

ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2020
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALISATION PAPER FOR PUBLIC HEALTH

Date	: February 27, 2021
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 the 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 **10 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. The term “baseline” refers to the
 - a) ideal level of health before a disaster occurs.
 - b) existing level of health before a disaster occurred.
 - c) lowest level of acceptable health in a disaster situation.
 - d) highest level of acceptable health in a disaster situation.

2. The ‘DDT’ chemical used in malaria control activities stands for
 - a) Dichloro Diphenyl Trichlorethylene
 - b) Dichloro Diphenyl Trichloromethylmethane
 - c) Dichloro-Diphenyl-Trichloroethane
 - d) Dichlor-Diphenyl-Trichlorethane

3. A stakeholder of a project is anyone who
 - a) is positively or negatively impacted by the project.
 - b) can impact/be impacted positively or negatively by the project.
 - c) is involved in the project.
 - d) can influence the direction of the project.

4. Which one of the following best defines an epidemiologic transition?
 - a) Describes changing patterns of individual age distributions, mortality, fertility, life expectancy and cause of death.
 - b) Describes changing patterns of population age distributions, mortality, fertility, life expectancy and cause of death.
 - c) Describes the distribution of health outcomes, risk factors and exposures in communities.
 - d) Describes a transition from high mortality to lower mortality.

5. What level of public health prevention occurs when the person already has symptoms of the disease?
 - a) Primary
 - b) Secondary
 - c) Tertiary
 - d) Quaternary

6. Which one of the following is NOT an epidemiologic measure of a person?
 - a) Physical location
 - b) Living condition
 - c) Education level
 - d) Genetic factors

7. All of the following steps must be taken to calculate a risk EXCEPT
- Define the at-risk study population.
 - Define a case definition for the health outcome under study.
 - Determine the number of new cases of the outcome under study.
 - Determine how many people in the study were exposed or unexposed to the exposure under study.
8. Which one of the following measures is sometimes used because of its convenient mathematical properties?
- Rate
 - Risk
 - Odds
 - Prevalence
9. In December 2020, there were 20 students sick with flu and 80 healthy students in Class X of a Middle Secondary School. What is the prevalence of flu among these students?
- 2%
 - 4%
 - 25%
 - 20%
10. Which one of the following studies best described the statement "A study where the effectiveness of 2 different diabetes drugs is compared."
- Case-control study
 - Cross-over clinical trial
 - Randomized controlled trial
 - Intervention study
11. Which among the four influenza virus causes epidemics and pandemics?
- Influenza A virus
 - Influenza B virus
 - Influenza C virus
 - Influenza D virus
12. Two-by-Two Table is also known as
- measurement of an association table.
 - contingency table.
 - study table.
 - square table.
13. You are seeing a 36-year-old woman with newly diagnosed metastatic breast cancer who complains of difficulty sleeping and anxiety about the future. What would you do?
- Refer her immediately to a psychiatrist.
 - Prescribe haloperidol to help her sleep.
 - Prescribe diazepam immediately for her anxiety.
 - Perform a psychological, social and spiritual assessment.

14. The four standard principles of medical ethics include
- beneficence, non-maleficence, justice and autonomy.
 - beneficence, maleficence, dignity and human rights.
 - beneficence, justice, independence and non-maleficence.
 - human rights, autonomy, freedom and justice.
15. A 50-year-old nurse has been working in a cancer unit of JDWNR hospital for the past 10 years. She has not had a vacation for the last two years. She has lately been experiencing fatigue, inefficiency at work, and lack of interest in her patient's stories, and she is thinking about quitting her job. Which of the following best describes what she is experiencing?
- Adjustment disorder
 - Anxiety neurosis
 - Menopause
 - Burnout
16. Choose the best definition of a crisis from the following statements:
- A sad person who needs immediate medical attention.
 - A time when people experience disappointments and setbacks.
 - A large crowd of people gathered after a serious accident occurs.
 - A distressing event during which a person experiences fear and possibly injury and loss.
17. Which statement regarding the influenza symptoms or their management is INCORRECT?
- Respiratory complaints such as cough, headache, muscle and joint pain, fatigue, fever, sore throat, runny nose are common.
 - The incubation period usually ranges from 1-5 days; an infectious person may be contagious 1-2 days before the onset of symptoms and for 4-5 days after their resolution.
 - Generally, it is a self-limiting condition, but complications may include lower respiratory tract infections, myocarditis, encephalitis, myositis, and even death.
 - Antibiotics are the preferred drugs of choice to reduce severity and duration of illness and are recommended at the onset of symptoms.
18. Which one of the following is NOT a greenhouse gas?
- Carbon dioxide
 - Carbon monoxide
 - Methane
 - Chlorofluorocarbon
19. Which one is odd one from the list of diseases below?
- Ascariasis
 - Japanese encephalitis
 - Plague
 - Rabies

