



## DEPARTMENT OF PATHOLOGY

**Topic: Cell Injury, Inflammation, Healing and Repair**  
**Total Marks:24**

**Date:15.11.2025**

**Duration:1hr**

### INSTRUCTIONS:1.Attempt all the Questions

Short essay (1\*6 marks)

- 1) Factors affecting wound healing.

Short answer (3 \* 4 marks)

- 1) Enlist four common types of Necrosis with suitable clinical examples.
- 2) Vascular events of acute inflammation.
- 3) Metastatic calcification.

MCQ (6 \* 1 mark)

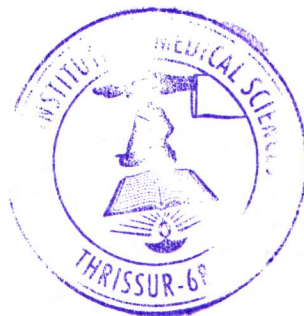
- 1) The action of putrefactive bacteria in necrosed tissue results in
  - a) Coagulative Necrosis
  - b) Infarction
  - c) Wet Gangrene
  - d) Caseation
- 2) One of the following cytokine is a powerful chemo attractant
  - a) Interleukin -8
  - b) Interleukin -2
  - c) Interleukin -6
  - d) Interleukin -4
- 3) Which of the following represents irreversible cell injury?
  - a) Cellular swelling
  - b) Fatty change
  - c) Mitochondrial damage with loss of membrane potential
  - d) Clumping of nuclear chromatin



(PTO)



- 4) Lipofuscin accumulation in cells is due to:
- a) Autophagocytosis of cell organelles
  - b) Apoptosis
  - c) Pyroptosis
  - d) Coagulative necrosis
- 5) Which of the following is not a cause of increased vascular permeability in acute inflammation?
- a) Endothelial contraction
  - b) Endothelial injury
  - c) Leukocyte-dependent endothelial damage
  - d) Vasoconstriction
- 6) The membrane attack complex (MAC) in complement system is composed of:
- a) C3a–C3b
  - b) C5b–C9
  - c) C1–C4
  - d) C2–C4



## Cell Injury, inflammation, healing and repair- answer key

**Total Marks : 24**

### Short essay - 6 marks

#### 1) Factors affecting wound healing

Answer

	Healing by first intention (Primary Union)	Healing by second intention (Secondary Union)
Nature of wound	Small incision space, surgically clean wound margins, generally uninfected	Large tissue defect, irregular wound margins, often infected
Inflammatory response	Limited inflammation and less granulation tissue formation	Marked inflammatory reaction, exuberant granulation tissue formation
Wound contracture	Less	Significant
Outcome	Shorter healing process; healed wound appears as a neat linear scar; rare complications (e.g. epidermal inclusion cyst formation)	Longer healing process; healed wound appears contracted and irregular; frequent complications (e.g.: suppuration)

Factors

- Infection : cause for delayed healing. Prolongs inflammation and increases the local tissue injury.
- Diabetes : important systemic cause of abnormal wound healing
- Nutritional status : protein and vit c deficiency.
- Aging
- Glucocorticoid (steroids): weakness of scar due to inhibition of TGF-B production and diminished fibrosis.
- Mechanical factors
- Poor perfusion
- Foreign bodies
- Type and extent of injury
- Location of injury

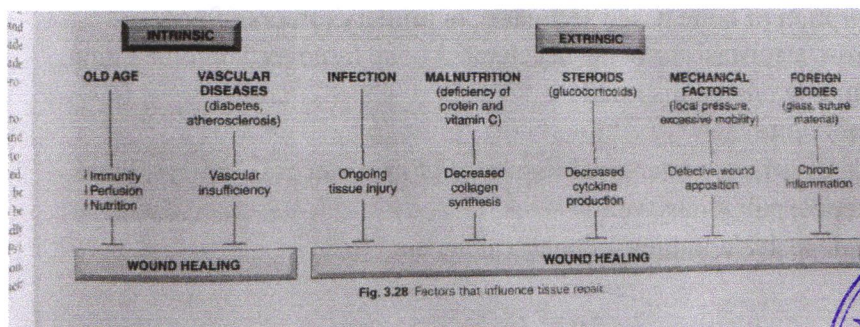


Fig. 3.28 Factors that influence tissue repair.



### **Short answer**

#### **1) Enlist four common types of Necrosis with suitable clinical examples (4 marks)**

Answer

1. Coagulative Necrosis (short description): Myocardial infarction
2. Liquefactive Necrosis (short description): Brain abscess, hypoxic death of cells in CNS.
3. Caseous Necrosis (short description): Tuberculosis
4. Fat Necrosis (short description): Acute pancreatitis, traumatic fat necrosis (e.g., breast).

