NEET-PG Social & Preventive Medicine Sample Paper-2

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, a sudden outbreak of a viral disease occurs. Over a period of one month, 500 new cases are detected. At the beginning of the month, 100 people were already living with the disease. A total of 20 deaths occurred due to this disease during the same month. What is the incidence rate of this disease per 1,000 population for that month?

(A) 5.00 per 1,000 population

(B) 5.01 per 1,000 population

(C) 6.00 per 1,000 population

(D) 4.80 per 1,000 population

Q2. A public health researcher is analyzing the correlation between daily sodium intake (in grams) and systolic blood pressure (in mmHg) among 150 participants. If both variables are normally distributed and the researcher wants to assess the strength and direction of the linear relationship, which statistical test is most appropriate?

(A) Spearman's rank correlation coefficient

(B) Pearson's correlation coefficient

(C) Chi-square test for independence

(D) Paired t-test

Q3. Under the National Tuberculosis Elimination Program (NTEP) guidelines, a 45-year-old newly diagnosed pulmonary tuberculosis patient weighing 52 kg is to be started on the intensive phase of treatment. What is the correct daily continuation phase regimen and duration for this patient under standard adult weight bands?

(A) 2 months of 3 fixed-dose combinations (FDCs) containing HRZ

(B) 4 months of 3 fixed-dose combinations (FDCs) containing HRE

(C) 4 months of 4 fixed-dose combinations (FDCs) containing HRZE

(D) 3 months of 3 fixed-dose combinations (FDCs) containing HRE

Q4. A new screening test for a specific carcinoma is evaluated in a cohort of 2,000 individuals where the true disease prevalence is 10%. The test accurately identifies 160 genuine cases but yields a false positive result in 180 disease-free individuals. What is the sensitivity of this screening test?

(A) 88.8%

(B) 80.0%

(C) 47.0%

(D) 90.0%

Q5. In a coastal district, an epidemiological investigation reveals a cluster of cases presenting with severe vomiting and watery diarrhea resembling "rice-water" stools. Which of the following environmental health interventions holds the highest priority to control the immediate propagation of this water-borne outbreak?

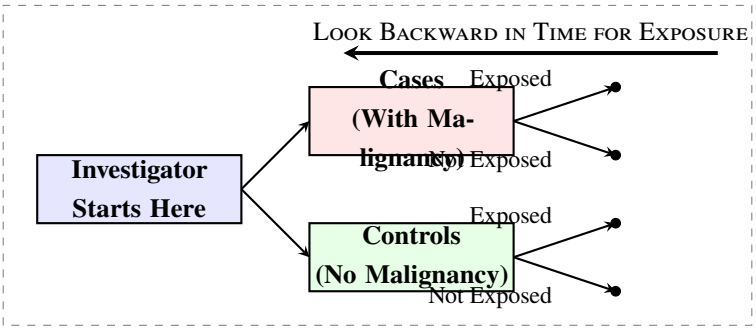
(A) Mass administration of doxycycline to the entire district

(B) Chlorination of public water sources to achieve a residual chlorine level of 0.5 mg/L after 30 minutes of contact time

(C) Routine immunization of all food handlers with oral cholera vaccines

(D) Immediate closure of all local open-air fish markets

Q6. An investigator wants to study the potential association between a rare localized bone malignancy and occupational exposure to a specific industrial solvent. Which epidemiological study design is most efficient and logistically feasible to test this hypothesis?



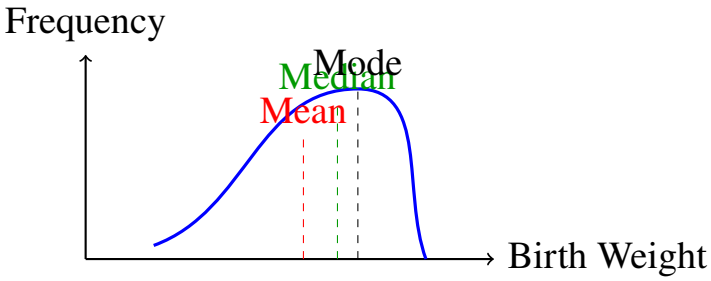
(A) Prospective cohort study

(B) Randomized controlled trial

(C) Case-control study

(D) Cross-sectional survey

Q7. During a routine statistical analysis of birth weights in a tertiary care hospital, the statistician observes that the data distribution is heavily skewed to the left due to a high number of premature births. Which measure of central tendency provides the most robust and accurate representation of the central location of this data?



(A) Arithmetic Mean

(B) Geometric Mean

(C) Median

(D) Mode

Q8. A mother brings her 14-month-old child to the primary health center. On checking the immunization card, the medical officer notes that the child received BCG, HepB birth dose, and OPV birth dose at birth, but missed all subsequent scheduled vaccines. According to the National Immunization Schedule (NIS) in India, which of the following vaccine combinations can be safely administered to this child during this visit?

(A) Pentavalent, OPV, Rotavirus vaccine, and fractional IPV

(B) DPT-1, OPV-1, Measles-Rubella (MR)-1, and Vitamin A

(C) Pentavalent-1, OPV-1, Measles-Rubella (MR)-1, and Vitamin A

(D) BCG repeat dose, DPT booster, and Oral Polio Vaccine

Q9. Under the National Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A) strategy, a community health worker (ASHA) is counseling a postpartum mother. Which of the following specific timelines matches the recommended routine home visits for a newborn delivered at a health facility (institutional delivery)?

