

INI CET Microbiology

Sample Paper – 9

Duration: 14 Minutes

Maximum Marks: 15

Instructions

- This paper contains **15** Multiple Choice Questions (Single Best Response), modelled on the Microbiology content of **INI CET** (Institutes of National Importance Combined Entrance Test) conducted by AIIMS New Delhi.
- The **15-question** length matches the number of Microbiology items you actually meet in the real 200-question paper.
- Each correct answer carries **+1 mark**. There is **negative marking of one-third (0.33) mark** for every incorrect answer; unattempted questions carry no penalty.
- Every question has **exactly one best answer**. Choose the single most appropriate option.
- Attempt this practice paper in one timed sitting of about **14 minutes**, the pace the real computer-based test demands.

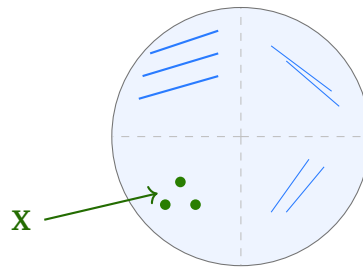
General Microbiology and Sterilization

- Q1.** The heat-stable toxic component of the gram-negative outer membrane that triggers fever and septic shock, and whose active moiety is lipid A of the lipopolysaccharide, is best described as an:
- (A) Secreted A-B exotoxin
 - (B) Superantigen protein
 - (C) Endotoxin (lipopolysaccharide, lipid A)
 - (D) Capsular polysaccharide
- Q2.** A busy endoscopy unit needs a liquid chemical agent to high-level disinfect heat-sensitive flexible endoscopes that cannot be autoclaved. Which agent is most appropriate?



- (A) 70% ethyl alcohol
- (B) 1% cetrime
- (C) Carbolic acid (5% phenol)
- (D) 2% glutaraldehyde

Q3. On the agar plate shown below the inoculating loop has been drawn across four sectors in turn, re-streaking from the previous sector so that fewer organisms are deposited each time, until well-separated colonies appear in the last sector marked **X**. The main purpose of this technique is to:



- (A) Test antibiotic susceptibility
- (B) Measure the total viable count
- (C) Detect haemolysis on the medium
- (D) Obtain isolated single colonies from a pure culture

Immunology

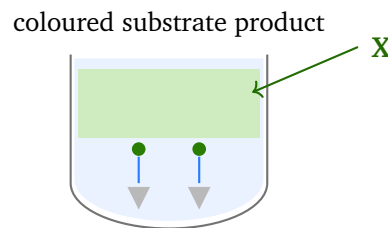
Q4. Alpha and beta cytokines released by virus-infected cells that induce an antiviral state in neighbouring uninfected cells, priming them to resist viral replication, are the:

- (A) Interleukins
- (B) Interferons (alpha and beta)
- (C) Chemokines
- (D) Tumour necrosis factors

Q5. In the enzyme immunoassay microplate well below, a fixed antigen has captured a specific antibody, an enzyme-linked conjugate is bound, and



adding substrate produces the coloured product marked X. The intensity of the colour developed is directly proportional to:



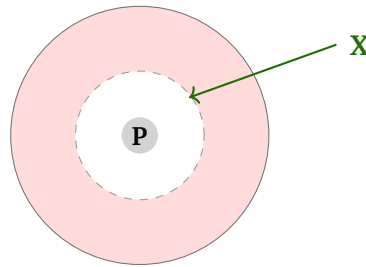
- (A) The temperature of incubation only
- (B) The thickness of the plastic well
- (C) The pH of the wash buffer
- (D) The amount of specific antibody (antigen) bound

Systematic Bacteriology

- Q6.** A child with paroxysmal coughing ending in an inspiratory whoop yields an organism grown on Bordet-Gengou (potato blood glycerol) medium. The causative agent is:
- (A) *Bordetella pertussis*
 - (B) *Haemophilus influenzae*
 - (C) *Corynebacterium diphtheriae*
 - (D) *Klebsiella pneumoniae*
- Q7.** A curved gram-negative rod recovered from a gastric mucosal biopsy is strongly urease positive and is associated with peptic ulcer disease and gastric carcinoma. The organism is:
- (A) *Campylobacter jejuni*
 - (B) *Vibrio parahaemolyticus*
 - (C) *Helicobacter pylori*
 - (D) *Proteus mirabilis*
- Q8.** On the blood-agar plate below an optochin (P) disk has been placed on a lawn of alpha-haemolytic cocci, and the clear ring marked X shows



growth inhibited around the disk. This zone of optochin sensitivity identifies the organism as:



