

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2015
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALIZATION PAPER for *Pharmacy*

Date	: 11 October 2015
Total Marks	: 100
Examination Time	: 150 minutes (2.5 hours)
Reading Time	: 15 Minutes (prior to examination time)

GENERAL INSTRUCTIONS:

1. Write your Roll Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided 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 and 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 under your choice.
4. 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 any or correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.
5. Begin each Section and Part in a fresh page of the Answer Booklet.
6. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
7. Use of any other paper including paper for rough work is not permitted.
8. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
9. This paper has 10 printed pages in all, 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 the correct answer chosen in the Answer Booklet against the question number. E.g. 31 (c). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Which if the following therapeutic class of antihypertensive is no longer recommended as a first – line therapy of hypertension?
 - a. ACE Inhibitor
 - b. Calcium channel blocker
 - c. Beta blocker
 - d. Thiazide diuretic

2. As per Vaughan Williams classification of antarrhythmic drugs, what class does Beta blockers come under?
 - a. Class I
 - b. Class II
 - c. Class III
 - d. Class IV

3. Phase inversion is a quality problem seen in which of the dosage forms?
 - a. Emulsion
 - b. Suspension
 - c. Mixture
 - d. Ointment

4. Choose the correct order of sedative propensity of antihistamines in their descending order:
 - a. Chlorpheniramine > Cetirizine > Promethazine
 - b. Promethazine> Cetirizine > Chlorpheniramine
 - c. Cetirizine > Promethazine > Chlorpheniramine
 - d. Promethazine > Chlorpheniramine > Cetirizine

5. Which of the following antibiotics is associated with QT prolongation?
 - a. Aminoglycosides
 - b. Fluoroquinolones
 - c. Cephalosporins
 - d. Macrolides

6. HLB system is used to classify which of the following?
 - a. Surfactants
 - b. Preservatives

- c. Antioxidants
 - d. Sequestering agents
7. Which of the following atypical antipsychotics is effective in negative symptoms but may cause agranulocytosis as a life threatening side effect?
- a. Olanzapine
 - b. Risperidone
 - c. Clozapine
 - d. Paliperidone
8. A drug has an elimination half life of 8 hours. How much will be eliminated in 16 hours?
- a. 100%
 - b. 75%
 - c. 50%
 - d. 25%
9. Which of the following is a reason for higher per kg drug dosing in children and infants compared to adults?
- a. Higher percentage of extracellular fluid volume and total body water.
 - b. Faster renal elimination of drugs
 - c. Efficient metabolism of drugs
 - d. Drug receptors in children are not well developed
10. Which of the following antiepileptics is effective in all forms of seizures?
- a. Phenytoin
 - b. Carbamazepine
 - c. Lamotrigine
 - d. Sodium valproate
11. Which of the following counselling point is NOT relevant to doxycycline?
- a. It should not be taken with milk and dairy products
 - b. It may impair the performance of skilled tasks
 - c. It should be taken with a glass of water while staying upright
 - d. Avoid exposure of skin to the direct sunlight
12. Which of the following is the most reliable laboratory parameter for assessing medication adherence in patients with diabetes mellitus?
- a. Fasting blood sugar
 - b. Post-prandial blood sugar
 - c. HbA1C
 - d. Total serum cholesterol

13. Which of the following antiretroviral drug requires renal function monitoring?
- Zidovudine
 - Lamivudine
 - Tenofovir
 - Efavirenz
14. All the following are the indications of beta blockers, EXCEPT:
- Left ventricular dysfunction
 - Stable angina
 - Myocardial infarction
 - Sinus bradycardia
15. Which of the following is measured to estimate the renal function?
- Uric acid
 - Creatinine
 - Albumin
 - Bilirubin
16. How many ml of 50% magnesium sulphate injection will be required if the dose prescribed is 1 gram?
- 0.5ml
 - 1ml
 - 2ml
 - 4ml
17. As per Bhutan Medicines Rules and Regulations 2012, under which schedule does Vaccines and Biological come under?
- Schedule A
 - Schedule C
 - Schedule E
 - Schedule F
18. Which of the following is most important risk associated with paracetamol overdose?
- Kidney damage
 - Acute liver failure
 - Pancreatitis
 - Thrombocytopenia
19. Which of the following score is used for risk stratification of stroke?
- CHADS₂
 - CURB
 - QRISK2
 - DMRD

