

**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2018  
EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALISATION PAPER FOR PHARMACY**

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<b>Date</b>	: 7 October 2018
<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 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 & SECTION B:
  - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions  
Part II - 4 Short Answer QuestionsAll 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 correct Section, Part and Question Number will NOT be evaluated and no marks will 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 **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. A diabetic patient was recently initiated on oral hypoglycaemic agent. She comes back to the pharmacy with complaint of intense gastric irritation. Which of the following agent she is most likely to have been put on?
  - a) Biguanide
  - b) Sulphonylurea
  - c) Meglitinide
  - d) DPP inhibitor
2. Metronidazole is a drug of choice in all of the following conditions, EXCEPT:
  - a) *Clostridium difficile* infection
  - b) Candidiasis
  - c) Amoebiasis
  - d) Trichomoniasis
3. Which of the following activity is responsible for extrapyramidal side effects associated with antipsychotics?
  - a) Antiadrenergic
  - b) Anticholinergic
  - c) Antidopaminergic
  - d) Serotonnergic
4. Which of the following is in correct descending order of steroids in terms of potency?
  - a) Dexamethasone > Prednisolone > Methylprednisolone > Hydrocortisone
  - b) Prednisolone > Dexamethasone > Hydrocortisone > Methylprednisolone
  - c) Dexamethasone > Methylprednisolone > Prednisolone > Hydrocortisone
  - d) Methylpredisalone > Prednisolone > Dexamethasone > Hydrocortisone
5. Which of the following opioid analgesics should not be used for long term analgesia?
  - a) Pethidine
  - b) Codeine
  - c) Morphine
  - d) Buprenorphine

6. Which of the following vaccines requires to be administered annually depending on the strain of organisms expected in the upcoming season?
  - a) Pneumococcal vaccine
  - b) Influenzae vaccine
  - c) Measles & Rubella vaccine
  - d) Varicella vaccine
  
7. Which of the following sweetener is not suitable for use in patients with phenylketonuria?
  - a) Aspartame
  - b) Mannitol
  - c) Sucrose
  - d) Saccharin
  
8. The apparent volume of distribution of a drug is 500L. If the target dose required is  $2.0\mu\text{gL}^{-1}$ , what should be the loading dose?
  - a)  $2000\mu\text{g}$
  - b)  $1000\mu\text{g}$
  - c)  $500\mu\text{g}$
  - d)  $250\mu\text{g}$
  
9. Which of the following is an antibiotic of choice for treatment of rickettsial disease?
  - a) Ampicillin
  - b) Doxycycline
  - c) Erythromycin
  - d) Vancomycin
  
10. All the following statements about tricyclic antidepressants are true, EXCEPT:
  - a) They act by inhibiting reuptake of noradrenaline and serotonin.
  - b) They are associated with anticholinergic side effects.
  - c) They are the first-line antidepressants currently available.
  - d) They are also effective in treatment of neuropathic pain.
  
11. Which of the following is not an enzyme inducer?
  - a) Erythromycin
  - b) Rifampicin
  - c) Carbamazepine
  - d) Phenobarbitone
  
12. Which of the following antibiotic is not suitable for treatment of MRSA?
  - a) Vancomycin
  - b) Linezolid
  - c) Teicoplanin
  - d) Meropenem

13. Which of the following antipsychotics is least likely to cause metabolic side effects?
- a) Aripiprazole
  - b) Olanzapine
  - c) Quetiapine
  - d) Risperidone
14. Angiotensin converting enzyme inhibitors and angiotensin receptor blockers have in common most of the adverse effects, EXCEPT:
- a) Hyperkalaemia
  - b) Dry cough
  - c) Hypotension
  - d) Dizziness
15. Which of the following agent is preferred for rate control in patients with atrial fibrillation and heart failure?
- a) Amiodarone
  - b) Digoxin
  - c) Dofetilide
  - d) Verapamil
16. Which of the following oral hypoglycaemic agents is contraindicated in heart failure?
- a) Metformin
  - b) Glipizide
  - c) Pioglitazone
  - d) Vildagliptin
17. A HIV patient recently started on antiretroviral medication reports of occasional hallucination. Which of the following medications would you attribute this to?
- a) Zidovudine
  - b) Emtricitabine
  - c) Nevirapine
  - d) Efavirenz
18. All the following statements about fluoxetine is incorrect, EXCEPT:
- a) It is no longer used as the first-line antidepressant because of extrapyramidal side effects.
  - b) It is used for treatment of peripheral neuropathies.
  - c) Its daily dose is preferably given in the morning.
  - d) It is the antidepressant of choice in pregnancy.