- (A) *Streptococcus pneumoniae*
- (B) *Streptococcus viridans*
- (C) *Enterococcus faecalis*
- (D) *Staphylococcus epidermidis*

Virology

Q9. An infant born with congenital cataract, sensorineural deafness and patent ductus arteriosus after a first-trimester maternal rash illness most likely has congenital infection with:

- (A) Rubella virus
- (B) Rotavirus
- (C) Rabies virus
- (D) Respiratory syncytial virus

Q10. A teenager develops painful bilateral parotid gland swelling, and later orchitis and aseptic meningitis. The paramyxovirus responsible is:

- (A) Measles virus
- (B) Parvovirus B19
- (C) Mumps virus
- (D) Coxsackievirus A

Mycology and Parasitology



- Q11.** A gardener pricked by a rose thorn develops a chain of subcutaneous nodules and ulcers along the lymphatics of the arm; tissue shows cigar-shaped budding yeasts. The dimorphic fungus responsible is:
- (A) *Candida albicans*
 - (B) *Malassezia furfur*
 - (C) *Sporothrix schenckii*
 - (D) *Trichophyton rubrum*
- Q12.** A woman with frothy yellow-green vaginal discharge and a punctate "strawberry" cervix yields a motile pear-shaped flagellate that exists only as a trophozoite, with no cyst stage. The organism is:
- (A) *Giardia lamblia*
 - (B) *Trichomonas vaginalis*
 - (C) *Entamoeba histolytica*
 - (D) *Balantidium coli*
- Q13.** A patient from an African river valley presents with intensely itchy skin nodules and progressive visual loss ("river blindness"); microfilariae are found in skin snips. The worm, transmitted by the blackfly *Simulium*, is:
- (A) *Wuchereria bancrofti*
 - (B) *Onchocerca volvulus*
 - (C) *Loa loa*
 - (D) *Brugia malayi*

Applied and Diagnostic Microbiology

- Q14.** Latex particles coated with specific antibody are mixed with a patient's cerebrospinal fluid and visibly clump within minutes, giving a rapid diagnosis (for example of cryptococcal antigen). This method is called the:
- (A) Latex agglutination test
 - (B) Complement fixation test



- (C) Radioimmunoassay
- (D) Immunofluorescence microscopy

Q15. Which laboratory marker is used to monitor the immune status and disease progression of a patient with HIV infection, guiding decisions on prophylaxis and therapy?

- (A) Total leucocyte count
- (B) CD4 T-lymphocyte count
- (C) Erythrocyte sedimentation rate
- (D) Serum bilirubin level



Detailed Solutions**Q1.****Solution**

Concept – bacterial toxins: Toxins are divided into secreted exotoxins and cell-wall endotoxin.

Step 1 – read the clues: Heat-stable, part of the gram-negative outer membrane, and active moiety lipid A all point to **endotoxin**.

Step 2 – the biology: Endotoxin is the **lipopolysaccharide (LPS)** of the outer membrane; its lipid A anchor drives fever, hypotension and septic shock through cytokine release.

Why the other options are wrong:

- A, exotoxin: heat-labile secreted protein, not a wall lipid.
- B, superantigen: a protein toxin that over-activates T cells, not LPS.
- D, capsule: an antiphagocytic polysaccharide, not the shock-inducing toxin.

Final Answer: Endotoxin (LPS, lipid A) ⇒ **C**

Answer: (C) [Go Back to Q1](#)

Q2.**Solution**

Concept – chemical sterilants: Heat-sensitive instruments need liquid disinfectants rather than autoclaving.

Step 1 – match the need: For flexible endoscopes the standard high-level disinfectant is **2% glutaraldehyde**.

Step 2 – why it fits: Glutaraldehyde is a cold chemical sterilant that kills bacteria, fungi, viruses and, with prolonged contact, spores, without damaging optics.

Why the other options are wrong:

- A, 70% alcohol: a good antiseptic but not sporicidal and evaporates fast.
- B, cetrimide: a quaternary ammonium detergent, low-level activity only.
- C, 5% phenol: irritant and not reliable for endoscope high-level disinfection.

Final Answer: 2% glutaraldehyde ⇒ **D**

Answer: (D) [Go Back to Q2](#)



Q3.

Solution

Concept – the streak plate: Progressive dilution across sectors thins the inoculum.

Step 1 – read the figure: Heavy growth in the first sector becomes fewer streaks and finally the separated colonies at X.

Step 2 – state the purpose: The quadrant streak is done **to obtain isolated single colonies**, each arising from one organism, giving a pure culture for identification.

