S5 Health Management and Social Care Practice Paper: Health Indicators, Nutrition, Stress and Mental Health, Addictive Behaviour, Community Care Services, Health Promotion

S5 Health Management and Social Care | Time allowed: 90 minutes | Total: 100 marks | 24 questions

A. Health Concepts and Body Function Indicators (18 marks)

BMI = weight in kg / height in m squared. Estimated basal metabolic rate: 655 + 9.6 x weight + 1.8 x height in cm - 4.7 x age.

1. A woman weighs 68 kg and is 1.60 m tall. Find her BMI to one decimal place and state the classification. (4 marks)

> **Answer:** BMI = 68 / 1.60^2 = 68 / 2.56 = 26.6. Under Asian adult cut-offs, 23 to 24.9 is overweight and 25 or above is obese, so 26.6 falls in obese class I.

2. Her friend is 30 years old, weighs 55 kg and is 160 cm tall. Using the formula, find the basal metabolic rate and the total energy expenditure for light activity. (5 marks)

> **Answer:** BMR = 655 + 9.6 x 55 + 1.8 x 160 - 4.7 x 30 = 655 + 528 + 288 - 141 = 1330 kcal; with a light activity factor of 1.55 the total is 1330 x 1.55 = 2061.5 kcal.

3. A woman has a waist of 86 cm and hips of 100 cm. Find the waist-to-hip ratio and explain its health meaning. (4 marks)

> **Answer:** Ratio = 86 / 100 = 0.86. For women a ratio of 0.85 or above indicates central obesity with more visceral fat, raising cardiovascular and type 2 diabetes risk, so 0.86 is elevated.

4. A 40-year-old man plans moderate-intensity aerobic exercise. Find his maximum heart rate and target range. (5 marks)

> **Answer:** Maximum heart rate = 220 - 40 = 180 beats per minute; moderate intensity is 60% to 80%, i.e. 108 to 144 beats per minute.

B. Nutrition and Dietary Management (17 marks)

Carbohydrate and protein supply 4 kcal per gram and fat 9 kcal per gram; adults need 25 g of dietary fibre and less than 5 g of salt a day.

5. A meal contains 60 g carbohydrate, 25 g protein and 18 g fat. Find its total energy and the percentage from fat. (5 marks)

> **Answer:** Total = 60 x 4 + 25 x 4 + 18 x 9 = 240 + 100 + 162 = 502 kcal; fat supplies 162 / 502 x 100 = 32.3 %, slightly above the 30 % guideline.

6. A person takes only 18 g of fibre a day. Find the shortfall against the recommendation and the percentage shortfall. (4 marks)

> **Answer:** Shortfall = 25 - 18 = 7 g, i.e. 7 / 25 x 100 = 28 %. More whole grains, pulses, vegetables and

> fruit are needed.

7. A person takes 2 800 mg of sodium a day. Given salt is about 40 % sodium, find the equivalent salt and compare with the daily limit. (4 marks)

> **Answer:** Salt = 2 800 x 2.5 / 1 000 = 7 g (1 g sodium equals 2.5 g salt); against the 5 g limit that is 7 / 5 x 100 = 140 %, i.e. 40 % over.

8. A 60 kg adult uses 35 ml per kg of body weight. Find the recommended daily fluid intake in ml and litres. (4 marks)

> **Answer:** Intake = 35 x 60 = 2100 ml = 2.1 litres, and more with exercise or hot weather.

C. Stress and Mental Health (16 marks)

Adults are advised to sleep 7 to 9 hours a night; on a 40-point stress scale, 20 or above counts as high stress.

9. A student sleeps 6, 5, 7, 4, 6, 8 and 6 hours over seven nights. Find the mean and median and judge against the guideline. (4 marks)

> **Answer:** Mean = 42 / 7 = 6 hours; the median is 6 hours. Both fall below the 7 to 9 hour guideline, so sleep is insufficient.

10. A student scores 24 on a 40-point stress scale. Find the percentage and say whether referral is needed. (4 marks)

> **Answer:** Percentage = 24 / 40 x 100 = 60 %, above the 20-point high-stress threshold, so the school should refer the student to the counselling team and teach time management and relaxation skills.

11. A person breathes 16 times a minute at rest and 24 times when tense. Find the percentage increase and one mechanism. (4 marks)

> **Answer:** Increase = (24 - 16) / 16 x 100 = 50 %. The sympathetic nervous system releases adrenaline, raising heart and breathing rates as part of the fight-or-flight response.