20. Which of the following opioid is not used clinically because of its abuse potential?
- Diacetylmorphine
 - Diamorphine
 - Morphine
 - Tramadol
21. Which of the following is a live vaccine?
- Oral polio vaccine
 - Tetanus toxoid
 - Rabies vaccine
 - Pneumococcal vaccine
22. Which of the following is the actual purpose of Aluminium salts commonly added in vaccine preparations?
- As a stabilizer
 - As a preservative
 - As an opacifying agent
 - To enhance the immunogenicity of the vaccine
23. According to the World Health Organization definition, MDR – TB refers to:
- Resistance to rifampicin and ethambutol regardless of resistance to other first line drugs
 - Resistance to isoniazid and rifampicin regardless of resistance to other first line drugs
 - Resistance to isoniazid and pyrazinamide regardless of resistance to other first line drugs
 - Resistance isoniazid and streptomycin regardless of resistance to other first line drugs
24. All the following are phase I reactions involved in metabolism of drugs, EXCEPT?
- Oxidation
 - Reduction
 - Hydrolysis
 - Glucuronidation
25. Which of the following is not a pharmacokinetic interaction?
- Calcium salts and tetracycline
 - Benzodiazepines and alcohol
 - Rifampicin and oral contraceptive pills
 - Clarithromycin and anticoagulants
26. Competent person registered with Drug Regulatory Authority is approved/registered to undertake all the following, EXCEPT:
- Manufacture of medicines

- b. Retail sale of medicinal products
 - c. Sale medicinal products by wholesale trade and distribution
 - d. Prescribing of medicinal products
27. Which of the following anticancer agents is M phase specific?
- a. Doxorubicin
 - b. Cisplatin
 - c. Vincristine
 - d. Bleomycin
28. Which of the following agents has the least propensity to cause photosensitization?
- a. Doxycycline
 - b. Ciprofloxacin
 - c. Amiodarone
 - d. Verapamil
29. A middle age woman with diabetes and hypertension was initiated on following medications:
- I. Metformin 250mg BD
 - II. Amlodipine 5mg HS
 - III. Atorvastatin 10mg HS
 - IV. Aspirin 75mg OD
 - V. Ranitidine
- After a week she returns with a swollen feet. Which of the above medicines is the cause?
- a. I
 - b. II
 - c. III
 - d. None of the above
30. Regarding antimicrobial resistance, which of the following is FALSE?
- a. Prudent use of antimicrobials can eradicate antimicrobial resistance.
 - b. Pets can harbour antimicrobial resistant organisms.
 - c. Infections caused by multiple-drug resistant organism are more difficult to treat.
 - d. Bacteria can acquire genetic material for antimicrobial resistance from other bacteria.
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PART II – Short Answer Type Questions (20 Marks)

Answer ALL the questions. Each question carries 5 marks. Mark for each sub-question is indicated in the brackets.

1. “Clinical pharmacy is still an uncharted territory in the Bhutanese Health care system and a lot is desired out of pharmacists in contributing to the direct patient care.” Discuss. (5)
 2. What do you understand by the term Structural Activity Relationship? Discuss with a suitable example, its role in drug design. (2 + 3)
 3. What is antimicrobial resistance (AMR)? Describe the mechanisms involved in AMR. Enlist the factors contributing to emergence of resistance and the strategies to tackle it. (1 + 2 + 2)
 4. World Health Organization (WHO) recommends two methods of quantification of drug requirements which include the patient morbidity – standard treatment method and the adjusted consumption method. Discuss the scenarios where each method is useful and the advantages and disadvantages of each method.
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SECTION B

Case Study

Choose either Case 1 or Case 2 from this Section. Each Case carries 50 marks. Mark for each sub-question is indicated in the brackets.

Case 1

Mr Sonam, a 41year old man is overweight and has both hypertension and diabetes. He smokes 10 cigarettes a day and leads a not-so-active life. He comes to the pharmacy with prescription for following medications:

1. Metformin 1g twice daily
2. Glipizide 10mg twice daily
3. Atenolol 50mg once daily
4. Losartan 25mg once daily
5. Aspirin 75mg OD
6. Atrovastatin 20mg at bed time
7. Omeprazole 20mg OD
8. Amitriptylline 12.5mg at bed time

Some of his Laboratory test results relevant to the case are given below:

1. Fasting blood sugar: 163mg/dl
2. Post-prandial blood sugar: 220mg/dl
3. HbA1C: 8%
4. Total cholesterol: 160mg/dl
5. Serum creatinine: 1.2mg/dl

His blood pressure is 136/85mmHg and his pulse rate is 60bpm.