#### **2) Vascular events of acute inflammation (4 marks)**

Answer

- Changes in vascular flow and caliber
  - Vasodilation
  - Increased vascular permeability
  - Stasis
  - Leucocyte recruitment
- Mechanisms of increased permeability
  - Endothelial cell contraction
  - Delayed prolonged leakage
  - Endothelial injury
  - Leucocyte dependant endothelial damage
- Responses of lymphatic vessels and lymph nodes
  - Increased lymph flow
  - Proliferation of lymphatic vessels
  - Signs of lymphatic involvement

#### **3) Metastatic calcification (4 marks)**

Answer

- Deposition of calcium in normal tissues, caused by hypercalcemia.
- Four causes
  - Increased secretion of parathyroid hormone
  - Resorption of bone tissue secondary to primary tumors of bone marrow/metastasis to bone/ accelerated bone turnover/immobilization.
  - Vitamin D related disorders.
  - Renal failure
- Most commonly affects : interstitial tissues of gastric mucosa, kidneys, lungs, systemic arteries, pulmonary vein
- Eg: massive deposits in kidney – nephrocalcinosis



## MCQ

- 1) **The action of putrefactive bacteria in necrosed tissue results in (1 mark)**
  - a) Coagulative Necrosis
  - b) Infarction
  - c) Wet Gangrene**
  - d) Caseation
- 2) **One of the following cytokine is a powerful chemo attractant (1 mark)**
  - a) Interleukin -8**
  - b) Interleukin -2
  - c) Interleukin -6
  - d) Interleukin -4
- 3) **Which of the following represents irreversible cell injury?(1 mark)**
  - a) Cellular swelling
  - b) Fatty change
  - c) Mitochondrial damage with loss of membrane potential**
  - d) Clumping of nuclear chromatin
- 4) **Lipofuscin accumulation in cells is due to:(1 mark)**
  - a) Autophagocytosis of cell organelles**
  - b) Apoptosis
  - c) Pyroptosis
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- 5) **Which of the following is not a cause of increased vascular permeability in acute inflammation?(1 mark)**
  - a) Endothelial contraction
  - b) Endothelial injury
  - c) Leukocyte-dependent endothelial damage
  - d) Vasoconstriction**
- 6) **The membrane attack complex (MAC) in complement system is composed of: (1 mark)**
  - a) C3a-C3b
  - b) C5b-C9**
  - c) C1-C4
  - d) C2-C4



**Second Professional MBBS Prelims examinations 2023 Batch**  
**Pathology Paper II Answer Key**

**II. Long Essays (2x10=20)**

2. a. Rheumatic fever leading to RHD

Most common in overcrowding situations

b. Post streptococcal

Immune mediated

M proteins mediated

c. Pancarditis - Endocarditis

Myocarditis

Pericarditis – Type of pericarditis

Typical lesion – Describe Aschoff body

Draw aschoff body

Valvular lesion

Verrucae

Mac callum plaque

d. Any two complications – Myocarditis – SCD

- Valve Regurgitation

- Stenosis

Embolism of verrucae

3. Classify GN, PSGN – Etiopathogenesis, morphology with microscopy and immune fluorescence

Primary glomerulonephritis – Classification

Etiopathogenesis – Strain of streptococcus that are causative of glomerulonephritis

- Latent period

- Immunological causes of the disease

- Mechanism of decay

Gross morphology and microscopy

Immunofluorescence – Granular depositis of IGG, IGM, C3

-GBM and mesangium

Electron Microscopy – Lumps / lumpy

- Sites where depositis seen

4. Hashimoto Thyroiditis

Gross findings – Symmetric enlargement

- Firm nodules

Microscopy - Atrophic follicles

- Lymphoid aggregates

- Hurthle cells – description

- Diagram



5. Crohns disease – Gross – Areas involved most commonly

- sharply demarcated from the adjacent tumor skip lesions
- mucosal lesion – Aphthous ulcer

Longitudinal serpentine ulcers – fissures, Fistulas

Thickened rubbery mucosa hosepipe string sign

Creeping fat – Serosites and contracted fat

Microscopy – Aphthous ulcer ; crypt abscess, distended glands

Non caseating granulomas

6. Germ cell Tumors of ovary

Classification

Most common tumor includes – mature cystic Teratoma

- Gross
- Microscopy in details

Note on immature Teratoma

Note on dysgerminoma

Note on yolk sack tumor – Schillar duval body ; alpha fetoprotein

7. OS

- Age groups affected
- Sites affected most commonly
- Area of base affected
- Gross appearance
- X-ray findings
- Microscopy with diagram
- Sub types
- Prognosis

8. Etiopathogenesis and morphology of fatty liver

- Causes of fatty liver
- Etiopathogenesis excess intake of free fatty acid defective metabolism of lipids and decreased excretion of lipoprotein

Microscopy – Microvesicular

- Macrovesicular, steatosis
- No inflammation or fibrosis
- Diagram

9. Pathogenesis of atheroma

Responds to injury hypothesis with diagram



10. Seminoma testis  
Malignant GCT  
Most common  
Age group  
Genetic alterations, 12p, k17 mutation  
Gross  
Microscopy – Uniform cells  
Large cells  
Cytoplasm  
PAS  
Stromal features  
PLAP ...