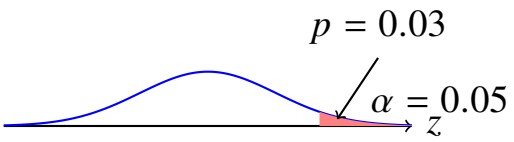
(A) Days 1, 3, 7, 14, 21, 28, and 42

(B) Days 3, 7, 14, 21, 28, and 42

(C) Days 2, 4, 8, 15, 22, and 30

(D) Days 1, 7, 14, and 28

Q10. A clinical trial evaluates the efficacy of a new antihypertensive drug compared to a standard beta-blocker. The p-value obtained from the primary outcome analysis is 0.03. Assuming the α level was set at 0.05, which of the following is the correct statistical interpretation of this result?



(A) There is a 3% probability that the new drug is ineffective.

(B) The probability of obtaining the observed results (or more extreme) by chance alone, assuming the null hypothesis is true, is 3%.

(C) The power of the study to detect a true difference is 97%.

(D) The null hypothesis is accepted, confirming no statistically significant difference.

Q11. In an urban slum, a sudden spike in jaundice cases among young adults is reported. Epidemiological investigation demonstrates a common-source outbreak linked to a ruptured sewage line contaminating a drinking water pipeline. Which viral hepatitis agent is most likely responsible for this outbreak?

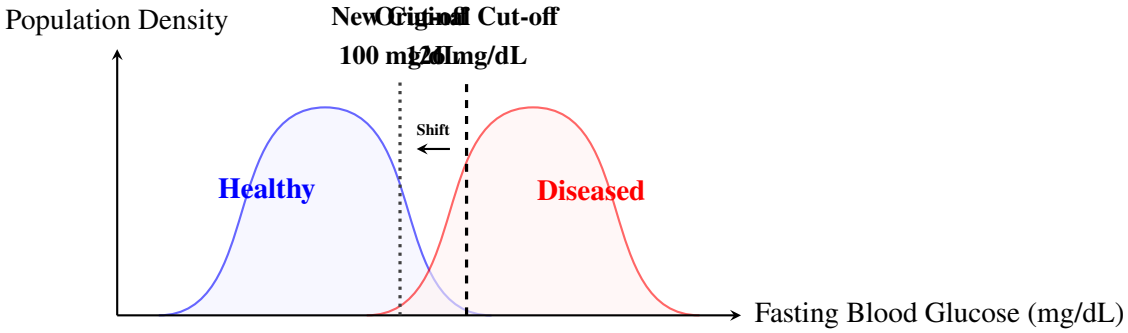
(A) Hepatitis B virus

(B) Hepatitis C virus

(C) Hepatitis D virus

(D) Hepatitis E virus

Q12. A screening program for diabetes mellitus is introduced in a corporate workforce using fasting blood glucose levels. If the cut-off point for a positive screening test is lowered from 126 mg/dL to 100 mg/dL, how will this modification affect the sensitivity and specificity of the screening program?



(A) Sensitivity will increase; Specificity will decrease

(B) Sensitivity will decrease; Specificity will increase

(C) Both sensitivity and specificity will increase

(D) Both sensitivity and specificity will decrease

Q13. In the Indian public health administrative hierarchy, a Community Health Centre (CHC) serves as the first referral unit (FRU) for a specified population. According

to Indian Public Health Standards (IPHS), a standard CHC in non-tribal plain areas is designed to cater to how many individuals?

(A) 3,000 to 5,000 population

(B) 20,000 to 30,000 population

(C) 80,000 to 120,000 population

(D) 500,000 population

Q14. An epidemiological study tracks 5,000 heavy smokers and 5,000 non-smokers over a 10-year period to observe the development of coronary artery disease (CAD). At the end of the study, 300 smokers and 60 non-smokers developed CAD. What is the Relative Risk (RR) of developing CAD among smokers compared to non-smokers?

(A) 5.0

(B) 4.0

(C) 0.2

(D) 6.0

Q15. A 24-year-old pregnant woman in her second trimester attends the antenatal clinic. She has no documented history of prior Tetanus Toxoid or Tetanus-Diphtheria (Td) vaccination. According to the National Immunization Schedule, what is the appropriate schedule for her vaccination to prevent maternal and neonatal tetanus?

(A) A single dose of Td vaccine immediately

(B) Two doses of Td vaccine spaced 4 weeks apart, with the first dose given as early as possible during pregnancy

(C) One dose of Td vaccine followed by a Td booster dose in the next pregnancy within 5 years

(D) Three doses of Td vaccine administered at 0, 1, and 6 months

Q16. Under the National Vector Borne Disease Control Programme (NVBDCP), the "Annual Blood Examination Rate" (ABER) is a crucial operational indicator for

monitoring malaria surveillance efficiency. How is ABER calculated?

(A) $\frac{\text{Total number of blood slides found positive}}{\text{Total population}} \times 100$

(B) $\frac{\text{Total number of blood slides examined}}{\text{Total population}} \times 100$

(C) $\frac{\text{Total number of blood slides examined}}{\text{Total suspected malaria cases}} \times 1,000$

(D) $\frac{\text{Total number of positive slides}}{\text{Total slides examined}} \times 100$

Q17. A study compares the mean reduction in serum cholesterol levels achieved by three distinct dietary interventions (Low-carb diet, Mediterranean diet, and Vegan diet) across three independent groups of participants. Which statistical test should be employed to determine if there is a significant difference among the mean values of these three groups?

