Higher Specialist Diploma

Medical Microbiology

Examination 2019

Paper 3

Discipline-specific questions

120 minutes

Attempt 3 out of 6 questions

<u>Instructions to candidates</u>

1. Record your candidate number, qualification title and where appropriate the discipline and examination paper number on the front sheet of the answer booklet

2. Record your candidate number and the page number in the spaces provided on the answer sheets

3. Begin each new answer on a new page

4. Write on one side of the answer sheet only

5. Each question is worth 100 marks

1. Discuss the role of *Candida auris* in nosocomial outbreaks around the world

2. Compare and contrast the different diagnostic methods for *Mycobacterium tuberculosis* infections.

3. Using examples discuss the major resistance issues seen in Gram-negative organisms related to the production of beta-lactamases

4. Discuss microbiology testing strategies aimed at improving patient flow within the hospital environment. Your answer should include consideration of rapid screening and current bottleneck areas.

5. Evaluate the types of laboratory tests used in the diagnosis of *Clostridium difficile* infections.

6. Critically review MRSA transmission in hospitals and what measures have been used to reduce the incidence of healthcare-associated MRSA.

Higher Specialist Diploma

Medical Microbiology

Examination 2019

Paper 4

Case studies

120 minutes

Attempt all case studies

<u>Instructions to candidates</u>

1. Record your candidate number, qualification title and where appropriate the discipline and examination paper number on the front sheet of the answer booklet

2. Record your candidate number and the page number in the spaces provided on the answer sheets

3. Begin each new answer on a new page

4. Write on one side of the answer sheet only

5. Each case study is worth 100 marks

Seen Case Study

Dear Colleague,

The UKNEQAS for Antibiotic Assays

I am writing to you, unaware of your identity since you are only known to me by your UK NEQAS Laboratory Number (above). My reason for writing is that in the 6 months up to **April 2018** your laboratory reported on the specimens distributed for **Vancomycin** assay and your laboratory score was:

<div align="center">

A: 286 (Acceptable: <200)

B: 16.87 (Acceptable ± 15)

C: 6.23 (Acceptable ± 15)

</div>

The fundamental reason your laboratory has been classed by the scheme as a poor performer is that the Accuracy and Bias of your assay is not as expected and out of consensus.

Conditions for participation by UK clinical laboratories in EQA

I realise that you have probably already taken corrective measures but I thought you should know that I am obliged under conditions for UK clinical laboratories laid down by the JWG on Quality Assurance to bring this to the attention of the National Quality Assurance Advisory Panel for Medical Microbiology. Please note however your identity will not be revealed to them; you will again be identified by your UK NEQAS Laboratory Number only.

I hope that your EQA returns will be consistently accurate in the future. However, should you need any help or advice, please do not hesitate to contact me.

Finally I would be grateful if you would acknowledge receipt of this letter to the above email address.

Yours sincerely,

Professor XYZ - *Organiser, UK NEQAS for Antibiotic Assays*

You have been asked by your Quality Manager to investigate the root cause of the reported vancomycin errors following receipt of a poor performance letter from your EQA provider.

a. Briefly discuss the benefits of participation in EQA schemes   (20 marks)

b. Formulate an action plan to investigate the poor performance.   (30 marks)

c. Briefly explain the monitoring requirements for patients prescribed IV vancomycin

(15 marks)

Your investigation has determined that only one other EQA participant uses the same vancomycin kit as your laboratory which may explain the out of consensus results. Further review indicates that your results have been 20% above the acceptable bias cut-off across all test values.

d. Explain the clinical impact of reporting vancomycin results above the acceptable bias cut-off (10 marks)

The Clinical Governance lead in your department has advised that a look-back exercise is required to establish if any adverse clinical effects have arisen as a result of these inaccuracies.

e. Describe the steps you would undertake to identify any at risk patients. (20 marks)

Two months after your department decided to switch to an alternatively sourced vancomycin kit, the original supplier informed you that they were producing a new assay as they had identified a problem with over-reporting levels.

f. If the erroneous kit was still available what would you do to ensure other potential users were advised of the continued risk of over-reporting? (5 marks)

Unseen Case Studies

2.
A 78-year-old man was admitted to hospital in late June 2018 presenting with symptoms of severe headache and vomiting, slight neck stiffness and a temperature of 39.3°C.

On further examination his speech was noted as being slightly slurred and his family reported that he appeared confused when found at home. Health records showed that he had insulin dependent diabetes and a diagnosis of hypertension. A Glasgow coma scale test was carried out with a resulting score of 13.

a. What do you consider the most likely diagnosis? You should comment on all of the information above when deciding. Suggest causative organisms given the age of the patient. (15 marks)

A CT scan was ruled out however a Lumber puncture was carried out, blood cultures and a pharyngeal swab were also taken. Serum glucose levels were also ascertained.

b. Comment on the relevance of the samples taken, any procedural requirements, risks and resulting symptoms.   (10 marks)

c. Detail culture media and associated incubation conditions required for the CSF sample, giving reasons to support your choices.   (5 marks)

d. Suggest initial empirical antibiotic treatment that could be considered post LP (5 marks)

The initial CSF results were as follows:

Appearance	Cloudy
Red Blood Cells	None seen
Leucocytes	1500×10^6/L (predominantly polymorphs)
Protein level	2.5g/L
Glucose	CSF: serum ratio 0.30
Gram Stain	Gram positive cocco-bacilli in appearance with some in short chains

e. Explain the above results and the relevance to your initial diagnosis.   (30 marks)

After 30hrs incubation growth was observed on the blood agar, with colonies being around 1mm and having a smooth translucent ground glass appearance surrounded by a zone of hazy β-haemolysis, initial tests showed the organism to be catalase positive. On day 2, the blood culture flagged positive and a similar Gram stain result was observed. No organisms of significance were obtained from the pharyngeal swab.

f. What is your final diagnosis and identification of the causative agent? What tests could be used to confirm your choice.   (30 marks)

g. Following identification of the causative agent what changes if any should be made to the treatment regime.   (5 marks)

3.
The subject is a 47-year-old woman who has recently returned from a one-week business trip to Russia. Here she had made several trips to inspect run-down, Soviet-era tower blocks and met with a number of their inhabitants.

She was complaining of a severe sore throat, moderate fever, listlessness and also she had some problems swallowing. Clinical examination of her throat revealed inflammation and a thick, tough, greenish, fibrinous exudate on her pharynx. Further examination of this subject revealed she was also suffering from tachycardia.

a.   Using the case information above provide and justify a provisional diagnosis. (15 marks)

b.   Devise an investigative strategy for the laboratory diagnosis of infection and review the expected results.   (40 marks)

c.   Explain the role of the reference laboratory in the confirmation of infection. (10 marks)

d.   Suggest how and why the patient might have acquired this infection.   (25 marks)

e.   What is the prognosis in this case and what treatment and prophylaxis is available?
                                                                                              (10 marks)