Model Question Paper (Blank) is on next page

Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2021

Course: Pathogenesis of Infectious Diseases — **Semester: II**
Program: M.Sc. Microbiology — **Time: 03 hrs.**
Course Code: HSMB7020 — **Max. Marks: 100**

Instructions: Read question carefully.

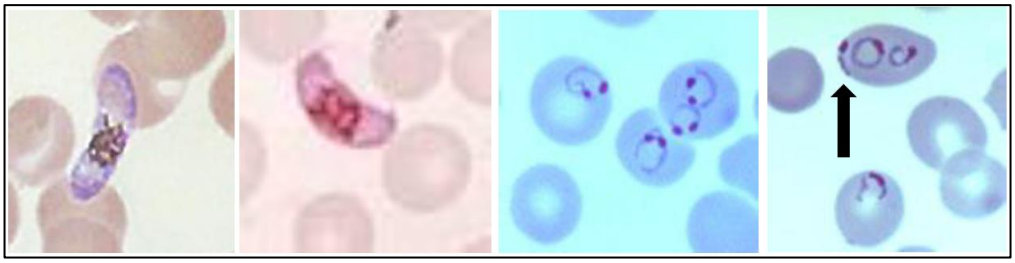
SECTION A

S. No.	MCQ's /Fill in the blanks/ T&F (1.5 marks each)	**30 Marks**	**CO**
1	**The following infections caused by *Escherichia coli*, except:** a. Urinary tract infections b. Septic infections of wounds c. Diarrhea d. Dysentery e. Meningitis	**1.5**	**CO3**
2	**Drugs used against tuberculosis (TB) are** a. Rifampicin, Isoniazid b. Pyrazinamide, Streptomycin c. Both a and b d. None of these	**1.5**	**CO3**
3	**Septicemia is** a. Bacteria in blood b. Toxin in blood c. Pus in blood d. Multiplication of bacteria and toxins in blood	**1.5**	**CO1**
4	**The causative agent of scrub typhus:** a. *R. quintana* b. *R .rickettsii* c. *R. orinetalis* d. *R. prowazekii*	**1.5**	**CO3**
5	**Black water fever is caused by** a. *P. vivax* b. *P. falciparum* c. *P. ovale* d. None of these	**1.5**	**CO5**
6	Write three important virulence factors of *Helicobacter pylori*.	**1.5**	**CO3**
7	**Skin of the healthy person has normal microbial flora which includes** a. Enterobacteriaceae b. Aerobic diphtheria bacilli c. Anaerobic diphtheriae bacilli d. Nonhemolytic staphylococci e. All of these	**1.5**	**CO1**
8	**Which of the following amoeba does not live in large intestine?** a. *Entamoeba coli*	**1.5**	**CO5**

	b. *Entamoeba histolytica* c. *Endolimax nana* d. *Entamoeba gingivalis*		
9	**Which organism is responsible for causing fever to a man dealing with goats?** a. *Treponema pallidum* b. *M. tuberculosis* c. *Clostridium novyl* d. *Brucella melitensis* e. None of these	**1.5**	**CO1**
10	**The smallest amount of chemotherapeutic agents required to inhibit the growth of the organism in Vitro is known as:** a. MIC (minimum inhibitory concentration) b. Thermal death point (TDP) c. Death rate d. None of these	**1.5**	**CO1**
11	A 24-year-old woman at 32 weeks gestation was confirmed through ultrasound that her foetus had hydrocephaly. This clinical manifestation is thought to be due to an infection acquired during her current pregnancy. The organism which causes this congenital anomaly is A. *Trypanosoma cruzi* B. *Plasmodium vivax* C. *Toxoplasma gondii* D. *Trypanosoma brucei* E. *Leishmania donovani*	**1.5**	**CO5**
12	Six months after a 2-week vacation in the countryside in central India, a 22-year old female patient developed irregular fever with chills and rigors, abdominal discomfort with hepatosplenomegaly. These clinical manifestations are thought to be due to an infection acquired via insect bite. The likely organism to cause these clinical manifestations is A. *Trypanosoma cruzi* B. *Loa loa* C. *Leishmania donovani* D. *Toxoplasma gondii* E. *Trypanosoma brucei*	**1.5**	**CO5**
13	A mother takes her 6 year old son to her general practitioner (GP) extremely anxious because the child has that morning pricked himself with a needle he found in a park frequented by drug users. Apart from a minor scratch to the right hand the child is otherwise well and has no past medical history of note. Select the most appropriate action for the GP at this consultation. A. Issue HIV post exposure prophylaxis to the child B. Reassure the mother and suggest an accelerated course of Hepatitis B vaccine C. Send the needle to the lab for testing D. Suggest accelerated course of Hepatitis B vaccine and Hepatitis C immunization E. Test the child for Hepatitis C, HIV, Hepatitis B surface antigen	**1.5**	**CO2**
14	**Incubation period for infective Hepatitis disease is _____.** a. 45 – 80 days b. 15 – 35 days c. 35 – 50 days	**1.5**	**CO2**