20. The prevalence of diabetes among the Bhutanese population aged 15-69 years is
- 2%
 - 3%
 - 4%
 - 5%
21. A measure taken beforehand to minimize the impact of a disaster is called
- Prevention
 - Mitigation
 - Protection
 - Preparedness
22. Structural interventions for HIV prevention include all of the following EXCEPT
- Social
 - Legal-Political
 - Cultural
 - Delaying sexual debut among adolescents
23. The most appropriate graphic representation to show components of a whole is
- Bar chart
 - Pie chart
 - Gantt chart
 - Histogram
24. The classified controlled narcotic drugs and psychotropic substances fall under which Schedule of the Medicines Act of the Kingdom of Bhutan?
- Schedule A
 - Schedule B
 - Schedule C
 - Schedule D
25. Which one of the following is TRUE about the epidemiological overlap between HIV and TB?
- Without proper treatment, 90% of those living with HIV/AIDS die within months of contracting TB.
 - People who are HIV infected and also infected with TB are 2 times more likely to develop active TB in any given year compared to people who are not infected with HIV.
 - ART reduces the individual risk of TB by 100% among people living with HIV/AIDS.
 - ART reduces the population-based risk by 10% among people living with HIV/AIDS.
26. All of the following are “building blocks” of healthcare systems EXCEPT
- Health workforce
 - Health research and innovation
 - Access to essential medicines
 - Leadership & governance

27. Results from the clinical trials show that Covishield vaccine manufactured by Serum Institute of India has an efficacy of
- 52-90%
 - 62-90%
 - 72-90%
 - 82-90%
28. As per the 2019 annual household survey, the improved sanitation coverage in Bhutan is
- 94%
 - 95%
 - 96%
 - 97%
29. All of the following are qualitative variables EXCEPT
- Categorical
 - Ordinal
 - Discrete
 - Nominal
30. The Researchers at the Institute of Health Partners followed 3 patients in a 5-year study. Begin by calculating the person-time for each patient. Then, calculate the total person-time by adding up the three individual person-times. What is the total person-time in this study?
- Patient A: Year 1: follow-up, Year 2: lost to follow-up at the end of the year*
- Patient B: Year 1: follow-up, Year 2: follow-up, Year 3: follow-up, Year 4: a disease at the end of the year*
- Patient C: Year 1: no observation, Year 2: follow-up, Year 3: follow-up, Year 4: follow-up, Year 5: death at the end of the year*
- 7 years
 - 9 years
 - 10 years
 - 11 years

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

Tuberculosis (TB) continues to be a major public health problem in the country with the disease affecting close to 1,000 Bhutanese people every year. In 2019, there were a total of 1005 cases of all forms of TB as against WHO estimated incidence of 1300 cases. Similarly, as of November 2020, there were a total of 781 TB cases (all forms of TB) of which 54 were RR/MDR-TB. Bhutan today has one of the highest incidences of MDR-TB cases in the South Asia region.

- What is the TB case detection gap in 2019? (1 mark)

- b) In what way do you think you can close the case detection gap to help National TB Control Program achieve the national target to end TB by 2030? (1 mark)
- c) Apart from the conventional sputum microscopy and culture, what is the latest technology used in Bhutan as the initial diagnostic test in adults suspected of having MDR-TB? (1 mark)
- d) In addition to modern allopathic medicine and traditional indigenous medicine, the third branch of healing called acupuncture practice had emerged as one of the most popular forms of complementary medicine in Bhutan since 2016. If you were asked by the Ministry of Health to draft the infection prevention and control guideline for acupuncture practice, what are some of the components that you would like to include in the guideline? (2 marks)

