

**ROYAL CIVIL SERVICE COMMISSION**  
**BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2023**  
**EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALISATION PAPER FOR NUTRITION AND DIETETICS**

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<b>Date</b>	: October 7, 2022
<b>Total Marks</b>	: 100
<b>Writing Time</b>	: 150 minutes (2.5 hours)
<b>Reading Time</b>	: 15 Minutes (prior to writing time)

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**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 - 3 Short Answer Questions  
All questions under SECTION A are COMPULSORY.
  - **SECTION B** consists of two QUESTIONS. All the questions under SECTION B are COMPULSORY.
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 correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
6. Begin each Section and Part in 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 are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **7 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 an essential fatty acid that must be obtained from the diet?
  - a) Linoleic acid
  - b) Oleic acid
  - c) Stearic acid
  - d) Palmitic acid
2. Which of the following nutrients is primarily responsible for forming connective tissues, such as tendons and ligaments?
  - a) Vitamin C
  - b) Vitamin D
  - c) Vitamin K
  - d) Vitamin A
3. What is the recommended daily intake of dietary fiber for adult men and women, respectively?
  - a) 20g, 30g
  - b) 25g, 35g
  - c) 30g, 40g
  - d) 35g, 45g
4. Which of the following is a water-soluble antioxidant vitamin?
  - a) Vitamin A
  - b) Vitamin C
  - c) Vitamin D
  - d) Vitamin E
5. In the context of nutrition labeling, what does "DV" stand for?
  - a) Daily Vitamin
  - b) Dietary Value
  - c) Daily Value
  - d) Dietetic Variation
6. Which of the following minerals is a critical component of hemoglobin, responsible for transporting oxygen in the blood?
  - a) Zinc
  - b) Magnesium
  - c) Iron
  - d) Calcium

7. Which of the following nutrients plays a crucial role in maintaining bone health and reducing the risk of osteoporosis?
  - a) Vitamin D
  - b) Vitamin B12
  - c) Vitamin K
  - d) Vitamin E
  
8. Which of the following dietary patterns is associated with reduced risk of heart disease and emphasizes consuming fish, fruits, vegetables, and whole grains?
  - a) Ketogenic diet
  - b) Mediterranean diet
  - c) Atkins diet
  - d) Paleo diet
  
9. Which of the following hormones is primarily responsible for regulating hunger and satiety?
  - a) Leptin
  - b) Insulin
  - c) Glucagon
  - d) Estrogen
  
10. What is the main function of cholecystokinin (CCK) in the digestive process?
  - a) Emulsify fats
  - b) Stimulate hunger
  - c) Promote insulin release
  - d) Trigger gallbladder contraction
  
11. Which of the following vitamins is crucial for vision and is found in high amounts in carrots and sweet potatoes?
  - a) Vitamin A
  - b) Vitamin B6
  - c) Vitamin C
  - d) Vitamin E
  
12. Which of the following fatty acids is considered heart-healthy and is abundant in olive oil and avocados?
  - a) Saturated fat
  - b) Trans fat
  - c) Monounsaturated fat
  - d) Polyunsaturated fat
  
13. Which of the following minerals is a major component of bones and teeth, and is essential for muscle function and nerve transmission?
  - a) Zinc
  - b) Magnesium
  - c) Calcium
  - d) Potassium

14. Which of the following is a good source of complete protein for vegetarians?
- Lentils
  - Chickpeas
  - Soya Beans
  - Brown rice
15. What is the primary function of lipase in the digestive process?
- Break down proteins into amino acids
  - Convert carbohydrates into glucose
  - Emulsify fats for better absorption
  - Hydrolyze fats into fatty acids and glycerol
16. Which of the following micronutrients is essential for the synthesis of thyroid hormones and is found in iodized salt and seafood?
- Zinc
  - Iron
  - Iodine
  - Selenium
17. Which of the following vitamins is necessary for the synthesis of collagen and is found in citrus fruits and bell peppers?
- Vitamin C
  - Vitamin D
  - Vitamin K
  - Vitamin B12
18. Which of the following food items is a good source of omega- 3 fatty acids, beneficial for heart health?
- Butter
  - Chia seeds
  - Red meat
  - Processed cheese
19. Which of the following health conditions is characterized by an immune system response to gluten, leading to intestinal damage and malabsorption of nutrients?
- Diabetes mellitus
  - Celiac disease
  - Hypertension
  - Gout
20. What is the primary function of bile in the digestive process?
- Break down proteins into amino acids
  - Neutralize stomach acid
  - Emulsify fats for better absorption
  - Convert carbohydrates into glucose