11. Pleomorphic adenoma  
Benign  
Parotid most commonly affected  
Age group  
Gross  
Microscopy  
Diagram

12. Phyllodes Tumor biphasic, Benign / malignant  
Age group  
- Size  
Gross appearance  
- Microscopy

13. Morphology of gastric carcinoma  
Sites most common  
Gross morphology types – 3 types  
Microscopy – Lauen classification

14. Meningioma Cells of origin  
Age group and female preponderance  
NF2 mutation association  
Gross appearance & sites mainly affected  
Microscopy – Type  
Meningioma - Benign  
Atypical meningioma – locally aggressive  
Anaplastic meningioma malignant lesion

15. Write a note on each of them  
Forming  
Storming  
Norming  
Performing



## MCQ ANSWERKEY

- i. c - Meningioma
- ii. c. Rabies
- iii. d. Teratoma
- iv. c. CK-MB fraction
- v. b Chronic Alcoholism
- vi. a. i, ii and iii are correct
- vii. b. i, iii and iv are correct
- viii. a. i and iii are correct
- ix. b. ii and iv are correct
- x. b. iii and iv are correct
- xi. a. Both A & R correct and R is the reason of A
- xii. c. A is correct R is incorrect
- xiii. b. Both A & R are correct but R is not reason for A
- xiv. a. Both A & R correct and R is the reason of A
- xv. d. A is incorrect R is correct
- xvi. d. Ulcerative colitis
- xvii. a. Adenocarcinoma
- xviii. b. Development of  $T_H17$  immune responses
- xix. b. Biopsy screening for dysplasia
- xx. c. Cholecystitis



## UG PRACTICAL EXAMINATION 12/01/2026- 60 marks

## I. HISTOPATHOLOGY SLIDES (25 marks)

1. Acute appendicitis, 12/M presented  $\bar{c}$  sudden onset (R) iliac fossa pain
  - a. Diagnosis with 2 points for identification (3 marks)
  - b. What is diapedesis? (2 marks)
2. Lepromatous leprosy
  - a. Diagnosis with 2 points for identification (3 marks)
  - b. 2 classic clinical features. (2 marks)
- ✓ 3. Fibroadenoma- 26/F, Lump in the breast
  - a. Diagnosis with 2 points for identification (3 marks)
  - b. Mention 2 points to distinguish between benign and malignant neoplasm. (2 marks)
4. Amyloidosis
  - a. Diagnosis with 1 point for identification (3 marks)
  - b. Which is a special stain useful in this condition? (2 marks)
5. CVC Liver
  - a. Diagnosis with 1 point for identification (3 marks)
  - b. Write down the classical gross description of this condition (2 marks)

## II. CYTOLOGY (5 marks)

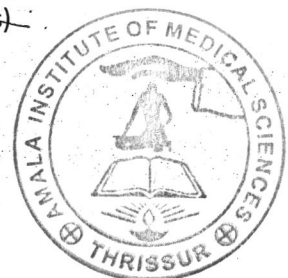
- ✓ b TB Lymph node- 35 year old male with evening rise of temperature, FNAC for *cellular*
  - a. Briefly describe with diagnosis (5 marks)

## III. GROSS (25 marks)

7. Carcinoma breast
  - a. Identify and briefly describe. (3 marks)
  - b. Mention 2 histological features of malignancy. (2 marks)
8. Calcinosis cutis *what is meant by Dysplasia (2 marks)*
  - a. Identify and briefly describe. (3 marks)
  - b. Which is a special stain useful in this condition? (2 marks)
9. Testicular infarction
  - a. Identify and briefly describe (2 marks)
  - b. What are the components of Virchow's triad (3 marks)
10. Fatty liver
  - a. Identify and briefly describe (3 marks)
  - b. Special stain useful in this condition (2 marks)
11. ~~TB lymph node~~ *Gangrene intestine*
  - a. Identify and briefly describe (3 marks)
  - b. What are the typical microscopic findings *special stain for calcium* in this condition? (2 marks)

## IV. INSTRUMENT (5 marks)

12. Ayer's spatula
  - a. Identify the instrument. (1 mark)
  - b. Uses (2 marks)
  - c. Write down name of 1 cytology fixative (2 marks)



Gangrene intestine

5) Gangrene intestine

a. Identify & briefly describe (3 marks)

b. What ~~is~~ are the lines of Zahn (2 marks)



6. IB lymphnode

- Necrotizing granuloma - central caseous necrosis
- Epithelioid histiocytes
- Giant cells

7. Carcinoma breast

- a)
- b) Dysplasia - Disordered (abnormal) growth and maturation of cells within a tissue/organ

8. Calcinosis cutis

- a)
- b) Von Kossa
- Alizarin Red S

9. Testicular infarction

- a)
- b) Virchow's triad - Endothelial injury
- Blood stasis
- Hypercoagulability

10. Fatty liver

- a)
- b) Oil red O



11. Gangrene intestine

- a)
- b) Lines of Zahn - characteristic of thrombus formed at site of rapid arterial blood flow
- alternating pale (pink) and dark (red) lamellations
- ↓ platelet/fibrin
- ↓ RBC/WBCs

12. Ayers spatula

- a)
- b) Pap smear - cervical cancer screening
- Candidiasis
- Tinea/scabies
- oral mucosa/skin scrapings

## 1. Acute appendicitis

a) Mucosal ulceration.

b) Transmural - neutrophilic infiltration

c) Diapedesis - Migration of WBC's from blood stream [capillaries] into fissure

## 2. Leprosy

a) Thinned out epidermis  
Grenz zone

b) Symmetrical hypopigmented erythematous macules/papules/nodules  
Hypoaesthetic/aneesthetic lesions [leonine faces]

## 3. Fibroadenoma

a) Biphasic tumor - proliferation of both glandular epithelial and stromal components  
Intracanalicular/pericanalicular pattern

b) Cellular differentiation [well/poorly differentiated]  
Metastasis

## 4. Arylosporin

a) Amorphous eosinophilic material on H&E

Apple green birefringence on Congo red stain under polarised light

b) Congo red

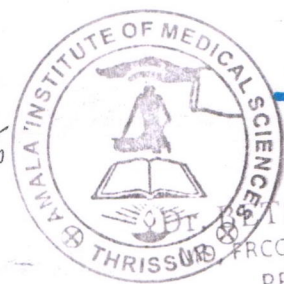
## 5. CVC liver

a) Dilated and congested central veins/sinusoids  
Centrilobular hemorrhage & necrosis

b) Nutmeg liver - mottled or variegated appearance

Dark - congested dilated central veins & surrounding sinusoids

Pale - fatty change/unaffected areas.