	d. 5 – 15 days		
15	**Toxic shock syndrome is caused by _____.** a. *Staph. albus* b. *Staph. aureus* c. *Strep. viridana* d. None of these	**1.5**	**CO3**
16	**Mantoux test detects _____.** a. *M. tuberculosis* b. Cynaobacteria c. Clostridia d. Both a and b	**1.5**	**CO3**
17	**Dengue virus is transmitted from man to man by the _____.** a. Sand fly b. Ticks c. *Aedes aegypti* d. Culex	**1.5**	**CO2**
18	**Kinetosomes are observed in _____.** a. Algae b. Fungi c. Protozoa d. Viruses	**1.5**	**CO1**
19	Virus that infects *Mycoplasma* is known as_____.	**1.5**	**CO1**
20	**Aflatoxin is produced by_____.** a. *Aspergillus sps* b. *Penicillium sps* c. *Alternaria sps* d. None of these	**1.5**	**CO4**
	SECTION B (5 marks each question)		
Q	Short Answer Type Question (5 marks each) Scan and Upload 4 questions 5 marks. Word limit (100-120)	**20 Marks**	**CO**
1	What are neglected tropical diseases (NTDs)? Name three common anti-parasitic drugs used to treat major enteric parasitic infections. What are the challenges for developing novel anti-parasitic chemotherapeutics?	**5 (1+2+2)**	**CO5**
2	**Match the following virulence factors with their respective modes of action from A to F:** 1. Hyaluronidase — A. Destroys the integrity of the cytoplasmic membrane of cells 2. Haemolysin — B. Bind to plasminogen and activate the production of plasmin 3. Streptokinase — C. Helps bacteria to spread through subcutaneous tissue 4. Lecithinase — D. Dissolves collagen 5. *Coagulase* — E. Causes lysis of RBC's, make iron available for microbial growth F. convert fibrinogen to fibrin clot	**5**	**CO1**
3	Many antiviral drugs act by inhibition of a viral DNA polymerase enzyme. Which of the following viral infection can be effectively treated with such type of anti-viral drugs and why? A. Cytomegalovirus B. Influenza C. Measles D. Mumps	**5**	**CO2**