(A) Independent samples t-test

(B) Chi-square test of homogeneity

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

(D) Multiple linear regression

Q18. The Sustainable Development Goal (SDG) 3 aims to ensure healthy lives and promote well-being for all at all ages. What is the specific global target for the Maternal Mortality Ratio (MMR) to be achieved under SDG 3 by the year 2030?

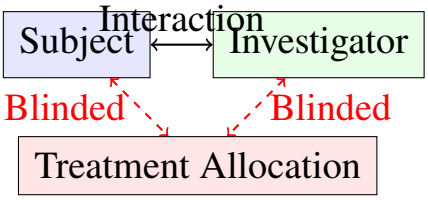
(A) Reduce MMR to less than 100 per 100,000 live births

(B) Reduce MMR to less than 70 per 100,000 live births

(C) Reduce MMR to less than 50 per 100,000 live births

(D) Eliminate maternal mortality entirely

Q19. In a double-blind, randomized controlled trial evaluating a new antiviral agent, both the study participants and the examining physicians are kept unaware of the group allocations. What is the primary methodological reason for implementing "double-blinding" in clinical trials?



(A) To eliminate selection bias during recruitment

(B) To minimize allocation concealment failure

(C) To eliminate measurement, assessment, and ascertainment bias

(D) To reduce attrition bias caused by participant dropouts

Q20. In the evaluation of a diagnostic test, the Positive Predictive Value (PPV) is heavily influenced by the baseline characteristics of the population being tested. If the test is applied to a population where the prevalence of the disease is significantly lower than the original validation cohort, how will the PPV and Negative Predictive Value (NPV) change?

(A) PPV will increase; NPV will decrease

(B) PPV will decrease; NPV will increase

(C) Both PPV and NPV will decrease

(D) Both PPV and NPV will remain entirely unchanged

Q21. According to the National Health Policy (NHP) 2017 targets, India aimed to increase public health expenditure to a specific percentage of the Gross Domestic Product (GDP). What is this targeted percentage allocation?

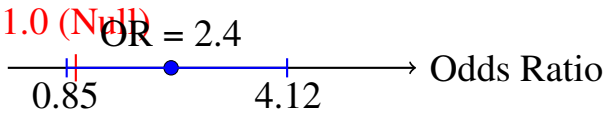
(A) 1.5% of GDP

(B) 2.5% of GDP

(C) 4.0% of GDP

(D) 5.0% of GDP

Q22. A retrospective cohort study evaluates the relationship between high dietary red meat consumption and colorectal adenomas. The investigators report an Odds Ratio (OR) of 2.4 with a 95% Confidence Interval (CI) ranging from 0.85 to 4.12. How should this finding be interpreted contextually?



(A) There is a statistically significant strong positive association.

(B) The association is positive but statistically non-significant because the confidence interval includes the value of 1.

(C) The sample size is adequate, and red meat is conclusively a protective factor.

(D) There is a 95% probability that the true odds ratio lies outside the range of 0.85 to 4.12.

Q23. A 5-year-old child presents to the pediatric outpatient department with a history of progressive night blindness and dry conjunctiva. On examination, the medical officer notices elevated, foamy, triangular plaques on the bulbar conjunctiva. According to the WHO classification of Xerophthalmia, how is this specific ocular manifestation classified?

(A) X1A

(B) X1B

(C) X2

(D) X3A

Q24. Under the National Leprosy Eradication Programme (NLEP), Multi-Drug Therapy (MDT) is supplied in specific blister packs. For an adult patient classified as having Multibacillary (MB) Leprosy, what is the exact composition and duration of the standard MDT regimen?

(A) Rifampicin, Dapsone, and Clofazimine for a total of 6 months

(B) Rifampicin and Dapsone for a total of 12 months

(C) Rifampicin, Dapsone, and Clofazimine for a total of 12 months

(D) Rifampicin, Ofloxacin, and Minocycline as a single dose monthly for 24 months

Q25. An epidemiologist constructs a spot map showing the precise geographic locations of households with positive cases of Dengue fever in an urban locality during a monsoon month. Which attribute of descriptive epidemiology is primarily illuminated by this visual mapping tool?

(A) Distribution by person

(B) Distribution by place

(C) Distribution by time

(D) Secular trend analysis

Detailed Solutions

Q1.

Solution

Concept: The standard measure of a disease outbreak's rate of development in a population is the Incidence Rate. Incidence captures only the newly diagnosed cases within a designated temporal window among the population at risk at the beginning of that specific period. It is entirely distinct from Prevalence, which includes both pre-existing and new cases.

Solution: Step 1: Identify the absolute total number of new cases diagnosed during the specific one-month window. According to the data provided, there are 500 new cases recorded. Pre-existing cases (100 people) are excluded from the numerator.

Step 2: Determine the total baseline population at risk at the beginning of the month. The baseline community population is given as 100,000.

Step 3: Apply the standard epidemiological mathematical formula for calculating the incidence rate per 1,000 population:

$$\text{Incidence Rate} = \left(\frac{\text{Number of new cases during specified time period}}{\text{Total population at risk at start of period}} \right) \times 1,000$$

Step 4: Substitute the values into the formula to compute the incidence value:

$$\text{Incidence Rate} = \left(\frac{500}{100,000} \right) \times 1,000$$

Step 5: Simplify the fraction to obtain the final rate per thousand:

$$\text{Incidence Rate} = 0.005 \times 1,000 = 5.00$$

Therefore, the incidence rate corresponds exactly to 5.00 per 1,000 population during that month.

Final Answer: 5.00 per 1,000 population

Answer: (A)

Go Back to Question 1

Q2.