Question 2

The following is a classic 2x2 table:

	Case	Control
Exposed	a	b
Unexposed	c	d

- a) What does a/b signify? (1 mark)
- b) What does c/d signify? (1 mark)
- c) What is the formula, using this table, for calculating an odds ratio? (1 mark)
- d) Based on this table and the formula from (c), what would an odds ratio of 0.5, 1.0 and 3.5 mean? (2 marks)

Question 3

While the terms equity and equality may sound similar, the implementation of one versus the other can lead to dramatically different outcomes for marginalized people

- a) What is the difference between health equality and health equity? (2 marks)
- b) What do you understand by the term health literacy? (1 mark)
- c) What are the three 'levels' of health literacy? (2 marks)

Question 4

In public health programme evaluations, the term confidence interval (CI) and p-value are often used invariably in almost all studies and researches.

- a) What do you understand by Confidence Interval (CI)? (1 mark)
- b) What is a p-value? (1 mark)
- c) What do the p-value and 95% CI tell us? (1mark)
- d) How do you interpret a bias in statistics? Name two types of commonly occurring statistical biases? (2 marks)

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

Non-communicable diseases (NCDs) in the recent past have become a serious cause of concern to the health and wellbeing of the people of Bhutan. It accounts for 69% of all deaths in the country and places a huge burden on individuals, families and societies. The 2019 STEPS survey reported that two out of five Bhutanese are current alcohol drinkers. Similarly, one out of five Bhutanese still uses some kind of tobacco products. The results of this survey not only revealed the trends in the NCD risk factors but also give a good assessment of the programmatic interventions and control strategies in the fight against non-communicable diseases. The survey findings suggest that action is required at several levels to achieve key NCD indicators and targets. The results from the 2019 survey will be instrumental in evaluating the performance of Bhutan's multi-sectoral action plan (2015–2020) and will provide a baseline for its next multi-sectoral action plan.

1. What do you understand by STEPS survey? Explain it in your own words. (3 marks)
2. What is a risk factor? List and explain the major behavioural risk factors and biological risk factors for NCDs? (9 marks)
3. What are the characteristic features of 'non-communicable diseases'? Name the major NCDs that contribute to the overall national NCD burden in the country? (4 marks)
4. What are the factors that lead to the development of NCDs? Who is at risk of such diseases? (4 marks)
5. What are the objectives of surveillance of the NCD risk factors? (2 marks)
6. What are the socioeconomic impacts of NCDs? (3 marks)
7. The STEPS survey reported that the mean population salt intake was 8.3 grams per day as against the WHO recommended level of 5 grams of salt per day. Design a plan of action to help the Bhutanese population reduce salt intake. (5 marks)
8. The multi-sectoral national action plan for the prevention and control of non-communicable diseases (2015-2020) had expired by December 2020. You are asked to evaluate the impact of the action plan on the NCD program. Explain how you will proceed to evaluate the NCD program. (8 marks)
9. While drafting the strategic action plan, one needs to be very clear about setting goals, objectives and strategies. Explain in your own words with examples the following terminologies: goals, targets, indicators, objectives, vision and mission. (8 marks)
10. How do emergencies and disasters affect persons with NCDs? (4 marks)

