ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2022
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALISATION PAPER FOR PUBLIC HEALTH

Date : October 9, 2022
Total Marks : 100
Writing Time : 150 minutes (2.5 hours)
Reading Time : 15 minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
   - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
     Part II - 4 Short Answer Questions
     All questions under SECTION A are **COMPULSORY**.
   - **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
6. Begin each Section and Part on a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You must hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **8 printed pages**, including this instruction page.

GOOD LUCK

SECTION A

PART I: Multiple Choice Questions [30 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Which of the following is **NOT TRUE** about communicable diseases?
   a) Need host-agent-environment interactions
   b) Public health measures target only to eliminate the etiologic agent
   c) Account the highest burden of diseases in many developing countries
   d) Portals of entry and means of transmission may differ

2. A _____ is a table with selected critical items such as name or identification number, age, sex, and case classification, while each row represents a different case, by number.
   a) Line listing
   b) Epidemic curve
   c) Two by two table
   d) Chi square

3. The hypothesis "Oral contraceptive pill use causes ovarian cancer". In this study, oral contraceptive pill is:
   a) Case
   b) Control
   c) Exposure
   d) Outcome

4. A t-test in research is a statistical test that can be used to
   a) determine if there is a difference between observed data and expected data is due to chance, or if it is due to a relationship between the variables you are studying.
   b) predict a binary outcome, such as yes or no, based on prior observations of a data set.
   c) determine if there is a significant difference between the means of two groups and how they are related.
   d) determine the number of occurrences of distinct values distributed within a given period.

5. The ICD-10 code for Human immunodeficiency virus (HIV) disease is:
   a) B10
   b) B20
   c) B30
   d) B40

6. Which one of the following is **NOT** correct about characteristic of infectious agents?
   a) Can enter, survive and multiply in the host
   b) Have capacity to cause infection
   c) All infectious agents cause severe diseases
   d) Some may cause inapparent infection

7. All are quantitative methods of data collection **EXCEPT**
   a) Surveys
   b) Experiments
   c) Focus groups
   d) Observations

8. A cohort study differs from a case-control study:
   a) Subjects are asked about their exposure status in a cohort study but not in a case-control study.
   b) Cohort studies require many years to conduct, but case-control studies do not.
   c) Cohort studies are conducted to investigate chronic diseases, case-control studies are used for infectious diseases.
   d) Subjects are enrolled or categorized on the basis of their exposure status in a cohort study but not in a case-control study.

9. The UN Sustainable Development Goals (SDG) contains:
   a) 15 goals
   b) 16 goals
   c) 17 goals
   d) 18 goals

10. _____ studies compare the occurrence of disease and exposure among people who are ill and people who are not ill.
    a) Experimental
    b) Descriptive
    c) Case control
    d) Cohort

11. In a study to find out the association between smoking and bladder cancer, 100 adult males with bladder cancer are recruited to the study group. The control group consists of 100 similar individuals without bladder cancer. The calculated odds ratio is 2.7. Which of the following statements best describes the study?
    a) The smokers have 2.7 times increased risk of developing bladder cancer when compared to the non-smokers.
    b) Odds of smoking in bladder cancer patients are 2.7 times higher than in those without bladder cancer.
    c) Bladder cancer patients have 2.7 times increased risk of smoking when compared to that of those without bladder cancer.
    d) Odds of smoking are 2.7 times higher in patients who have a risk of developing bladder cancer in the future.

12. UNAIDS estimate of PLHIV in Bhutan is:
    a) 1000
    b) 1300
    c) 1500
    d) 1800

13. All the following are cervical cancer screening tests **EXCEPT**
    a) HPV DNA test
    b) Cervical compression test
    c) Pap smear test
    d) VIA test

14. The Governing Body of the World Health Organization Framework Convention on Tobacco Control (WHO-FCTC) is:
    a) The Director General of WHO.
    b) The World Health Assembly.
    c) The Conference of the Parties.
    d) The WHO Executive Committee.