Solution

Concept: Parametric statistical tests require specific structural parameters regarding the data distribution. When evaluating a linear association between two continuous statistical variables that follow a standard Gaussian normal distribution, a parametric correlation coefficient is required.

Solution: Step 1: Analyze the scale and data type of both study variables. Both daily sodium intake (measured in grams) and systolic blood pressure (measured in mmHg) are continuous, interval-ratio scale metrics.

Step 2: Assess the underlying distribution assumption stated in the scenario. The problem notes that both variables are normally distributed within the study group of 150 participants.

Step 3: Match the research goal with the statistical test parameters. The objective is to evaluate the strength and directional orientation of a strictly linear relationship between these two normally distributed parameters.

Step 4: Differentiate between Pearson and Spearman coefficients. Spearman's rank correlation is a non-parametric alternative used when data is skewed or ordinal. Pearson's product-moment correlation is the precise parametric instrument for normally distributed continuous variables.

Step 5: Conclude that Pearson's correlation coefficient is the single most appropriate, powerful statistical test to apply here.

Final Answer: Pearson's correlation coefficient

Answer: (B)

Go Back to Question 2

Q3.

Solution

Concept: The National Tuberculosis Elimination Program (NTEP) follows standardized daily regimens utilizing Fixed-Dose Combinations (FDCs) categorized systematically by patient weight bands. Treatment is divided into a 2-month Intensive Phase and a subsequent Continuation Phase.

Solution: Step 1: Evaluate the clinical category of the patient. The patient is an adult, newly diagnosed with pulmonary tuberculosis, indicating a standard first-line anti-TB treatment regimen.

Step 2: Determine the weight band assignment for the patient. The patient weighs 52 kg. Under current NTEP adult weight categories, individuals weighing between 50 and 64 kg fall into the 4-tablets-per-day FDC category.

Step 3: Define the duration and drug composition of the standard standard Intensive Phase (IP). The IP lasts for 2 months and consists of 4 drugs: Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), and Ethambutol (E) in a 4-FDC presentation.

Step 4: Define the duration and drug composition of the standard Continuation Phase (CP). The CP follows the IP immediately and lasts for 4 months. The drugs included are Isoniazid (H), Rifampicin (R), and Ethambutol (E).

Step 5: Note that under the daily treatment guidelines, Pyrazinamide is dropped during the CP, reducing the formulation to a 3-FDC daily dose containing HRE for a period of 4 months.

Final Answer: 4 months of 3 fixed-dose combinations (FDCs) containing HRE

Answer: (B)

Go Back to Question 3

Q4.

Solution

Concept: Sensitivity represents the intrinsic probability that a screening diagnostic test will correctly return a positive result when applied to an individual who genuinely possesses the disease under investigation. It is a calculation based strictly on true positives and total diseased individuals.

Solution: Step 1: Determine the total number of genuinely diseased individuals in the screened cohort using the baseline prevalence rate:

$$\text{Total Diseased} = 2,000 \times 10\% = 200 \text{ individuals}$$

Step 2: Identify the components of the standard 2×2 epidemiological screening matrix. The test correctly identifies 160 genuine cases, which represents the True Positives (TP).

Step 3: Calculate the False Negatives (FN) within the diseased population. Since there are 200 total diseased individuals and 160 are detected, the missed cases are:

$$\text{False Negatives (FN)} = 200 - 160 = 40 \text{ individuals}$$

Step 4: Recall the mathematical formula utilized to calculate screening sensitivity:

$$\text{Sensitivity} = \left(\frac{\text{True Positives (TP)}}{\text{Total Genuinely Diseased (TP + FN)}} \right) \times 100$$

Step 5: Substitute the numerical values into the diagnostic formula and calculate:

$$\text{Sensitivity} = \left(\frac{160}{200} \right) \times 100 = 0.8 \times 100 = 80.0\%$$

The sensitivity of this new screening test is exactly 80.0%.

Final Answer: 80.0%

Answer: (B)

Go Back to Question 4

Q5.

Solution

Concept: During an acute outbreak of a water-borne enteric pathogen like *Vibrio cholerae*, immediate containment relies heavily on environmental sanitation barriers. Interrupting transmission through public drinking water pathways takes clinical priority over individual pharmaceutical measures to protect the wider population.

Solution: Step 1: Recognize the clinical presentation described in the scenario. Profuse watery diarrhea presenting with a characteristic "rice-water" appearance and vomiting signifies a classic, highly contagious Cholera outbreak.

Step 2: Evaluate the primary route of transmission. Cholera propagates rapidly through the fecal-oral route, most frequently via mass contamination of common public drinking water supplies.

Step 3: Prioritize interventions based on immediate community protection. While treating individual patients with rehydration and antibiotics like doxycycline is clinically necessary, it does not halt environmental transmission vectors.

Step 4: Assess water treatment standards. Effective disinfection of water contaminated with enteric bacteria requires systemic chlorination. The standard parameter to ensure complete disinfection is a residual chlorine level of 0.5 mg/L after an exposure contact time of 30 minutes.

Step 5: Conclude that public water chlorination serves as the primary environmental barrier to arrest the epidemic.

Final Answer: Chlorination of public water sources to achieve a residual chlorine level of 0.5 mg/L after 30 minutes of contact time

Answer: (B)

Go Back to Question 5

Q6.

Solution

Concept: Epidemiological study designs vary in efficiency depending on disease characteristics. When investigating a very rare disease outcome (such as a specific localized bone malignancy), prospective monitoring is inefficient due to the immense sample sizes and long tracking periods required to observe a sufficient number of cases.