Why the other options are wrong:

- A, susceptibility testing: uses disk diffusion on a confluent lawn.
- B, viable count: needs measured dilutions and spread or pour plates.
- C, haemolysis: an observation on blood agar, not the aim of streaking.

Final Answer: Obtain isolated single colonies ⇒ D

Answer: (D) [Go Back to Q3](#)

Q4.

Solution

Concept – antiviral cytokines: Certain cytokines block viral spread rather than fighting bacteria.

Step 1 – name them: Interferons alpha and beta are produced by virus-infected cells.

Step 2 – the action: They bind receptors on neighbouring cells and induce an antiviral state, switching on enzymes that degrade viral RNA and halt protein synthesis.

Why the other options are wrong:

- A, interleukins: coordinate leucocyte communication broadly, not this antiviral priming.
- C, chemokines: attract cells by chemotaxis.
- D, tumour necrosis factor: mainly pro-inflammatory, not the classic antiviral cytokine.

Final Answer: Interferons (alpha and beta) ⇒ B

Answer: (B) [Go Back to Q4](#)



Q5.

Solution

Concept – the ELISA readout: An enzyme converts substrate into a coloured product measured by absorbance.

Step 1 – read the figure: More bound antibody means more enzyme conjugate, which converts more substrate.

Step 2 – the relationship: The colour intensity is **proportional to the amount of specific antibody (or antigen) bound** in the well, letting absorbance quantify it.

Why the other options are wrong:

- A, incubation temperature: standardised, not what the signal measures.
- B, well thickness: a fixed property of the plate.
- C, buffer pH: controlled during washing and unrelated to the final colour.

Final Answer: Amount of bound antibody (antigen) $\Rightarrow$ **D**

Answer: (D) [Go Back to Q5](#)

Q6.

Solution

Concept – whooping cough: A special medium is needed to grow the fastidious causative organism.

Step 1 – match the clues: Paroxysmal cough with an inspiratory whoop and growth on **Bordet-Gengou** medium identify ***Bordetella pertussis***.

Step 2 – the organism: It is a small gram-negative coccobacillus whose toxins damage respiratory ciliated epithelium.

Why the other options are wrong:

- B, *Haemophilus influenzae*: needs factors X and V on chocolate agar.
- C, *C. diphtheriae*: grows on tellurite and Loeffler medium, causes diphtheria.
- D, *Klebsiella*: a capsulate lactose fermenter causing pneumonia.

Final Answer: *Bordetella pertussis* $\Rightarrow$ **A**

Answer: (A) [Go Back to Q6](#)



Q7.

Solution

Concept – gastric curved rods: One urease-positive organism colonises the stomach.

Step 1 – apply the clues: A curved gram-negative rod in gastric mucosa that is strongly urease positive is *Helicobacter pylori*.

Step 2 – the disease: Its urease neutralises acid locally; it causes chronic gastritis, peptic ulcer and gastric carcinoma.

Why the other options are wrong:

- A, *Campylobacter jejuni*: causes enteritis, not gastric ulcers.
- B, *Vibrio parahaemolyticus*: a marine organism causing seafood diarrhoea.
- D, *Proteus*: urease positive but a straight urinary-tract rod, not gastric.

Final Answer: *Helicobacter pylori* ⇒

Answer: (C) [Go Back to Q7](#)

Q8.

Solution

Concept – optochin testing: Optochin separates the two main alpha-haemolytic streptococci.

Step 1 – read the plate: A zone of inhibition around the optochin (P) disk marks an **optochin-sensitive** organism.

Step 2 – name it: This identifies *Streptococcus pneumoniae*, which is optochin sensitive and bile soluble.

Why the other options are wrong:

- B, viridans streptococci: alpha-haemolytic but optochin resistant.
- C, *Enterococcus faecalis*: bile-aesculin positive, not optochin sensitive.
- D, *Staph. epidermidis*: a catalase-positive cluster-forming coccus.

Final Answer: *Streptococcus pneumoniae* ⇒

Answer: (A) [Go Back to Q8](#)



Q9.

Solution

Concept – congenital viral infection: A first-trimester maternal rash illness can cause classic birth defects.

Step 1 – match the triad: Cataract, deafness and cardiac defect (patent ductus) form the congenital rubella triad, so the agent is **rubella virus**.

Step 2 – the biology: Rubella (German measles) crosses the placenta early in pregnancy and disrupts organogenesis.

Why the other options are wrong:

- B, rotavirus: causes infantile diarrhoea, not congenital defects.
- C, rabies: a fatal encephalitis, not a congenital syndrome.
- D, RSV: causes bronchiolitis in infants after birth.