Betsy

ANITHY THOMAS  
FRCOG, DNB, MCOG  
PRINCIPAL  
AMALA INSTITUTE OF MEDICAL SCIENCES  
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## AMALA INSTITUTE OF MEDICAL SCIENCES

Second Professional MBBS Prelims – Paper II - 2023 Regulars

### MICROBIOLOGY

Time: 3 hours.

Maximum Marks: 100

*(Answer all questions. Draw diagrams wherever necessary)*

#### Long Essays

(2x10=20 marks)

2. A 30- years old male present to medical casualty with fever headache and vomiting. He gives history of chronic liver disease. O/E he was febrile, neck rigidity present. CSF Gram staining showed pus cells and grampositive diplococci. (1+1+2+2+3+1=10 marks)
  - a) What is the diagnosis?
  - b) Name the causative organism.
  - c) Discuss the pathogenesis of the above condition.
  - d) Discuss the laboratory diagnosis.
  - e) Name the vaccines available and the schedule
  - f) Name two drugs used for treatment.
  
3. A 25-years old lady presented to medicine O.P with fever sore throat and breathlessness. One of her family members is a health care worker who was on medical ICU duty. (1+1+2+3+2+1=10)
  - a) What is the provisional diagnosis?
  - b) Name two viruses responsible for this condition.
  - c) Discuss the pathogenesis of this condition.
  - d) How do you confirm the laboratory diagnosis?
  - e) How do you manage the patient
  - f) Discuss about the prophylaxis of the above condition.

#### Short Essays

(6x6= 36 Marks)

4. Discuss the pathogenesis, laboratory diagnosis and prophylaxis of Tetanus. (2+2+2=6 Marks)
5. Discuss the laboratory diagnosis of Hepatitis B infection.
6. Discuss the pathogenesis and laboratory diagnosis of Hook worm infection (3+3=6)
7. Name the vaccines used and discuss the current vaccination schedule for Polio. (2+4=6)
8. Discuss about Pathogenesis and lab diagnosis of Cholera. (3+3=6 Marks)
9. Describe in detail Viral gastroenteritis.

#### Short Answers

(6x4= 24 Marks)

10. Name four fungi causing respiratory infections.
11. Discuss about lung fluke.
12. Name four parasites causing hepatic infections.
13. Informed consent
14. Enumerate 4 bacteria causing community acquired Pneumonia
15. Name four Bactericidal Antituberculous drugs.





# AMALA INSTITUTE OF MEDICAL SCIENCES

## Second Professional MBBS Prelims – Paper II - 2023 Regulars

### 1. MCQ.

(20X 1=20 marks)

#### Questions i-v are single response type

- i. Food poisoning by preformed toxin is caused by  
A. Shigella flexneri. B. Staphylococcus aureus. C. Salmonella enteritidis D. Vibrio cholerae
- ii. Drug of choice for Mycoplasma pneumoniae is  
A. Doxycycline B. Gentamicin C. Ciprofloxacin D. Penicillin
- iii. All are dimorphic fungi causing systemic infection EXCEPT  
A. Histoplasma capsulatum. B. Blastomyces dermatitidis C. Candida albicans D. Coccidioides immitis
- iv. The infective form of intestinal taeniasis  
A. Egg. B. Cercariae C. Metacercariae D. Cysticercus
- v. Acute Hemorrhagic conjunctivitis is caused by  
A. Enterovirus 70 B. Enterovirus 72 C. Coxsackie B D. Herpes simplex.

#### Questions vi-x are case scenario based

#### Read the following clinical history and select the most appropriate response.

A 30 years old male patient presented to medical casualty with fever, altered behavior and hydrophobia. He gives a history of bite by a stray dog one month back.

- vi. Most probable clinical diagnosis is  
A. Pyogenic meningitis. B. Encephalitis. C. Rabies. D. Tetanus.
- vii. The test most commonly used for confirmation of clinical diagnosis is  
A. IgM Antibody detection. B. PCR. C. Viral isolation. D. IgG detection.
- viii. The specimens collected include all the following EXCEPT  
A. Skin biopsy from nape of neck B. CSF C. Saliva. D. Blood
- ix. Non neural vaccine used for prophylaxis include the following EXCEPT  
A. Human Diploid Cell. B. Semple C. Chick Embryo. D. Vero Cell
- x. The most important commonly affected site in brain is  
A. Cranial nerves. B. Anterior horn cells. C. Hippocampus. D. Pons

Question numbers xi-xv consists of two statements-Assertion (A) and reason (R). Answer these questions by selecting the appropriate options given below.