Solution: Step 1: Identify the primary attributes of the disease under study. The bone malignancy is specifically characterized as being rare.

Step 2: Evaluate the primary exposure under study. The exposure is an occupational contact with an industrial chemical solvent.

Step 3: Analyze the feasibility of a Cohort study design. A prospective cohort would require following tens of thousands of workers for decades to yield a statistically viable number of bone malignancy cases, making it logistically and financially impractical.

Step 4: Analyze the Case-Control study design. This retrospective approach selects existing diagnosed cases of the rare malignancy and matches them with healthy controls. The investigator then looks backward in time to compare exposure frequencies.

Step 5: Conclude that the case-control method is the most efficient, cost-effective, and logistically viable design for rare disease etiologies.

Final Answer: Case-control study

Answer: (C)

Go Back to Question 6

Q7.

Solution

Concept: The shape of a frequency distribution determines the validity of measures of central tendency. In a perfectly symmetric distribution, the mean, median, and mode are identical. However, when data exhibits significant skewness, extreme values pull certain metrics away from the true center.

Solution: Step 1: Analyze the specific nature of the birth weight data distribution. The problem notes that the distribution curve is heavily skewed to the left (negatively skewed) due to an excess of low birth weight premature infants.

Step 2: Understand the behavior of the Arithmetic Mean in skewed datasets. The mean is highly sensitive to extreme outliers. Leftward skewness pulls the mean downward toward the lower tail, making it unrepresentative of the central bulk of the population.

Step 3: Understand the behavior of the Mode. The mode represents only the single point of maximum frequency, which can fluctuate randomly and fails to incorporate the wider distribution structure.

Step 4: Evaluate the Median. The median is the positional middle value, dividing the dataset into two equal halves. It remains resistant to extreme values in the tails of skewed distributions.

Step 5: Conclude that the Median is the most robust, accurate representation of central tendency for heavily skewed continuous datasets.

Final Answer: Median

Answer: (C)

Go Back to Question 7

Q8.

Solution

Concept: The National Immunization Schedule (NIS) provides specific age limits and catch-up guidelines for children who have missed routine vaccinations. When a partially vaccinated child presents later in infancy, the medical officer must administer the appropriate primary series antigens based on safe upper age cut-offs.

Solution: Step 1: Analyze the current chronological age of the child, which is 14 months, and review the prior vaccination history. The child received only birth doses (BCG, HepB, OPV).

Step 2: Evaluate the eligibility for the Pentavalent vaccine. The Pentavalent vaccine (comprising DPT, HepB, and Hib) has a strict upper age limit of 12 months for administration. Because this child is 14 months old, Pentavalent can no longer be administered.

Step 3: Determine the alternative for primary pertussis, diphtheria, and tetanus protection. For children presenting between 1 and 7 years of age who missed the primary series, the standard DPT vaccine replaces the Pentavalent formulation.

Step 4: Check eligibility for other vaccines. Oral Polio Vaccine (OPV) can be safely initiated up to 5 years of age. The first dose of Measles-Rubella (MR-1) along with Vitamin A is routinely scheduled at 9-12 months, making it appropriate for catch-up at 14 months.

Step 5: Assemble the correct clinical catch-up package for this 14-month-old child: DPT-1, OPV-1, MR-1, and Vitamin A fluid solution.

Final Answer: DPT-1, OPV-1, Measles-Rubella (MR)-1, and Vitamin A

Answer: (B)

Go Back to Question 8

Q9.

Solution

Concept: The Home Based New Born Care (HBNC) guidelines under the RMNCH+A strategy specify separate home visit protocols for Accredited Social Health Activists (ASHAs) depending on the anatomical site of delivery, optimizing neonatal survival tracking.

Solution: Step 1: Identify the site of delivery specified in the clinical prompt. The newborn was delivered via an institutional delivery at a health facility.

Step 2: Recall the baseline distinction between home and institutional schedules. For deliveries occurring directly at home, the ASHA conducts 7 routine visits to monitor for danger signs. For institutional births, the count changes to 6 visits because the infant is already monitored in the facility during the first 24-48 hours.

Step 3: Review the schedule for a home delivery, which occurs on Days 1, 3, 7, 14, 21, 28, and 42.

Step 4: Adjust the schedule for an institutional delivery by removing the Day 1 visit, as the mother and infant are still under direct facility care on the first day.

Step 5: Identify the remaining schedule for institutional delivery tracking: Days 3, 7, 14, 21, 28, and 42.

Final Answer: Days 3, 7, 14, 21, 28, and 42

Answer: (B)

Go Back to Question 9

Q10.

Solution

Concept: The p-value represents a conditional probability metric under a strict statistical assumption. It defines the probability of obtaining data as extreme or more extreme than the observed study results, assuming that the null hypothesis (H_0) is completely true.

Solution: Step 1: Identify the preset alpha (α) significance threshold level, which is 0.05. This represents the acceptable limit for committing a Type I error.

Step 2: Compare the observed trial p-value (0.03) against the alpha threshold. Since $0.03 \leq 0.05$, the result is considered statistically significant, leading to the rejection of the null hypothesis.

Step 3: Define the fundamental definition of a p-value. It is not the probability that the null hypothesis is true, nor is it the probability that a drug is ineffective or effective.

Step 4: Clarify the precise phrasing: it measures the probability that the observed therapeutic difference (or an even larger variance) would occur purely due to random sampling chance, assuming there is no true difference between the drugs.