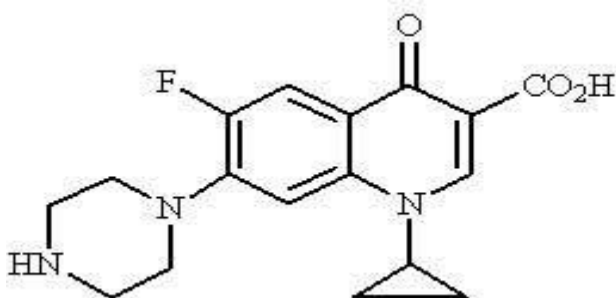
19. Following are the counselling points usually covered during dispensing of medicines.

- I. It should be taken with meals to avoid GI irritation.
- II. Do not drive or operate machineries.
- III. It should not be taken with dairy products.
- IV. Avoid direct exposure to sunlight while on it.
- V. Drink plenty of fluids.

From the above, choose the most appropriate counselling points for doxycycline.

- a) I & II
  - b) II & III
  - c) III & IV
  - d) IV & V
20. Which of the following immunomodulator acts through inhibition of tumour necrosis factor –  $\alpha$ ?
- a) Infliximab
  - b) Rituximab
  - c) Adalimumab
  - d) Tocilizumab

21. The structure given below is a synthetic antibacterial agent:



To which class of antibiotics does this compound belong?

- a) Aminoglycoside
  - b) Fluoroquinolone
  - c) Macrolide
  - d) Nitrofuran
22. Which of the following is not a catecholamine?
- a) Adrenaline
  - b) Noradrenaline
  - c) Dopamine
  - d) Phenylephrine

23. Who is attributed to have isolated and extracted morphine from opium?
- Charles Wright
  - Felix Hoffmann
  - Friedrich Serturner
  - Heinrich Dreser
24. Which of the following method is used for evaluation of suppositories?
- Melting range test
  - Breaking test
  - Liquefaction
  - All of the above
25. Dose dumping is a problem in which of the following formulation?
- Compressed tablet
  - Suppository
  - Sub-lingual tablet
  - Controlled release tablet
26. Which of the following method is used for determining moisture content?
- Gas Chromatography
  - K-F Method
  - IR spectroscopy
  - Cascade impactor
27. Which of the following diameter of the mesh aperture is generally recommended by the pharmacopoeias for the disintegration apparatus?
- 3 mm
  - 2 mm
  - 1mm
  - 0.5 mm
28. In inventory control, which of the following best describes the purpose of ABC analysis?
- It is a categorization and arrangement of goods by their alphabetical order.
  - It is a categorization of goods in descending order of their quantities.
  - It is a categorization of items in terms of monetary value to impose high inventory control on goods with high value.
  - It is a categorization of goods based on their criticality in running of the organization.

29. According to the Bhutan Medicines Act of the Kingdom of Bhutan, 2003 who is the chairman of the Bhutan Medicines Board?
- Minister of Health
  - Secretary of Health
  - Drug Controller
  - Government Analyst
30. Drugs inspectors are empowered to perform the following duties, EXCEPT:
- Inspect premises where any medicinal product is being manufactured, sold, stocked or distributed.
  - Take samples of medicinal products for testing.
  - Search any person or premise, whenever he has reason to believe that an offence is being committed.
  - Examine persons applying for registration as a competent person.

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

**This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.**

1. What are monoclonal antibodies? Discuss their therapeutic applications. (2 + 3=5)
2. Describe the types of insulin preparations commercially available based on the onset and duration of action. (5)
3. WHO defines palliative care as “an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems physical, psychosocial and spiritual” Discuss at least five categories of medicines used in palliative care setting to alleviate the problems. (5)
4. What do you understand by the term “Good Manufacturing Practice”? Explain its importance in ensuring quality of pharmaceutical products. (2 + 3=5)

SECTION B

Case Study

Choose either Case I OR Case II from this section. Each case study carries 50 marks.

Case I

Penjor, a 57 year old man was diagnosed as a case of Rheumatoid Arthritis (RA) 3 years ago. He is also hypertensive. His current medications include the following:

- a. Methotrexate 15mg PO once weekly
- b. Folic acid 5mg PO once daily
- c. Hydroxychloroquine 200mg PO once daily
- d. Prednisolone 5mg PO once daily
- e. Hydrochlorthiazide 25mg once daily
- f. Omeprazole 20mg once daily

During his recent review by the rheumatologist, his symptoms were found to have flared up.