Final Answer: Rubella virus ⇒

Answer: (A) [Go Back to Q9](#)

Q10.

Solution

Concept – parotitis-causing virus: One paramyxovirus classically swells the salivary glands.

Step 1 – match the features: Bilateral parotid swelling with orchitis and aseptic meningitis is typical of **mumps virus**.

Step 2 – the biology: Mumps is a paramyxovirus spread by respiratory droplets; the MMR vaccine prevents it.

Why the other options are wrong:

- A, measles: causes rash with Koplik spots, not isolated parotitis.
- B, parvovirus B19: causes erythema infectiosum (slapped cheek).
- D, coxsackievirus A: causes herpangina and hand-foot-mouth disease.

Final Answer: Mumps virus ⇒

Answer: (C) [Go Back to Q10](#)



Q11.

Solution

Concept – subcutaneous mycosis: A thorn injury introduces a dimorphic fungus into the skin.

Step 1 – match the picture: Nodules spreading along lymphatics after a rose-thorn prick, with cigar-shaped yeasts, is **sporotrichosis**.

Step 2 – name the fungus: The cause is *Sporothrix schenckii*, the "rose gardener's disease" fungus.

Why the other options are wrong:

- A, *Candida albicans*: causes thrush and invasive candidiasis, not lymphocutaneous nodules.
- B, *Malassezia furfur*: causes pityriasis versicolor of the skin surface.
- D, *Trichophyton rubrum*: a dermatophyte causing ringworm.

Final Answer: *Sporothrix schenckii* ⇒ C

Answer: (C) [Go Back to Q11](#)

Q12.

Solution

Concept – urogenital flagellate: One protozoan has only a trophozoite and no cyst.

Step 1 – apply the clues: Frothy discharge, a strawberry cervix and a motile pear-shaped flagellate with no cyst stage indicate *Trichomonas vaginalis*.

Step 2 – the biology: It is sexually transmitted and diagnosed by seeing motile trophozoites in a wet mount.

Why the other options are wrong:

- A, *Giardia lamblia*: an intestinal flagellate with a cyst stage.
- C, *Entamoeba histolytica*: causes dysentery and has a cyst form.
- D, *Balantidium coli*: a ciliate causing colitis, with a cyst stage.

Final Answer: *Trichomonas vaginalis* ⇒ B

Answer: (B) [Go Back to Q12](#)



Q13.

Solution

Concept – filarial river blindness: A skin-dwelling filaria is spread by the blackfly.

Step 1 – match the clues: Itchy skin nodules with progressive blindness and microfilariae in skin snips, spread by *Simulium*, indicate ***Onchocerca volvulus***.

Step 2 – the biology: Its microfilariae migrate through skin and eye, and ivermectin is the treatment of choice.

Why the other options are wrong:

- A, *Wuchereria bancrofti*: causes lymphatic filariasis via mosquitoes, microfilariae in blood.
- C, *Loa loa*: the eye worm spread by *Chrysops*, not blackfly.
- D, *Brugia malayi*: lymphatic filariasis, mosquito borne.

Final Answer: *Onchocerca volvulus* ⇒

Answer: (B) [Go Back to Q13](#)

Q14.

Solution

Concept – rapid antigen detection: Antibody-coated particles make an antigen reaction visible.

Step 1 – name the test: Antibody-coated latex particles that visibly clump with antigen define the **latex agglutination test**.

Step 2 – the use: It gives rapid bedside diagnosis, for example detecting cryptococcal antigen in cerebrospinal fluid.

Why the other options are wrong:

- B, complement fixation: an older, slower serological assay.
- C, radioimmunoassay: uses radioactive labels and specialised equipment.
- D, immunofluorescence: needs a fluorescent microscope, not visible clumping.

Final Answer: Latex agglutination test ⇒

Answer: (A) [Go Back to Q14](#)



Q15.

Solution

Concept – monitoring HIV: A specific cell count tracks immune damage in HIV.

Step 1 – name the marker: The **CD4 T-lymphocyte count** measures the helper T cells HIV destroys.

Step 2 – the use: A falling CD4 count signals progression and guides prophylaxis and antiretroviral therapy decisions.

Why the other options are wrong:

- A, total leucocyte count: too nonspecific for HIV staging.
- C, ESR: a general inflammatory marker, not HIV specific.
- D, serum bilirubin: reflects liver function, not immune status.

Final Answer: CD4 T-lymphocyte count ⇒ B

Answer: (B) [Go Back to Q15](#)



Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	D	3	D	4	B	5	D
6	A	7	C	8	A	9	A	10	C
11	C	12	B	13	B	14	A	15	B