- A. Both A and R are true, and R is the correct explanation of A
- B. Both A and R are true, and R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

- xi. A. Exotoxin is the virulence factor for Diphtheria.



R. It acts by protein synthesis inhibition. A

xii. A. Trophozoite is the infective form for acute amoebic dysentery.

R. Trophozoite with ingested RBC in stool confirms acute amoebic dysentery. D

xiii. A. Syphilis is transmitted from mother to child.

R. Congenital syphilis infection is diagnosed by demonstrating IgM antibody in neonatal serum. B

xiv. A. In Trichomoniasis, both partners are treated simultaneously

R. Trichomoniasis is a sexually transmitted disease.. A

xv. A. Japanese encephalitis is a zoonotic disease.

B. Man to man transmission occurs by culex mosquito. C

**Question numbers xvi-xx are Multiple Response type questions. Read the statements & mark the answers appropriately.**

xvi. Examples of live viral vaccines include

1. Measles. 2. Rubella. 3. BCG. 4. Mumps

A. 1,2,4 are correct. B. 1,2,3 are correct. C. 2,3,4 are correct. D. 1, 2,3, 4 are correct

xvii. All are vector borne bacterial infections

1. Plague. 2. Relapsing fever. 3. Scrub typhus. 4. Dengue

A. 1,2, are correct. B. 1,2,4 are correct. C. 2,3,4 are correct. D. 1,2, 3 are correct.

xviii. All the following parasites infect liver

1. Entamoeba histolytica 2. Echinococcus granulosus 3. Fasciola hepatica. 4. Clonorchis sinensis

A. 1,2,3, are correct. B. 1,2,4 are correct. C. 1,2,3,4 are correct. D. 2,3,4 are correct.

xix. All the following are causative agents of bacterial STDs.

1. Neisseria gonorrhoeae. 2. Haemophilus ducreyi 3. Klebsiella granulomatis. D. Klebsiella pneumoniae.

A. 1,2 are correct. B. 1,2,3 are correct. C. 2,3,4 are correct. D. 1,3,4 are correct.

xx. All are intestinal nematodes

1. Ascaris. 2. Ancylostoma. 3. Trichinella spiralis. 4. Trichuris trichiura.

A. 1,2,3,4 are correct. B. 1,2,3 are correct. C. 1,3,4 are correct. D. 1,2,4 are correct.





**MICROBIOLOGY**

**Time: 3 hours.**

**Maximum Marks: 100**

*(Answer all questions. Draw diagrams wherever necessary)*

**Long Essays**

**(2x 10=20 marks)**

2. Classify Hypersensitivity reactions. Describe in detail Type 1 hypersensitivity (4 + 6)
3. A 50 year old agriculture worker came with complaints of fever, malaise and headache. O/E, there was jaundice and microalbuminuria. Patient belonged to an area which was flood affected on the previous week.
  - a) Write the probable diagnosis and the causative agent (2)
  - b) Describe pathogenicity (3)
  - c) Describe laboratory diagnosis (3)
  - d) Write about treatment and prophylaxis (2)

**Short Essays.**

**(6X6 = 36 marks)**

4. Describe major HAI s and its preventive measures
5. Enumerate different moist heat sterilisation methods. Describe autoclave(2+4)
6. Enumerate the clinical types and lab diagnosis of Dermatophytes (2+4)
7. Discuss the lab diagnosis of Dengue infection
8. Describe the different horizontal gene transfer methods
9. List the different methods of antimicrobial resistance.

**Short Answers.**

**(6x4 = marks)**

10. Enumerate non treponemal and treponemal tests
11. Compare active and passive immunity
12. Describe the pathogenesis of Chicken pox and Varizella zoster
13. Name the vector of Bancroftianfilariasis. What is DEC provocation test?
14. Name 4 agents causing cutaneous larva migrans
15. A swab is collected from an abscess in the ward. The details of the patient on the sample container do not match those on the request form. Discuss the correct decision and the appropriate action to be taken.



Case based

HIV

A 35 year old man admitted to Medicine ward with complaints of recurrent fever and diarrhea of 6 months duration, not responding to treatment. Patient gives history of blood transfusion following a road traffic accident at age of 27. On examination he is emaciated and oral thrush present.

1. What is the provisional diagnosis
  - a. Hepatitis B b. Syphilis c. HIV d. Hepatitis C
2. What is the primary target cell of this organism?
  - a. CD4 b. ACE -2 c. CD80 d. CDHR3
3. Most recommended method for diagnosis of the above infection during infancy?
  - a. ELISA b. Western blot c. DNA PCR d. CD4 T cell count
4. Risk of infection transmission by needle stick injury is
  - a. 0.03 % b. 0.3% c. 3% d. 30%
5. Which of the following is not a fungal opportunistic infection?
  - a. Cryptococcal meningitis b. Toxoplasma encephalitis c. Disseminated histoplasmosis
  - b. d. Esophageal candidiasis

Multiple response

Which of the following are cell wall acting antibiotics?

1. Penicillin 2. Carbapenems 3. Macrolides 4. Fluoroquinolones
- a.1,2,4 b. 2,3 c. 1,2 d. 3,4

Which of the following are high level disinfectants?

1. Alcohol 2. Gluteraldehyde 3. Phenol 4. Peracetic acid
- a.2,3 b. 2,4 c. 1,2,3,4 d. 1,3

Which of the following items cannot be sterilised in autoclave?