Step 5: Select the option that correctly outlines this standard statistical definition of the p-value.

Final Answer: The probability of obtaining the observed results (or more extreme) by chance alone, assuming the null hypothesis is true, is 3%.

Answer: (B)

Go Back to Question 10

Q11.

Solution

Concept: Epidemic outbreaks of viral hepatitis are categorized by their primary modes of transmission. Hepatitis A and Hepatitis E are transmitted primarily through the fecal-oral route via contaminated water or food, whereas Hepatitis B, C, and D are transmitted via parenteral and sexual routes.

Solution: Step 1: Evaluate the transmission vector identified by the field investigation. The outbreak is a common-source waterborne epidemic caused by a broken sewage line leaking directly into a public drinking water system.

Step 2: Exclude parenteral pathogens. Hepatitis B, C, and D require blood-borne, percutaneous, or sexual contact for transmission and do not cause large, explosive waterborne outbreaks.

Step 3: Differentiate between Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV). While both spread via the fecal-oral route, HEV is the predominant cause of large, epidemic waterborne outbreaks of acute jaundice among young adults in developing urban regions.

Step 4: Note that HAV outbreaks typically present as sporadic cases or smaller clusters predominantly affecting young children in endemic areas.

Step 5: Conclude that Hepatitis E Virus is the most likely etiological agent responsible for this common-source waterborne epidemic.

Final Answer: Hepatitis E virus

Answer: (D)

Go Back to Question 11

Q12.

Solution

Concept: Altering the diagnostic cut-off point of a continuous screening variable creates an inverse relationship between sensitivity and specificity. Moving the threshold closer to the normal population mean alters the proportions of true/false positives and true/false negatives.

Solution: Step 1: Analyze the direction of the cut-off modification. The diagnostic threshold for diagnosing diabetes is being lowered from a stringent 126 mg/dL down to a lower level of 100 mg/dL.

Step 2: Evaluate the impact on the diseased population. By lowering the diagnostic criteria, fewer true cases of diabetes will be missed. The number of False Negatives drops, which increases the proportion of True Positives. This causes an increase in Sensitivity.

Step 3: Evaluate the impact on the healthy population. A threshold of 100 mg/dL will capture many healthy individuals who have slightly elevated but normal physiological glucose levels. This increases False Positives and reduces True Negatives.

Step 4: Relate True Negatives to the statistical definition of Specificity:

$$\text{Specificity} = \frac{\text{True Negatives}}{\text{Total Healthy}}$$

As True Negatives decrease due to the lower threshold, Specificity decreases.

Step 5: Conclude that lowering the fasting blood glucose cut-off point causes sensitivity to increase and specificity to decrease.

Final Answer: Sensitivity will increase; Specificity will decrease

Answer: (A)

Go Back to Question 12

Q13.

Solution

Concept: The rural health infrastructure in India is organized hierarchically based on population targets to optimize healthcare delivery across different geographic terrains under the Indian Public Health Standards (IPHS).

Solution: Step 1: Review the three primary tiers of the rural public health infrastructure: Sub-Centres, Primary Health Centres (PHCs), and Community Health Centres (CHCs).

Step 2: Review the population criteria for a Sub-Centre: 3,000 in hilly/tribal areas and 5,000 in non-tribal plain areas.

Step 3: Review the population criteria for a Primary Health Centre (PHC): 20,000 in hilly/tribal areas and 30,000 in non-tribal plain areas.

Step 4: Review the population criteria for a Community Health Centre (CHC), which serves as the First Referral Unit (FRU) providing specialized secondary care. The target population is 80,000 in hilly/tribal/difficult terrains and 120,000 in standard plain regions.

Step 5: Match the specific query parameters: standard CHC in non-tribal plain areas corresponds to a target population of 80,000 to 120,000 individuals.

Final Answer: 80,000 to 120,000 population

Answer: (C)

Go Back to Question 13

Q14.

Solution

Concept: Relative Risk (RR), or the risk ratio, is the primary measure of association used in cohort studies. It calculates the ratio of the incidence of a disease outcome among an exposed cohort to the incidence of the same outcome among an unexposed cohort.

Solution: Step 1: Calculate the cumulative incidence of coronary artery disease (CAD) within the exposed cohort of heavy smokers:

$$\text{Incidence}_{\text{exposed}} = \frac{300}{5,000} = 0.06$$

Step 2: Calculate the cumulative incidence of CAD within the unexposed cohort of non-smokers:

$$\text{Incidence}_{\text{unexposed}} = \frac{60}{5,000} = 0.012$$

Step 3: State the mathematical formula for Relative Risk:

$$\text{Relative Risk (RR)} = \frac{\text{Incidence among the exposed}}{\text{Incidence among the unexposed}}$$

Step 4: Substitute the calculated incidence values into the formula:

$$\text{RR} = \frac{0.06}{0.012}$$

Step 5: Perform the division to determine the risk ratio:

$$\text{RR} = 5.0$$

This indicates that heavy smokers face a 5.0 times higher risk of developing coronary artery disease compared to non-smokers in this study population.

Final Answer: 5.0

Answer: (A)

Go Back to Question 14

Q15.

Solution

Concept: Maternal immunization against tetanus utilizes the Tetanus-Diphtheria (Td) vaccine, which has replaced the traditional Tetanus Toxoid (TT) vaccine under the National Immunization Schedule to provide additional protection against adult diphtheria outbreaks.

