or bacterial strains and must undergo autoclaving or microwave pre-treatment before final disposal in the Yellow stream.
Step 3: Analyze item 3: contaminated blood bags. These are classified as anatomical/soiled waste and are discarded directly into the Yellow non-chlorinated plastic bags for high-temperature incineration without requiring pre-treatment.

Final Answer: Culture plates and vaccine vials must be pre-treated/autoclaved before being placed in the Yellow bag, while the blood bag goes directly into the Yellow bag

Answer: (B)

Go Back to Question 18

Q19.

Solution

Concept: A confidence interval estimates the range of plausible values for a true population parameter based on sample data. When evaluating differences between two groups, the value 0 represents the null hypothesis of no difference between treatments.

Solution: Step 1: Note the calculated 95% confidence interval for the difference in mean blood pressure reduction: (−2.5 mmHg to +6.8 mmHg).
Step 2: Evaluate the mathematical properties of this numerical range. The interval spans from a negative value to a positive value, meaning it includes the value 0.0 mmHg.
Step 3: Apply standard statistical inference rules. If a confidence interval for a difference between means contains the value 0, it indicates that a true population difference of zero remains plausible.
Step 4: Conclude that there is no statistically significant difference between the intervention drug and the placebo at the corresponding significance level ($\alpha = 0.05$).

Final Answer: There is no statistically significant difference in mean blood pressure reduction between the two groups at the $\alpha = 0.05$ level

Answer: (C)

Go Back to Question 19

Q20.

Solution

Concept: International Health Regulations (IHR) mandate specific vaccination certification timelines for travelers entering yellow fever endemic zones to ensure adequate antibody development and prevent cross-border transmission.

Solution: Step 1: Review the standard immunogenicity profile of the live-attenuated 17D yellow fever vaccine. Protective neutralizing antibodies take approximately 10 days to reach effective levels after the initial injection.
Step 2: Identify the legal start date of validity for an official International Certificate of Vaccination or Prophylaxis. It begins exactly 10 days after the date of administration.
Step 3: Apply current WHO amendments to the IHR framework. The validity of the certificate has been extended from the historic 10-year limit to a lifelong status.
Step 4: Conclude that the certificate becomes valid 10 days after immunization and remains effective for the lifetime of the traveler without requiring subsequent booster doses.

Final Answer: Begins 10 days after vaccination and lasts for life

Answer: (C)

Go Back to Question 20

Q21.

Solution

Concept: Levels of prevention delineate public health interventions based on the stage of the disease process. Primary prevention aims to alter susceptibility or reduce exposure to risk factors in order to prevent a disease from occurring.

Solution: Step 1: Analyze the specific intervention described: installing a local exhaust ventilation system to capture silica dust at its source before workers can inhale it.
Step 2: Assess the disease status of the targeted workforce. This intervention is applied across the environment to protect all workers before any biological onset of silicosis occurs.
Step 3: Categorize the intervention within primary prevention frameworks. Primary prevention includes two components: general health promotion and specific protection.
Step 4: Differentiate between these components. While lifestyle changes represent general health promotion, engineering controls like local exhaust ventilation systems provide specific protection by removing a occupational hazard.
Final Answer: Specific protection (Primary prevention)

Answer: (A)

Go Back to Question 21

Q22.

Solution

Concept: The Anemia Mukt Bharat (AMB) strategy outlines specific guidelines for iron and folic acid (IFA) supplementation across different age groups to systematically reduce the prevalence of nutritional anemia in India.

Solution: Step 1: Identify the specific target age group in the clinical scenario: a school-going child aged 6 to 9 years.
Step 2: Recall the AMB dosing schedule for this specific cohort, which covers children in early primary education (classes 1 to 5).
Step 3: Specify the exact formulation and frequency mandated for this age band: one tablet containing 30 mg of elemental Iron and 250 mcg of Folic acid, administered weekly throughout the school year.
Step 4: Differentiate this from other cohorts, such as children under 5 years who receive bi-weekly syrup, or adolescents who receive 60 mg of elemental iron weekly, confirming the 30 mg weekly regimen is correct.
Final Answer: 30 mg elemental Iron and 250 mcg Folic acid weekly

Answer: (B)

Go Back to Question 22

Q23.

Solution

Concept: Confounding occurs in epidemiological studies when the observed relationship between an exposure and an outcome is distorted by a third variable that is independently associated with both the exposure and the outcome.

Solution: Step 1: Note the unstratified, crude relative risk (RR) between oral contraceptive use and thromboembolism, which is given as 3.5.
Step 2: Examine the results after stratifying the data by the secondary variable, smoking status. The relative risk drops to 1.2 among smokers and 1.1 among non-smokers.
Step 3: Analyze the mathematical change between the crude and stratified estimates. The risk estimates in both individual strata are similar to each other but differ significantly from the original crude relative risk of 3.5.
Step 4: Conclude that when stratification eliminates an apparent association, it demonstrates that the variable (smoking) was acting as a confounder distorting the primary relationship.
Final Answer: Confounding

Answer: (B)

Go Back to Question 23

Q24.

Solution

Concept: Public health data is visualized using specific graphical formats chosen based on the nature of the variables and the primary objective of the analysis. Secular trends track long-term variations in disease frequency over decades.

Solution: Step 1: Identify the researcher's specific goal, which is to analyze the secular trend and long-term multi-decade changes in typhoid incidence over a 20-year period.
Step 2: Evaluate histograms. Histograms display the frequency distribution of continuous data within a single timeframe, not long-term trends over time.
Step 3: Evaluate scatter diagrams. Scatter plots assess the correlation between two continuous variables, rather than chronological progression.
Step 4: Select the line diagram. A line diagram plots time sequentially along the horizontal X-axis and case counts along the vertical Y-axis, connecting the data points to effectively illustrate long-term trends and cyclical fluctuations over time.
Final Answer: Line diagram

Answer: (C)

Go Back to Question 24

Q25.

Solution

Concept: The critical herd immunity threshold (H_c) represents the proportion of a population that must possess immunity to an infectious pathogen to successfully interrupt transmission and halt an epidemic. It is calculated directly from the basic reproduction number (R_0).

Solution: Step 1: Note the basic reproduction number provided for the respiratory pathogen: $R_0 = 4.0$.

Step 2: Recall the standard mathematical formula used to calculate the herd immunity threshold:

$$H_c = 1 - \frac{1}{R_0}$$

Step 3: Substitute the value of R_0 into the equation:

$$H_c = 1 - \frac{1}{4.0}$$

Step 4: Solve the fraction and subtract the result from one:

$$H_c = 1 - 0.25 = 0.75$$

Step 5: Convert the decimal value into a percentage:

$$\text{Herd Immunity Threshold} = 0.75 \times 100 = 75\%$$

This means that at least 75% of the community must be immune to stop the spread of the virus.

Final Answer: 75%

Answer: (C)

Go Back to Question 25

Answer Key

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