15. _____epidemiology deals with an unexplained event and a timely response is needed to control an outbreak.
    a) Field
    b) Descriptive
    c) Applied
    d) Analytical

16. Which one is a metabolic risk factor?
    a) Unhealthy diet
    b) Physical inactivity
    c) Obesity
    d) Tobacco use

17. The WHO recommended level of daily salt intake is:
    a) less than 5 grams/day.
    b) less than 5 milligrams/day.
    c) less than 10 grams/day.
    d) less than 10 milligrams/day.

18. Disability-adjusted life years (DALY) represents
    a) years of life lost due to premature mortality.
    b) years of healthy life lost due to disability.
    c) the total number of years lost to an illness, disability or premature death within a given population.
    d) how many extra months or years of life of reasonable quality a person might gain as result of treatment.

19. All, **EXCEPT** which of the following cardiovascular risk factors are substantially influenced by lifestyle choices?
    a) Obesity
    b) Diabetes mellitus
    c) Smoking
    d) Arteriosclerosis

20. Virulence is the ability to
    a) cause clinical disease.
    b) cause severe disease.
    c) evoke an immune response.
    d) resist infection.

21. A TB patient is considered non-infectious when he/she has
    a) a negative chest x-rays.
    b) three sequential negative sputum smears.
    c) no physical symptoms.
    d) All of the above

22. Which rate is produced by dividing the number of deaths among 45 to 64-years-old during one year by the population aged 45-64 years?
    a) Crude death rate
    b) Morbidity incidence
    c) Age-specific death rate
    d) Cause-specific death rate

23. A _____ contains conditions to determine if a person has the disease that you are studying.
    a) Case study
    b) Confirmed case
    c) Possible case
    d) Case definition

24. As a general guide, what percentage of a program's budget should go toward M&E?
    a) 1%-2%
    b) 5%-10%
    c) 10%-15%
    d) 10%-20%

25. Results based management includes
    a) planning, implementing and monitoring.
    b) planning and monitoring and evaluation.
    c) the planning and implementing phase only.
    d) the monitoring and evaluation phase only.

26. VDCP health officials are concerned about the summer outbreak of a dengue virus transmitted to humans by mosquitoes. The officials establish mosquito traps in areas to determine the prevalence of the virus in the mosquitoes. This mosquito trapping is an example of
    a) active surveillance.
    b) passive surveillance.
    c) sentinel surveillance.
    d) population-based surveillance.

27. Which one of the following is a measure of incidence?
    a) Do you currently have asthma?
    b) Have you had asthma during the last 5 years?
    c) Have you ever had asthma?
    d) Were you first diagnosed with asthma in 2020?

28. A researcher is interested in recording the number of individuals in a particular geographic region who have common cold at some point during the month of July 2011. Which of the following measures of morbidity would be most appropriate in answering this question?
    a) Period prevalence
    b) Point prevalence
    c) Cumulative incidence
    d) Incidence

29. At what stage of a program should monitoring take place?
    a) At the beginning of the program.
    b) At the mid-point of the program.
    c) At the end of the program.
    d) Throughout the life of the program.

30. Which one of the following is **FALSE**?
    a) Tobacco taxation is a central tool of prevention efforts
    b) Tobacco taxation is an important tool to encourage smokers to quit.
    c) Levying taxes on tobacco products discourages the purchase and subsequent use of tobacco products
    d) Tobacco taxation is the main driver of illicit trade in tobacco products

PART II – Short Answer Questions [20 marks]

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks. Mark for each sub-question is indicated in the brackets.