Solution: Step 1: Assess the pregnancy and immunization status of the patient. The patient is a 24-year-old pregnant woman in her second trimester with no prior documentation of Td or TT vaccination.

Step 2: Determine the requirement for completely unimmunized pregnant women. To ensure protective antibody transfer to the fetus and prevent neonatal tetanus, a two-dose primary series of the Td vaccine is required.

Step 3: Determine the timing for the first dose (Td-1). It should be administered as early as possible during the pregnancy, ideally as soon as the pregnancy is confirmed or during an antenatal visit in the early trimesters.

Step 4: Determine the interval for the second dose (Td-2). The second dose must be administered at least 4 weeks (28 days) after the first dose.

Final Answer: Two doses of Td vaccine spaced 4 weeks apart, with the first dose given as early as possible during pregnancy

Answer: (B)

Go Back to Question 15

Q16.

Solution

Concept: The Annual Blood Examination Rate (ABER) serves as a key operational indicator under the National Vector Borne Disease Control Programme. It measures the screening efficiency and sensitivity of active and passive malaria surveillance mechanisms in a community.

Solution: Step 1: Define the operational components of ABER. It evaluates the total volume of blood smears collected and microscopically examined relative to the total population residing in that endemic area over a full year.

Step 2: Identify the algebraic numerator for the equation. The numerator is the total number of blood slides (or rapid diagnostic tests) actually examined for malaria parasites within 12 months.

Step 3: Identify the algebraic denominator for the equation. The denominator is the total mid-year population of the specific target area under surveillance.

Step 4: Identify the standard multiplier used to express this rate. The calculation is expressed as a percentage, meaning the multiplier is 100.

Step 5: Write the complete mathematical formula for ABER:

$$\text{ABER} = \left(\frac{\text{Total number of blood slides examined}}{\text{Total population}} \right) \times 100$$

Final Answer: $\boxed{\dfrac{\text{Total number of blood slides examined}}{\text{Total population}} \times 100}$

Answer: (B)

Go Back to Question 16

Q17.

Solution

Concept: Selecting an appropriate inferential statistical test depends on the number of groups being compared and the measurement scale of the primary outcome variable. Parametric tests are used to compare continuous numerical means across groups.

Solution: Step 1: Identify the primary outcome variable. The variable under examination is the reduction in serum cholesterol level, which is a continuous numerical value.

Step 2: Count the number of independent intervention groups being evaluated. There are three distinct groups: Low-carb diet, Mediterranean diet, and Vegan diet.

Step 3: Evaluate the suitability of a standard t-test. An independent samples t-test is limited to comparing the means of exactly two groups. Running multiple t-tests across three groups would inflate the probability of committing a Type I error.

Step 4: Identify the parametric alternative for multiple groups. The Analysis of Variance (ANOVA) test is designed to compare the means of three or more independent groups simultaneously by analyzing variances.

Step 5: Conclude that a One-way Analysis of Variance (ANOVA) is the correct statistical test for this three-arm dietary study.

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

Answer: (C)

Go Back to Question 17

Q18.

Solution

Concept: Sustainable Development Goal 3 (SDG 3) establishes specific global targets for health indicators, including maternal, neonatal, and child mortality metrics, to be achieved by the year 2030.

Solution: Step 1: Define the target metric. The Maternal Mortality Ratio (MMR) measures maternal deaths per 100,000 live births.

Step 2: Recall the baseline parameters of the UN Sustainable Development Agenda. SDG Target 3.1 specifically addresses maternal mortality reductions globally.

Step 3: Review the global threshold established under this target. The objective is to reduce the global maternal mortality ratio to a specific value to ensure safe maternal health outcomes.

Step 4: Identify the exact target value. The target states that the global MMR must be reduced to less than 70 maternal deaths per 100,000 live births by the year 2030.

Final Answer: Reduce MMR to less than 70 per 100,000 live births

Answer: (B)

Go Back to Question 18

Q19.

Solution

Concept: Methodological blinding protocols in randomized controlled trials are designed to isolate the experimental intervention from human subjectivity and behavioral bias during data collection and interpretation.

Solution: Step 1: Define the structural layers of a double-blind trial design. In a double-blind trial, both the study subjects and the evaluating clinical investigators are kept completely unaware of the specific treatment allocations.

Step 2: Analyze the role of randomization and allocation concealment. Randomization controls for baseline selection bias during the initial recruitment phase, which is distinct from blinding.

Step 3: Evaluate the impact of blinding on the study participants. Blinding prevents placebo effects or subjective changes in reporting symptoms based on knowing whether they received the active drug or a control.

Step 4: Evaluate the impact of blinding on the clinical investigators. Blinding prevents measurement and assessment bias, ensuring that the clinician evaluates outcomes and records data objectively without conscious or unconscious preconceptions.

Step 5: Conclude that double-blinding is implemented specifically to eliminate measurement, assessment, and ascertainment biases during a trial.

Final Answer: To eliminate measurement, assessment, and ascertainment bias

Answer: (C)

Go Back to Question 19

Q20.

Solution

Concept: Predictive values (PPV and NPV) are dependent on the baseline prevalence of the disease in the population being tested, whereas sensitivity and specificity are intrinsic properties of the test that remain constant.

Solution: Step 1: Understand the mathematical structure of Positive Predictive Value (PPV):

$$\text{PPV} = \frac{\text{True Positives}}{\text{True Positives} + \text{False Positives}}$$

Step 2: Understand the mathematical structure of Negative Predictive Value (NPV):

$$\text{NPV} = \frac{\text{True Negatives}}{\text{True Negatives} + \text{False Negatives}}$$

Step 3: Analyze the effect of lowering disease prevalence. When a screening tool is applied to a population with lower prevalence, the absolute number of true positive cases drops significantly, while the number of false positives increases relative to true cases. This causes the PPV to decrease.