1. Surgical instruments 2. Bronchoscopes 3. Culture media 4. Paraffin oil
- a.3 and 4 b. 2,3,4 c. 1 and 3 d. 2 and 4

Which of the following are heterophile agglutination tests?

1. Widal test 2. Paul Bunnell test 3. Cold agglutination test 4. Weil – Felix reaction
- a.1and 4 b. 2and 4 c. 2,3 and 4 d. 1 and 2

Which one is a dimorphic fungi?

1. Candida albicans 2. Penicillium marneffeii 3. Sporothrix schenckii 4. Trichophyton mentagrophytes
- a.2,3 and 4 b. 2 and 4 c. 2 and 3 d. 1 and 4



Single response

Urinary schistosomiasis is caused by

a. Schistosoma japonicum b. Schistosoma haematobium c. Schistosoma mansoni d. Schistosoma mekongi

Which of the following is not a selective media

a. Thiosulphate citrate bile salt sucrose agar b. potassium tellurite agar c. Selenite F broth d. Lowenstein – Jensen medium

Transfer of a portion of DNA from one bacterium to another by a bacteriophage is called

a. Transduction b. Transformation c. Conjugation d. Transposition

Causative agent of eumycetoma include all except

a. Madurella b. Nocardia c. Pseudoallescheria d. Aspergillus

The scientist who introduced sterilization techniques

a. Robert Koch b. Joseph Lister c. Louis Pasteur d. Edward Jenner

A – In malaria, thin smear is used to for speciating the parasite

R - Schizont of plasmodium falciparum is banana shaped Answer C

A - Carbapenems cannot be used to treat MRSA infections

R - MRSA will be resistant to all beta lactam antibiotics Answer A

A - Clindamycin can be used to treat Gram negative organisms

R - Action of Clindamycin is protein synthesis inhibition Answer D

A - Beta D glucan is a marker of invasive fungal infection

R - Beta D glucan is not found on the cell wall of zygomycetes Answer B

A – Negative staining of CSF specimen is done to demonstrate capsule

R – Cryptococcus neoformans is a capsulated parasite which causes meningitis Answer C



## ANSWER KEY

### 2. Classify Hypersensitivity Reactions

Immediate Hypersensitivity Reactions:

Type I – Ig E mediated

Type II – IgG/ IgM

Type III – Immune Complex mediated

Delayed Hypersensitivity Reactions:

T Helper cells

Type I Hypersensitivity:

IgE, Atopy and Anaphylaxis, Wheal & Flare response, Mechanisms – Sensitization phase and Effector phase – Explain with diagram, Mediators – Primary & Secondary

Detection- Skin prick test, IgE, Treatment

3.

- a) Leptospirosis, *Leptospira interrogans*
- b) Mode of transmission, Zoonotic, Septicemic phase & Immune phase, Clinical – Mild anicteric febrile illness, Weil's disease
- c) Laboratory Diagnosis – Specimens collected, Microscopy : Dark ground/ phase contrast/silver impregnation, Culture medium – EMJH, Korthof, Fletchers, Serological tests ( Microscopic agglutination tests), Molecular methods
- d) Treatment: Doxycycline, Amoxicillin, Penicillin  
Prophylaxis : SPIROLEPT

### Short Essays

4. Describe major HAI s and its preventive measures

a. Catheter – Associated UTI: Major agents;

- pathogenesis: main entry points through which bacteria enter and spread;

- Lab diagnosis

- prevention : care bundle approach like insertion bundle and maintenance bundle

b. Catheter related blood stream infection ( CRBSI)

- risk factors like device related , patient related and care giver related

- pathogenesis like colonisation and biofilm,



- diagnosis – differential time to positivity
- prevention: care bundle approach like insertion bundle and maintenance bundle
- , adherence to hand hygiene
- c. VAP: early onset and late onset, agents
- pathogenesis and diagnosis- microbiological criteria
- prevention:
- d. Surgical site infection (SSI)- definition, agents, pathogenesis
- prevention: pre operative, peri operative and post operative measures
- 10. Enumerate different moist heat sterilisation methods. Describe autoclave
  - Below 100 °C- name the methods and temperature employed
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  - Clinical types depending on the site of involvement like Tinea capitis etc.
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- 5. Discuss the lab diagnosis of Dengue infection
  - NS1 antigen detection – rapid as well as ELISA
  - Antibody detection- primary infection - IgM with MAC-ELISA; Secondary infection- IgG
  - Neutralization tests
  - Virus isolation
  - Molecular - Viral RNA, genotype detection



### Short answers

8. Describe gene transfer methods

- Explain transformation, transduction, conjugation, Transposition
- Write down the clinical significance of each method

9. Different methods of antimicrobial resistance

- Explain phenotypic methods
- Explain genotypic methods- mutational, transferable
- Explain R factor.

10. Enumerate treponemal and nontreponemal tests

- Treponemal- TPI, FTA ABS, TPA, TPHA, TPPA
- Nontreponemal- VDRL, RPR, TRUST, USR

11. List the difference between active and passive immunity

12. Write Mode of transmission , Clinical features and complications of chicken pox and varicella  
Zoster. Zoster- Latent infection.

13. Vector- *Culex quinquefasciatus*. DEC provocation test – To collect blood in the day time. Orally DEC tablet – nocturnal microfilariae stimulated to peripheral blood within 15- 1 hour.

