S4 Technology and Living Practice Paper: Nutrition and Meal Planning, Food Science and Cooking, Food Safety and Hygiene, Textiles and Clothing, Consumer Resource Management, Food Labels

S4 | Technology and Living | Time: 75 minutes | Total: 100 marks | 24 questions

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Part A Nutrition and Meal Planning (16 marks)

Answer all questions and show your working.

1. A meal contains 30 g protein, 20 g fat and 60 g carbohydrate. Find the total energy (using 4, 9 and 4 kcal/g) and the percentage of energy supplied by fat. [4]

2. A 16-year-old girl weighs 55 kg and is 160 cm tall. Use the Harris-Benedict equation (655 + 9.6W + 1.8H - 4.7A) to find her basal metabolic rate, then apply an activity factor of 1.55 to find total daily energy expenditure. [4]

3. The protein requirement is 0.8 g per kg body weight per day. How many grams of protein does the 55 kg girl need daily, and what percentage of the TDEE above does it supply (using 4 kcal/g)? [4]

4. The girl is 1.60 m tall and weighs 55 kg. Calculate her body mass index (BMI = weight / height squared) and state her weight category using the Asian adult standard (normal 18.5-22.9). [4]

Part B Food Science and Cooking (16 marks)

Show your working for every answer.

5. 100 g of flour is mixed with water at 75% hydration (relative to flour weight). How much water is needed and what is the total mass of the dough? [4]

6. 50 g of sugar is fully dissolved in 150 g of water. Find the concentration of the syrup as a mass percentage of the solution. [4]

7. A 200 ml vinaigrette uses oil and vinegar in the ratio 3:1. Find the volume of each, and explain why the oil must be added slowly. [4]

8. A recipe uses 250 g of flour and is scaled up 1.5 times; yeast is 1% of the flour weight. Find the new flour weight, the yeast weight, and convert 180 degrees C to Fahrenheit (F = C x 9/5 + 32). [4]

Part C Food Safety and Hygiene (16 marks)

Show the calculation or the reason clearly.

9. Food stays in the danger zone (4 C to 60 C) for 2 hours and bacteria double every 20 minutes. Find how many times the original number of bacteria, and state two ways to shorten the time. [4]

10. A fridge runs at 4 C and a freezer at -18 C. Find the temperature difference in kelvin. A 5-log reduction removes five orders of magnitude of bacteria; find the percentage killed. [4]

11. Bleach is diluted 1:100 for wiping tables. How many millilitres of bleach are needed for 5 L of water, and why must it be made fresh each day? [4]

12. Cooked food must cool from 60 C to 21 C within 2 hours, then to 5 C within 4 hours. Find the maximum total cooling time and explain the risk of leaving food out overnight. [4]

Part D Textiles and Clothing (16 marks)

Give units in every answer.

13. A fabric weighs 200 g per square metre. A pattern piece measures 1.5 m by 1.2 m. Find its area and mass. [4]

14. A garment uses 2.3 m of fabric at $48 per metre, plus $8 of thread and $60 of labour. Find the fabric cost, the total cost, and the selling price at 1.6 times the total cost. [4]

15. A pattern piece is 60 cm by 80 cm and a 1.5 cm seam allowance is added on all four sides. Find the new area in cm2 and in m2. [4]

16. A 500 g blended fabric is 65% polyester and 35% cotton. Find the mass of each fibre and give one advantage of each. [4]

Part E Consumer and Resource Management (16 marks)

Show the working; give money answers to the cent.

17. The same brand of rice costs $42 for 1.5 kg and $54 for 2 kg. Find the unit price of each, state which is cheaper and by what percentage. [4]

18. A household earns $24,000 a month and spends 40% on housing, 20% on food and 10% on transport; the rest is saved. Find the savings percentage and amount. [4]

19. A 1500 W kettle is used 4 minutes a day. Find the electricity used in a 30-day month in kWh, and the cost at $1.2 per kWh. [4]

20. A $6,000 refrigerator is depreciated on a straight-line basis over 8 years. Find the annual depreciation and the book value after 3 years, and suggest one way to extend its life. [4]

Part F Food Labels and Integrated Application (20 marks)

Show the working and add one sentence of comment on health or value for money.

21. A biscuit label shows 1,900 kJ of energy per 100 g. How much energy is in a 30 g serving, in kJ and in kcal (1 kcal = 4.184 kJ)? [5]

22. The same label shows 12 g of sugar per 100 g (4 kcal/g) and 1,900 kJ (that is 454.1 kcal) of energy per 100 g. Find the percentage of energy supplied by sugar. [5]

23. A label shows 0.48 g of sodium per 100 g. Using salt = sodium x 2.5, find the salt content per 100 g and its percentage of the WHO daily limit of 5 g. [5]

24. A pack of the biscuits costs $32.5 and contains 8 servings. Find the cost per serving. In a survey of 250 customers, 62% said they would buy again; find that number and compare the cost per serving with a rival at $5.5 per serving. [5]