Step 4: Analyze the effect on NPV. In a low-prevalence setting, the vast majority of the population is healthy. The number of true negatives rises substantially relative to false negatives, which causes the NPV to increase toward 100%.

Step 5: Conclude that a decrease in baseline population prevalence leads to a lower PPV and a higher NPV.

Final Answer: PPV will decrease; NPV will increase

Answer: (B)

Go Back to Question 20

Q21.

Solution

Concept: National Health Policies establish structural goals, economic benchmarks, and resource allocation targets to guide public healthcare delivery and fiscal planning over multi-year periods.

Solution: Step 1: Identify the document under review, which is the National Health Policy (NHP) of 2017 enacted by the Government of India.

Step 2: Review the core financial targets outlined within the policy framework to strengthen public health delivery systems.

Step 3: Identify the specific commitment regarding government health spending as a share of national economic output.

Step 4: Recall the precise target value. The policy states that public health expenditure should be scaled up systematically to reach a benchmark of 2.5% of the Gross Domestic Product (GDP) by 2025.

Final Answer: 2.5% of GDP

Answer: (B)

Go Back to Question 21

Q22.

Solution

Concept: The statistical significance of an association metric (such as an Odds Ratio or Relative Risk) is evaluated using its calculated Confidence Interval (CI). The null value representing no difference or association is exactly 1.0.

Solution: Step 1: Identify the point estimate reported in the study. The retrospective cohort study yields an Odds Ratio (OR) of 2.4, which suggests a positive association between red meat and adenomas.

Step 2: Analyze the 95% Confidence Interval boundaries, which range from a lower limit of 0.85 to an upper limit of 4.12.

Step 3: Check for the inclusion of the null value (1.0) within the interval range. Because the lower bound is 0.85 and the upper bound is 4.12, the value 1.0 falls squarely inside the confidence interval.

Step 4: Determine the implication of including 1.0. This indicates that the data is statistically compatible with the null hypothesis of no association. Therefore, the observed association could be due to random chance.

Step 5: Conclude that while the point estimate suggests a positive risk, the finding is statistically non-significant because the confidence interval overlaps the null value of 1.0.

Final Answer: The association is positive but statistically non-significant because the confidence interval includes the value of 1.

Answer: (B)

Go Back to Question 22

Q23.

Solution

Concept: The World Health Organization (WHO) clinical classification of Xerophthalmia categorizes the progressive ocular manifestations of Vitamin A deficiency using structured clinical codes based on severity.

Solution: Step 1: Analyze the clinical presentation of the patient. The 5-year-old child presents with night blindness, conjunctival dryness, and characteristic elevated, foamy, triangular plaques on the bulbar conjunctiva.

Step 2: Identify these characteristic plaques pathognomonically as Bitot's spots, which represent keratinization of the conjunctival epithelium due to Vitamin A deficiency.

Step 3: Review the standard WHO classification codes for xerophthalmia:

X1A: Conjunctival Xerosis

X1B: Bitot's Spots

X2: Corneal Xerosis

X3A: Corneal Ulceration/Keratomalacia affecting $< 1/3$ of corneal surface

Step 4: Match Bitot's spots with the corresponding classification code, which is X1B.

Final Answer: X1B

Answer: (B)

Go Back to Question 23

Q24.

Solution

Concept: The National Leprosy Eradication Programme uses standard Multi-Drug Therapy (MDT) blister packs tailored to the clinical classification of the disease (Paucibacillary vs. Multibacillary) to prevent drug resistance.

Solution: Step 1: Identify the clinical classification of the patient provided in the prompt, which is adult Multibacillary (MB) Leprosy.

Step 2: Recall the drug composition required for MB Leprosy. It utilizes a three-drug regimen consisting of Rifampicin, Dapsone, and Clofazimine. (Paucibacillary leprosy uses only Rifampicin and Dapsone).

Step 3: Determine the treatment duration for Multibacillary leprosy. The standard guideline requires completing 12 monthly blister packs within a maximum period of 18 months.

Step 4: Contrast this with the Paucibacillary regimen, which lasts for 6 months.

Step 5: Conclude that the standard adult MB-MDT regimen consists of Rifampicin, Dapsone, and Clofazimine administered for a total duration of 12 months.

Final Answer: Rifampicin, Dapsone, and Clofazimine for a total of 12 months

Answer: (C)

Go Back to Question 24

Q25.

Solution

Concept: Descriptive epidemiology organizes and summarizes disease data according to three primary dimensions: person, place, and time. Spot maps are a classic visual tool used to analyze spatial distributions.

Solution: Step 1: Analyze the specific epidemiological tool described. The investigator is constructing a spot map of an urban locality.

Step 2: Identify the data plotted on the map, which includes the precise geographic coordinates and household locations of confirmed Dengue fever cases.

Step 3: Evaluate which descriptive dimension this mapping addresses. Plotting geographic clusters, households, and physical locations directly evaluates spatial variations and clustering.

Step 4: Differentiate from time or person dimensions. Temporal trends (time) are tracked using epidemic curves or line graphs. Demographic variations (person) are analyzed using age, sex, or occupational distributions.

Step 5: Conclude that a spot map primarily illustrates the distribution of a disease by place.

Final Answer: Distribution by place

Answer: (B)

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Answer Key

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