Contraindicated for *Onchocerca* and *Loa loa*

14. *A. brasiliensis*, *A. caninum* and *A. ceylanicum*, *Strongyloides stercoralis*, *Ancylostoma duodenale* and *Necator americanus* .

15. Reject the sample and ask for a repeat sample



## ANSWER KEY PRELIMS II

### Q4. Pathogenesis, lab diagnosis and prophylaxis of Tetanus

Pathogenesis: causative agent – *Clostridium tetani*; mode of infection – through injury, surgery without sepsis, otitis media, neonates following delivery and unhygienic practices, abortion

Virulence factor – Tetanospasmin (plasmid coded) – prevents presynaptic release of inhibitory neurotransmitters Glycine and GABA leading to spastic muscle contraction

Lab diagnosis : specimen – excised tissue; Gram stain – with diagram, culture and toxigenicity test

Prophylaxis: TT/ DPT/ Pentavalent vaccine/Td/TdaP – explain with schedule

Pregnancy and post injury vaccination

### Q5. Lab diagnosis of Hep B infection

Specimen: Blood

Antigen detection: HbsAg, HbeAg, HbcAg(in hepatocytes)

Antibody detection: AntiHbc, AntiHbs, AntiHbe

Graph showing various serological markers of HBV against time

Molecular: HBV DNA detection by PCR

Non specific markers like elevated liver enzymes, bilirubin

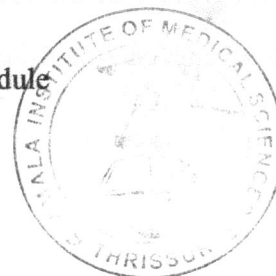
### Q6. Pathogenesis and lab diagnosis of Hookworm infection

Pathogenesis: mode of infection – skin penetration; infective stage – L3 filariform larva, life cycle description. Pathogenicity – sucks blood from intestine after secretion of anticoagulants and hydrolytic enzymes leading to anaemia

Lab diagnosis: specimen – stool, microscopy: diagnostic stage – egg with features and diagram

Molecular: PCR; Other tests – anemia, hypoalbuminemia, eosinophilia

### Q7. Vaccines used for Polio and the current vaccination schedule



Oral Polio Vaccine (Sabin)

Injectable Polio Vaccine (Salk)

IPV – 2 f-IPV (0.1 mL/dose) ID 6<sup>th</sup> and 14<sup>th</sup> week along with OPV

OPV – bivalent (1&3) – 2 drops/dose – At birth, 6, 10, 14 weeks; booster dose at 16-24 months

PPI – 2 doses 6 weeks apart every year for all children under 5 yrs of age irrespective of their vaccination status.

Qn 8 :Pathogenesis and lab diagnosis of Cholera

- The vibrios enter orally through contaminated water or food. Vibrios are highly susceptible to acids, and gastric acidity provides an effective barrier against small doses of cholera vibrios. Achlorhydria predisposes to cholera.
- Mode of transmission - Ingestion of contaminated water or food
- Infective dose - high infective dose of 10<sup>8</sup> bacilli
- Crossing of the protective layer of mucus: motility, Secreting mucinase and other proteolytic enzymes, Secreting hemagglutinin protease (cholera lectin) - Cleaves the mucus and fibronectin
- Adhesion and colonization - Facilitated by a special type IV fimbria called toxin-coregulated pilus (TCP)
- Gene for cholera toxin (CTX): Cholera toxin is phage coded -
- Cholera toxin (CT)
- The toxin molecule consists of two peptide fragments—A and B.
- Fragment B is the binding fragment. Fragment A is the active fragment, causes ADP ribosylation of G protein - accumulation of cyclic adenosine monophosphate (cAMP). Increase in cyclic AMP - accumulation of sodium chloride in intestinal lumen - Water moves passively into the bowel lumen - accumulation of isotonic fluid (watery diarrhea) Loss of fluid and electrolytes - shock (due to profound dehydration) and acidosis (due to loss of bicarbonate)
- Lab diagnosis
- Specimens: Watery stool or rectal swab (for carriers) Transport media: VR medium, Cary-Blair medium Direct microscopy: with flagella, Motility Culture & Identification – Enrichment and selective media Biotyping, Serogrouping: To differentiate O1 and O139, Serotyping, Antigen detection, Molecular method, Antimicrobial susceptibility testing

Qn9: Viral Gastroenteritis

Agents causing viral gastroenteritis -explain about rotavirus – pathogenesis, lab diagnosis, treatment prevention and vaccine.

Qn 10: 4 Fungi causing Respiratory infection



Aspergillus, Penicillium, Mucor, Histoplasmosis, Blastomycosis, Coccidioidomycosis

Paracoccidioidomycosis

Qn11: Lung fluke

Paragonimus westermani is a trematode, also known as oriental lung fluke, Lifecycle , pathogenesis, clinical features, lab diagnosis, treatment prevention

12. E. histolytica

Echinococcus

Fasciola hepatica, Fasciola gigantica, Clonorchis

Opisthorchis, Schistosoma japonicum, Schistosoma mansoni

Toxocara.