12. A person has six counselling sessions at $600 each with a 50 % subsidy. Find the total cost and the out-of-pocket amount. (4 marks)

> **Answer:** Total = 600 x 6 = $3600; after a 50 % subsidy the person pays 3600 x 50 % = $1800.

D. Addictive Behaviour and Harms (17 marks)

One alcohol unit is 10 g of pure ethanol; ethanol density is about 0.789 g/ml. The adult caffeine limit is about 400 mg a day.

13. A person drinks 500 ml of beer at 5 % alcohol by volume. Find the ethanol mass and the number of alcohol units. (5 marks)

> **Answer:** Ethanol volume = 500 x 5 % = 25 ml; mass = 25 x 0.789 = 19.73 g; units = 19.73 / 10 = 1.97 units.

14. A person smokes one pack of 20 cigarettes a day at $78 a pack. Find the monthly and yearly spending. (4 marks)

> **Answer:** Monthly = 78 x 30 = $2340; yearly = 78 x 365 = $28470, enough to fund a holiday after one year of quitting.

15. A person drinks three cups of coffee with 95 mg of caffeine each. Find the intake and its percentage of the limit. (4 marks)

> **Answer:** Intake = 3 x 95 = 285 mg, which is 285 / 400 x 100 = 71.2 % of the limit: within it but close.

16. A person earning $20 000 loses $12 000 gambling in a month. Find the percentage of income and two warning signs. (4 marks)

> **Answer:** Share = 12 000 / 20 000 x 100 = 60 %. Warning signs include chasing losses by betting more, borrowing to gamble and hiding the behaviour.

E. Community Health and Social Care Services (16 marks)

Day care centres operate on subsidised places and staff ratios; home care planning must include travel and care time.

17. Three day care centres in a district have 45 places each and 180 older people need the service. Find the places, the unmet number and the percentage. (4 marks)

> **Answer:** Places = 3 x 45 = 135; unmet = 180 - 135 = 45 people, i.e. 45 / 180 x 100 = 25 %.

18. A centre serves 96 users. If the staff ratio improves from 1:8 to 1:6, how many more carers are needed? (4 marks)

> **Answer:** 1:8 needs 96 / 8 = 12 staff; 1:6 needs 96 / 6 = 16 staff, an increase of 4.

19. A home carer makes six visits a day, each with 45 minutes of care and 15 minutes of travel. Find the daily working hours. (4 marks)

> **Answer:** Each visit = 45 + 15 = 60 minutes; daily = 6 x 60 = 360 minutes = 6 hours, before any record keeping.

20. A centre has an annual budget of $1.2 million for 300 users. Find the average cost per user. (4 marks)

> **Answer:** Average = 1 200 000 / 300 = $4000, useful for comparing day care with home care on cost-effectiveness.

F. Health Promotion and Policy (16 marks)

Positive predictive value = true positives / (true positives + false positives); coverage is the vaccinated share of the target population.

21. A screening test is given to 1 000 people with 5 % prevalence, 90 % sensitivity and 90 % specificity. Find the positive predictive value. (4 marks)

> **Answer:** True positives = 1 000 x 5 % x 90 % = 45; false positives = 950 x 10 % = 95; PPV = 45 / (45 + 95) x 100 = 32.1 %, so only about one in three positives is a true case.

22. A district has 12 000 people in the target group and 8 400 vaccinated against influenza. Find current coverage and the number needed to reach 95 %. (4 marks)

> **Answer:** Coverage = 8 400 / 12 000 x 100 = 70 %; 95 % needs 11400 people, so 3000 more are needed.

23. A district health budget is $2.4 million, 40 % for prevention, serving 12 000 people. Find the prevention spending and the per capita amount. (4 marks)

> **Answer:** Prevention = 2 400 000 x 40 % = $960000; per capita = 960000 / 12 000 = $80.

24. Adult smoking prevalence in a city falls from 18 % to 12 %. Find the percentage-point drop and the relative fall, and suggest one policy measure. (4 marks)

> **Answer:** Drop = 18 - 12 = 6 percentage points; relative fall = 6 / 18 x 100 = 33.3 %. Measures include wider statutory no-smoking areas, higher tobacco duty and accessible cessation services.