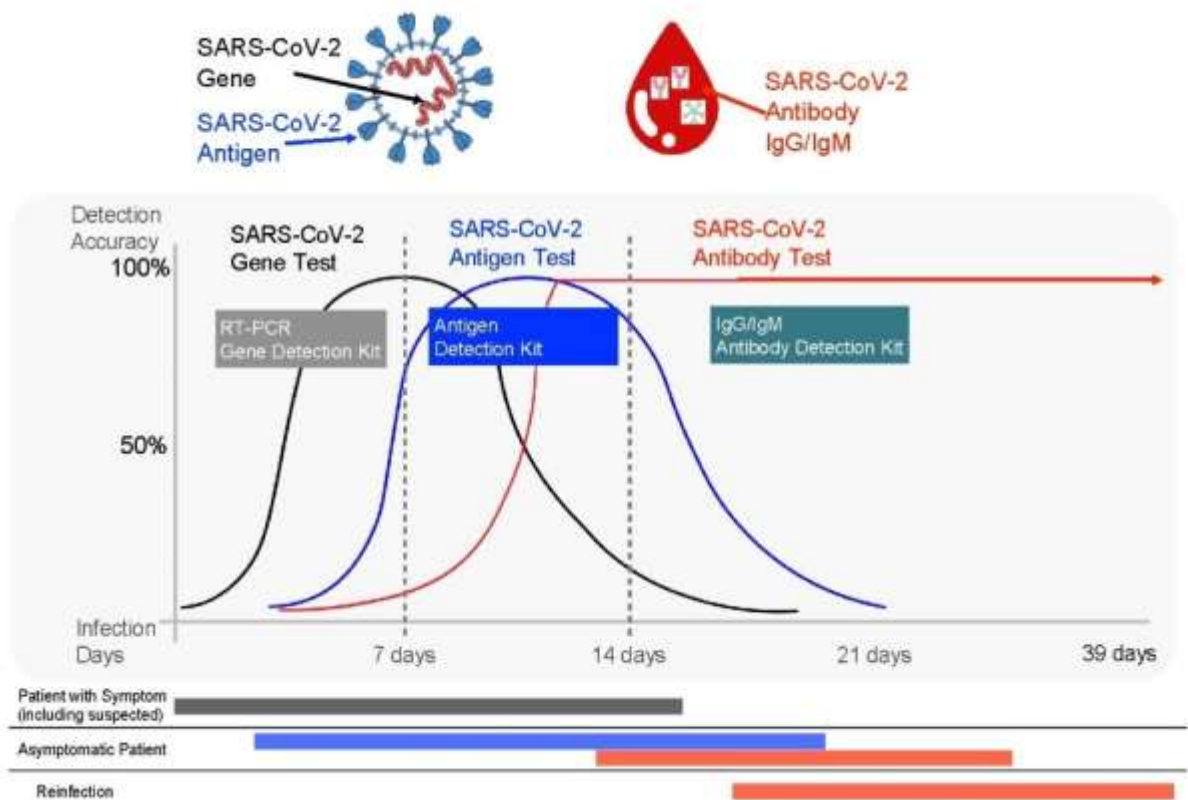
CASE II

On 30 January 2020, the WHO declared COVID-19 - a severe acute respiratory syndrome (SARS) caused by a novel coronavirus - a public health emergency of international concern. COVID-19 was unknown before the outbreak in Wuhan, China in December 2019 but is now a pandemic affecting most countries globally including Bhutan.

1. What is the difference between pandemic, epidemic and outbreak? (3 marks)
2. While investigating a case of Covid-19 outbreak in the community, you need to interview potential case to determine if they meet the WHO definition for suspected, probable or confirmed case to obtain epidemiological information.

Explain in your own words the definition of different cases? Explain with the help of a flowchart how Covid-19 contact tracing is done in Bhutan under the guidance of National Preparedness and Response Plan for Outbreak of Novel Coronavirus. (10 marks)

3. Below is a graph showing different tests done for Covid-19. Interpret the graph. (10 marks).



4. What are the different types of immunity? Explain whether herd immunity against coronavirus disease (COVID-19) might slow the spread of the disease? (5 marks)
5. What is a vaccine? How does the vaccine help build body immunity? (2 marks)

6. Under the “Emergency Use Authorization” some vaccines against Covid-19 had been allowed to be used in adults. Name one mRNA vaccine and vector vaccine each. (3 marks)
7. How was Covid-19 vaccine developed very fast while vaccines for AIDS and cancers could not be developed? (7 marks)
8. Against the backdrop of ominous surging infections and hospitalisations that have strained healthcare systems to their limits, many countries including the United Kingdom and the United States of America had begun the mass rollout of a vaccine against Covid-19, spearheading an effort widely seen as pivotal in ultimately vanquishing the pandemic that has upended daily life of people and devastated the economy. While COVAX - the vaccine pillar of the ACT Accelerator will facilitate equitable access and distribution of vaccines to protect people in all countries, Bhutan should start developing a national deployment and vaccination plan for Covid-19 vaccine in 2021. What are some of the key elements that you would like to include in the plan to ensure equity and win public trust? (10 marks)

TASHI DELEK