Following are some of his the recent laboratory results:

Haemoglobin	13g/dL	(13.0-18.0)
WBC	$7.8 \times 10^3/\mu\text{L}$	$(4.0 - 11 \times 10^3)$
Platelets	$219 \times 10^3/\text{L}$	$(150 - 450 \times 10^3)$
Plasma sodium	142mEq/L	(135 -145)
Plasma potassium	4.5mEq/L	(3.5 - 4.5)
Plasma urea	8mg/dL	(15 - 45)
Plasma creatinine	0.9mg/dL	(0.8 - 1.4)
Plasma glucose (random)	131mg/dL	(110 - 160)
C-reactive protein	44mg/dL	<10
Erythrocyte sed. rate	80mm/hr	(0 - 20)

His new prescription reads as follows:

- a. Prednisolone 30mg PO once daily for 1 week  
20mg PO once daily for 1 week  
10mg PO once daily for 1 week  
5mg PO once daily to be continued
- b. Omeprazole 20mg PO twice daily
- c. Methotrexate 15mg PO once weekly
- d. Folic acid 5mg PO once daily
- e. Hydroxychloroquine 200mg PO once daily
- f. Sulfasalazine 500mg PO twice daily

Answer the following questions:

1. What is rheumatoid arthritis? Describe the clinical features of RA? (2 + 3)
2. What investigations are performed to confirm the diagnosis of RA? (2)



3. Both rheumatoid arthritis and osteoarthritis involve inflammation of joints. Explain how RA is different from osteoarthritis. (5)
4. Discuss the goals of treatment of RA? (3)
5. Methotrexate belongs to a category of medicines called DMARD. What does DMARD stand for? Describe in brief their mode of action. What are the 2 other medicines in the prescription which belong to the same category? (1 + 2 + 2)
6. Why is folic acid supplementation given in patients taking methotrexate? (3)
7. Penjor was prescribed a high dose prednisolone with the guidance to taper to maintenance dose of 5mg daily. Why does use of high dose steroid require tapering? (2)
8. Discuss the adverse effects associated with long term use of steroids and the measures to address each adverse effect. (5)
9. Why do you think sulfasalazine was added to the prescription? Discuss how its dose titration is to be carried out. (2 + 3)
10. Sulfasalazine is chemically composed of two distinct chemical entities linked by an azo bond, one of which is sulfapyridine. What is the other component? Which of the two is responsible for the pharmacological activity? Describe how and where the cleaving of the azo bond occurs. (1 + 1 + 3)
11. Hydroxychloroquine was primarily developed as an antimalarial agent. What is the current strength of evidence for use its use in RA? What are the concerns surrounding its long term use? What is the maximum maintenance dose of hydroxychloroquine that can be considered in RA? (2 + 2 +1)
12. Discuss other therapeutic options available for treatment of RA. (5)

### **Case II**

Aum Dema, a 68 year old woman was admitted to the Emergency Department with dizziness, palpitation and shortness of breath. She had been having dizziness and palpitation for last 5 days. Her previous medical history include hypertension and heart failure (ejection fraction <40%). She is also hypertensive. Her current medication includes the following:

- i. Enalapril 2.5mg PO twice daily
- ii. Metoprolol 25mg PO once daily
- iii. Aspirin 75mg PO once daily
- iv. Furosemide 20mg PO one each in the morning

On examination, her blood pressure was found to be 130/80mmHg. Her pulse was 88 beats per minute and irregularly irregular. The diagnosis of atrial fibrillation (AF) was confirmed with ECG. Her laboratory tests including the complete blood count, liver function tests, electrolytes and renal function tests were found to be normal.

She was transferred to the medical ward where her AF was confirmed as persistent AF. It was decided to continue her ventricular rate control with metoprolol. Assessment of risk of stroke was done using CHADS<sub>2</sub> score and the decision was made to put her on thromboprophylaxis.

Answer all the questions:

1. What is atrial fibrillation (AF)? What are the common symptoms of AF? (2 + 3)
2. Discuss the goals of treatment for Aum Dema. (3)
3. Ventricular rate control has been opted as the treatment strategy to treat AF for the patient. What factors in this patient do you think would have influenced this choice? (2)
4. Rhythm control is another strategy employed for treatment of AF. Discuss various strategies employed for restoration and maintenance of sinus rhythm and the scenario in which each strategy is employed. (5)
5. Give the classification of antiarrhythmics according to Vaughan-Williams classification with suitable examples. (5)
6. How is atrial flutter different from atrial fibrillation? Discuss the treatment strategies involved in atrial flutter. (2 + 3)
7. Discuss the need for thromboprophylaxis in patients with AF. How is CHADS<sub>2</sub> score useful in assessing the need for thromboprophylaxis? (3 + 2)
8. Describe warfarin as the drug choice for long term thromboprophylaxis in AF. Why is monitoring of INR required in patients receiving warfarin? (3+ 2)
9. Assuming that Aum Dema is being dispensed warfarin for the first time, discuss the counselling points that you would include in the counselling session. (5)
10. Discuss the current evidence on use of novel oral anticoagulants for thromboprophylaxis in AF. Enlist the advantages of their use over warfarin. (3 + 2)
11. Given the new diagnosis of AF, do you think any change is required in Aum Dema's current prescription? If yes, justify. (2 + 3)

**TASHI DELEK**