He was previously on following medications:

1. Metformin 1g twice daily
2. Glipizide 5mg once daily
3. Atenolol 50mg once daily
4. Hydrochlorothiazide 25mg once daily
5. Aspirin 75mg OD
6. Atorvastatin 20mg at bed time
7. Omeprazole 20mg OD

He says that he has been taking his medication regularly and has not missed any dose. He says he understands the importance of lifestyle modification but is too lazy. He is also not able to cut down on his cigarette smoking.

Answer the following questions:

1. What is diabetes mellitus? Give its clinical manifestations. (2 + 3)
2. Discuss the short term and long term complications of diabetes. (5)
3. Enlist at least five differences between the type 1 and type 2 diabetes. (5)
4. Going by the prescription, which type of diabetes do you think the patient is suffering from? Justify. (3)
5. Is his blood sugar level under control? If not, what is the target level of blood sugar for both fasting and post-prandial that he should be aiming for? (1 + 2)
6. What pharmacological category does glipizide belong to? What are its general side effects? What should you remind him in the view of increase in its dose during the visit? (1 + 2 + 2)
7. What is the maximum daily dose of metformin in adults? Give its contraindications? (1 + 2)
8. What are the other options of pharmacological treatment available for the patient? Discuss at least 2 pharmacological categories of antidiabetic drugs other than biguanide and sulfonylurea. (Your discussion should cover mechanism of action and their status in management of diabetes). (5)
9. Despite adequate control of his blood pressure, hydrochlorothiazide is replaced with losartan. Discuss the possible reasons. (2)

10. What are the advantages of daily low dose aspirin and statin in patients with diabetes and hypertension? State the possible reasons the patient has been put on amitriptylline. (4)
11. Going by the laboratory test result do you think the patient has had long term issue of uncontrolled blood sugar? Enlist the strategies to promote medication adherence in patients with diabetes. (1+4)
12. Discuss the non-pharmacological interventions that you would recommend to Sonam. (5)

Case 2

Ms. Pema, a 62 year old woman presented to the emergency department following haematemesis and melaena. She suffered no pain. She had non-ST-elevated myocardial infarction (NSTEMI), for which she had undergone percutaneous coronary intervention in India (after referral) 4 months ago. She stopped smoking 2 years previously, drinks alcohol in moderation and is not obese. He has been on following medications:

1. Aspirin 75mg once daily
2. Clopidogrel 75mg once daily
3. Enalapril 5mg after dinner
4. Atorvastatin 20mg daily
5. Bisoprolol 5mg daily
6. Isorbide dinitrate 5mg (sublingual) three times daily

On investigation her haemoglobin was found to be 7g/dl. Her blood pressure was 95/60mmHg with a heart rate of 115bpm and respiratory rate of 20bpm. Her serum creatinine was 1.1mg/dl. Serum sodium and potassium was 140mmol/L and 4.3mmol/L, respectively. Endoscopy revealed an actively bleeding gastric ulcer.

Answer the following questions

1. What immediate treatment should Pema receive? (2)
2. Do you think the patient's conditions warrant stopping any of the drugs she is on? If so which are the likely drugs to be stopped? (1 + 2)
3. Describe the causes of peptic ulcer disease (PUD)? How is dyspepsia different from PUD? (3 + 2)
4. Which medicines in Pema's prescription must have contributed to PUD for Pema? What do you think she should have been receiving for prophylaxis of PUD along with the medications for management of NSTEMI? (2 + 3)
5. During the endoscopy a biopsy was taken. What purpose do you think the biopsy report will serve in treating her condition? (3)
6. Discuss the current approach for treatment of peptic ulcer disease. (5)

7. What is the role of *Helicobacter pylori* in PUDs? Describe the WHO regimes for eradication of *H. Pylori* infection. (2 + 3)
8. To what pharmacological category does omeprazole belong? Give its mechanism of action and the recommended dose and duration for both treatment and prophylaxis of PUD. (1 + 4)
9. Do antacids have a role in treatment of PUD? Justify. (3)
10. Do you think the use of dual antiplatelet therapy is appropriate? If so, provide justifications supporting your statement? (1 + 3)
11. Discuss options of pharmacological treatment to correct her anaemia? (5)
12. Describe Pema's educational needs in terms of her medicines. (5)