	E. Rabies		
4	Write the toxins and symptoms associated with their ingestion by animals and humans of foodstuffs (e.g., grain, cheese), contaminated with *Aspergillus* and *Penicillium*?	**5**	**CO4**
	SECTION C 30 marks		
Q	**Two case studies 15 marks each subsections**	**30 Marks**	**CO**
1	Case Study 1 (Word limit-250-300) Majority of ***Helicobacter pylori*** infections in human are chronic and showed **asymptomatic to mild abdominal discomfort**. However, with disease progression, the infection can leads to duodenal and **gastric ulcer disease and gastric cancer**. I**t is the second leading cause of cancer-related deaths worldwide**. Specific determinants for these diverse disease outcomes still remain elusive; however, host genetics and pathogen's genotypes could be two potential factors. It has been hypothesize that genetic make-up of infecting strains potentially contribute to pathophysiology and outcome of infection. If you are instructed to evaluate this potential relation between pathogen's genotypes and outcome of infection in an endemic settings: **Q1:** What could be your research strategy to verify that? (word limit: 120) **Q2:** What are the different types of study population you will include in your study and why? (word limit: 80) **Q3:** Assume you have successfully identified the pathogen's genetic determinants, what could be your future direction of study? (word limit: 120) **Q4:** What are the antibiotics used to treat *H. pylori* infection?	**15 (5+3+5+ 2)**	**CO1**
2	Case Study 2 (Word limit- 250-300) A physician in Texas suspects one of his patients has botulism, a potentially fatal and notifiable illness. The physician reports the suspect case to the Texas Department of State Health Services who in turn notify the United States Centers for Disease Control and Prevention (CDC). As the CDC epidemiologist assigned to the case, it is your responsibility to determine the source of illness and to suggest means to prevent others from becoming ill. This involves interviewing the patient, determining potential exposure sources, determining what should be tested, interpreting laboratory results, helping to determine necessary actions to prevent others from becoming ill, and helping to determine actions necessary to prevent future occurrences. To determine the source of infection, you have been provided the following list of foods, the patients consume day before infection: unrefrigerated vacuum-packaged meat, unprocessed milk (in room temperature), boiled egg and bread. **Q1:** What symptom(s) distinguishes botulism from other microbiological foodborne illnesses?	**15 (3 + 3 + 5 + 4)**	**CO3**

	Q2: What could the potential source of infection from the list of foods, provided above and why? **Q3:** Write the mode of action of botulinum toxins. (word limit: 120) **Q4:** How you can treat a patients with botulism? (word limit: 100)		
	SECTION- D 20 marks		
Q	Long Answer type Questions Scan and Upload (10 marks each) Word limit 200-250	**20 Marks**	**CO**
1	The following images (oil immersion power, 1000x) are obtained from the blood smear of patient, suffering from fever, headache, muscle aches and weakness.  **Q1:** Identify the pathogen and the disease it cause. **Q2:** How the pathogen enters into human body? **Q3:** How the pathogen establish the infection within human body? (word limit: 100) **Q4:** What are the drugs available to control the infection?	**10 (2+2+3+ 3)**	**CO5**
2	**Option list:** **A.** *Calymmatobacterium granulomatis* **B.** *Candida albicans* **C.** *Chlamydia trachomatis* **D.** *Cryptococcus neoformans* **E.** *Haemophilus ducreyi* **F.** *Herpes simplex virus, type 2* **G.** *Human papilloma virus type 6* **H.** *Neisseria gonorrhoeae* **I.** *Treponema pallidum* **J.** *Trichomonas vaginalis* For each of the following clinical scenarios, select the most likely infecting organism from the list of options. Each option may be used once, more than once, or not at all. **1.** A 17 year old heterosexual male presents to his general practitioner with a 24 hour history of painful dysuria and a thin urethral discharge. Nothing abnormal is found on	**10 (2x5)**	**CO2, CO3, CO4, CO5**

	examination. A Gram-stained smear of an uretheral swab shows numerous pus cells and scattered intra-and extra-cellular Gram-negative diplococci. **2.** A 30 year old heterosexual male treated for gonococcal urethritis returns to the surgery 5 days later with a relapse of dysuria and urethral discharge. Bacterial culture of a urethral swab is reported as negative. **3.** A 38 year old homosexually-active male presents with a painless ulcer at the anal margin. He has had a steady partner for 5 years and not left the UK during the past 2 years, but had receptive anal intercourse with a new partner 3 weeks ago. **4.** A 25 year old female presents with a short history of severe vulvo-vaginal inflammation and whitish discharge. She denies having had intercourse for the past month. Two weeks ago she had an episode of dysuria which was treated by her general practitioner with a 5 day course of amoxicillin. **5.** A 25 year old woman presents with dysuria and vaginal soreness. She admits to several similar episodes during the past year. On examination the external genitalia show extensive inflammation with a few vesicular lesions on the periphery.		