21. Which of the following nutrients is essential for the production of red blood cells and is found in foods like beef, spinach, and lentils?
- a) Vitamin B12
  - b) Folic acid (folate)
  - c) Vitamin D
  - d) Vitamin K
22. Which of the following is a type of soluble fiber that helps lower cholesterol levels and is found in oats and barley?
- a) Cellulose
  - b) Lignin
  - c) Pectin
  - d) Beta-glucan
23. Which of the following minerals is important for nerve transmission, muscle function, and maintaining fluid balance in the body?
- a) Zinc
  - b) Magnesium
  - c) Iron
  - d) Sodium
24. Which of the following health conditions is associated with excessive sodium intake and is a risk factor for heart disease and stroke?
- a) Anemia
  - b) Osteoporosis
  - c) Hypertension
  - d) Diabetes mellitus
25. What is the recommended daily intake of fruits and vegetables for adults?
- a) 1 serving
  - b) 2 servings
  - c) 5 servings
  - d) 10 servings
26. Which of the following nutrients provides the most energy per gram?
- a) Protein
  - b) Carbohydrates
  - c) Fiber
  - d) Fats
27. Which of the following blood pressure readings indicates hypertension?
- a) 120/80 mmHg
  - b) 130/85 mmHg
  - c) 135/90 mmHg
  - d) 140/95 mmHg

28. What is the desirable range for LDL cholesterol levels according to current guidelines?
- Less than 100 mg/dL
  - 100-129 mg/dL
  - 130-159 mg/dL
  - 160-189 mg/dL
29. BMI of 29.1 kg/m<sup>2</sup> falls into which category according to the World Health Organization (WHO) classification?
- Normal weight
  - Overweight
  - Obese class I
  - Obese class II
30. Which of the following vitamins is fat-soluble?
- Vitamin C
  - Vitamin B12
  - Vitamin D
  - Vitamin K

**PART II – Short Answer Questions (20 marks)**

**This part has 3 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks. Mark for each sub-question is indicated in the brackets.**

- Explain the following: **(2.5 x 4 marks = 10 marks)**
  - Glycemic index (GI)
  - Essential amino acids
  - Antioxidants
  - Recommended Dietary Allowance (RDA)
- Define basal metabolic rate (BMR) and explain its significance in weight management **(5 marks)**.
- Compare and contrast saturated fats, unsaturated fats, and trans fats, and discuss their impact on heart health **(5 marks)**.

**SECTION B: Case Study (50 marks)**

**This section consists of two questions carrying 25 marks each. All the questions are compulsory. Mark for each sub-question is indicated in the brackets.**

**Question 1**

A 50-year-old male presents with a body weight of 85 kg and a height of 175 cm. He is concerned about his recent weight gain and is experiencing symptoms of fatigue and shortness of breath during physical activity. His blood pressure is elevated at 150/95 mmHg, and blood tests reveal elevated fasting blood glucose levels of 160 mg/dL and triglycerides of 200 mg/dL.

- Based on the provided information, what are the possible health conditions the patient might be at risk for? **(5 marks)**

2. Describe the nutritional assessment process for this patient, including relevant assessments and measurements. **(5 marks)**
3. Develop a comprehensive nutrition and lifestyle intervention plan to address the patient's health concerns. **(15 marks)**

**Question 2**

You are assigned to provide nutrition counselling to a 30-year-old female athlete who is preparing for a bodybuilding competition. She weighs 60 kg and is 165 cm tall. Her goal is to reduce body fat while maintaining muscle mass and strength.

1. Calculate the athlete's BMI and classify it into the appropriate category. **(5 marks)**
2. Assess the athlete's energy and macronutrient needs based on her bodybuilding goals and training regimen. **(5 marks)**
3. Design a meal plan that meets the athlete's nutritional needs, focusing on nutrient timing and food choices. **(10 marks)**
4. Discuss the potential risks of excessive dieting and restrictive eating behaviors in bodybuilding and provide recommendations for a balanced approach to nutrition. **(5 marks)**

**TASHI DELEK**