Question 1

In an Asian country with a population of 6 million people, 60,000 deaths occurred during the year ending December 31, 2020. These included 30,000 deaths from Covid-19 in 100,000 people who were sick with Covid-19.

a) What was the cause-specific mortality rate from Covid-19 in 2020? **(2 marks)**
b) What was the case fatality rate from Covid-19 in 2020? **(2 marks)**
c) Calculate the crude death rate. **(1 mark)**

Question 2

a) What is Universal Health Coverage (UHC)? **(1 mark**)
b) What are the implications of high out-of-pocket expenditure as a share of health spending for progress toward Universal Health Coverage? **(2 marks)**
c) What is the source of health funding that constitutes the largest share of health spending in Bhutan? **(2 marks)**

Question 3

Write the formula for calculating the following measurements:

a) Attack rate **(1 mark)**
b) Odds ratio **(1 mark)**
c) Risk ratio **(1 mark)**
d) Relative risk **(1 mark)**
e) Attributable risk among exposed **(1 mark)**

Question 4

Define the following:

a) Health system **(1 mark)**
b) SDG 3 **(1 mark)**
c) Sensitivity of screening test **(1 mark)**
d) Specificity of screening test **(1 mark)**
e) Determinants of health **(1 mark)**

SECTION B: Case Study [50 marks]

Choose either CASE I OR CASE II from this section. Each case study carries 50 marks. Mark for each sub-question is indicated in the brackets.

CASE I

Research is a systematic inquiry that uses disciplined methods to answer questions and solve problems. The ultimate goal of research is to develop, refine, and expand a body of knowledge. Health care providers today are increasingly engaged in disciplined studies that benefit the profession and its clients. They are expected to adopt an evidence-based practice (EBP) based on the emerging evidences from their research. EBP is broadly defined as the use of the best clinical evidence in making patient care decisions, and such evidence typically comes from research conducted by doctors, nurses and other health care professionals.

Question 1

What are the different types of research design? How is it different from study design? **(10 marks)**

Question 2

What is Sampling? Explain different sampling techniques with examples? **(10 marks)**

Question 3

What are the strategies to determine sample size? Using Cochran's formula, calculate the required sample size, given the confidence level = 95%, sampling error = 5% and variability = 0.5? **(10 marks)**

Question 4

What are the basic steps in writing a research proposal? Elaborate each step with detailed explanation and examples wherever appropriate. **(20 marks)**

CASE II

Some new infectious diseases have the potential to produce a pandemic, spreading beyond political boundaries. Such infectious diseases spread quickly and widely, sometimes in a very short period of time, to many nations as international travel and trade pick up speed and volume. Recent experiences with Covid-19, SARS and avian influenza show how such rapidly spreading new infectious illnesses have the potential to have catastrophic effects on human health and the global economy. Most emerging infectious disease pathogens are bacterial, viral, fungal, helminths, or protozoan. Nearly 40 previously unknown infections have emerged just within the past three decades, including SARS, the first new infectious disease of the twenty-first century.

Question 1

Describe factors responsible for emergence and re-emergence of infectious diseases in the world? **(5 marks)**

Question 2

Explain what is meant by the epidemiological triangle. Define the three elements of the triangle. **(10 marks)**

Question 3

Describe the steps in the investigating an infectious disease outbreak. Why do investigators collect information about clinical symptoms, attack rates, and the incubation period? **(20 Marks)**

Question 4

Discuss and interpret the following surveillance data using descriptive epidemiology. The table shows the number of Pertussis cases by age group. **(5 marks)**

AGEGRP	FREQ	PERCENT	CUM.
< 6 MO	57	36.1%	36.1%
6–12 MO	41	25.9%	62.0%
13–18 MO	6	3.8%	65.8%
19–23 MO	6	3.8%	69.6%
2–5 YR	18	11.4%	81.0%
6–9 YR	17	10.8%	91.8%
10 YR+	12	7.6%	99.4%
AGE UNK	1	0.6%	100.0%
Total	158	100.0%	

Question 5

What are the different levels of prevention in epidemiology? Discuss each one with examples. Why should we identify high risk subgroups in the population? **(10 marks)**

TASHI DELEK