Rare - Plasmodium

Vis. Leishmania

B. coli, Enterobius

Occult filariasis

Capillaria hepatica

13. Informed consent definition – types written, verbal

14. CAP : S. pneumonia

Atypical -

Legionella , C. psittaci

H. influenzae

& Mycoplasma pneumoniae

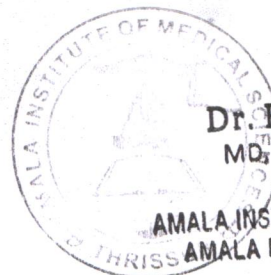
15. Isoniazid, Rifampin

Pyrazinamide

Fluoroquinolones

Ethambutol

Streptomycin, Bedaquiline, Delamanid



*Betsy*

**Dr. BETSY THOMAS**  
MD, FRCOG, DNB, MICOG  
PRINCIPAL

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**MICROBIOLOGY**

**Time: 3 hours.**

**Maximum Marks: 100**

*(Answer all questions. Draw diagrams wherever necessary)*

**Long Essays**

**(2x 10=20 marks)**

2. Classify Hypersensitivity reactions. Describe in detail Type 1 hypersensitivity (4 + 6)
3. A 50 year old agriculture worker came with complaints of fever, malaise and headache. O/E, there was jaundice and microalbuminuria. Patient belonged to an area which was flood affected on the previous week.
  - a) Write the probable diagnosis and the causative agent (2)
  - b) Describe pathogenicity (3)
  - c) Describe laboratory diagnosis (3)
  - d) Write about treatment and prophylaxis (2)

**Short Essays.**

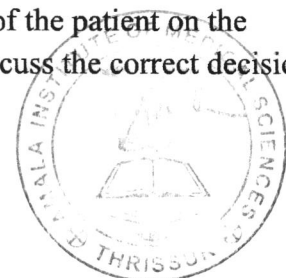
**(6X6 = 36 marks)**

4. Describe major HAI s and its preventive measures
5. Enumerate different moist heat sterilisation methods. Describe autoclave(2+4)
6. Enumerate the clinical types and lab diagnosis of Dermatophytes (2+4)
7. Discuss the lab diagnosis of Dengue infection
8. Describe the different horizontal gene transfer methods
9. List the different methods of antimicrobial resistance.

**Short Answers.**

**(6x4 = marks)**

10. Enumerate non treponemal and treponemal tests
11. Compare active and passive immunity
12. Describe the pathogenesis of Chicken pox and Varizella zoster
13. Name the vector of Bancroftianfilariasis. What is DEC provocation test?
14. Name 4 agents causing cutaneous larva migrans
15. A swab is collected from an abscess in the ward. The details of the patient on the sample container do not match those on the request form. Discuss the correct decision and the appropriate action to be taken.



## 2. Classify Hypersensitivity Reactions

### Immediate Hypersensitivity Reactions:

Type I – Ig E mediated

Type II – IgG/ IgM

Type III – Immune Complex mediated

### Delayed Hypersensitivity Reactions:

T Helper cells

Type I Hypersensitivity:

IgE, Atopy and Anaphylaxis, Wheal & Flare response, Mechanisms – Sensitization phase and Effector phase – Explain with diagram, Mediators – Primary & Secondary

Detection- Skin prick test, IgE, Treatment

3.

- a) Leptospirosis, *Leptospira interrogans*
- b) Mode of transmission, Zoonotic, Septicemic phase & Immune phase, Clinical – Mild anicteric febrile illness, Weil's disease
- c) Laboratory Diagnosis – Specimens collected, Microscopy : Dark ground/ phase contrast/silver impregnation, Culture medium – EMJH, Korthof, Fletchers, Serological tests ( Microscopic agglutination tests), Molecular methods
- d) Treatment: Doxycycline, Amoxycillin, Penicillin  
Prophylaxis : SPIROLEPT

## Short Essays

### 4. Describe major HAI s and its preventive measures

a. Catheter – Associated UTI: Major agents;

- pathogenesis: main entry points through which bacteria enter and spread;

- Lab diagnosis

- prevention : care bundle approach like insertion bundle and maintenance bundle

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- risk factors like device related , patient related and care giver related

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15. Reject the sample and ask for a repeat sample



Case based

HIV

A 35 year old man admitted to Medicine ward with complaints of recurrent fever and diarrhea of 6 months duration, not responding to treatment. Patient gives history of blood transfusion following a road traffic accident at age of 27. On examination he is emaciated and oral thrush present.

1. What is the provisional diagnosis  
a. Hepatitis B b. Syphilis c. HIV d. Hepatitis C
2. What is the primary target cell of this organism?  
a. CD4 b. ACE -2 c. CD80 d. CDHR3
3. Most recommended method for diagnosis of the above infection during infancy?  
a. ELISA b. Western blot c. DNA PCR d. CD4 T cell count
4. Risk of infection transmission by needle stick injury is  
a. 0.03 % b. 0.3% c. 3% d. 30%
5. Which of the following is not a fungal opportunistic infection?  
a. Cryptococcal meningitis b. Toxoplasma encephalitis c. Disseminated histoplasmosis  
d. Esophageal candidiasis

Multiple response

Which of the following are cell wall acting antibiotics?

1. Penicillin 2. Carbapenems 3. Macrolides 4. Fluoroquinolones
- a. 1,2,4 b. 2,3 c. 1,2 d. 3,4

Which of the following are high level disinfectants?

1. Alcohol 2. Gluteraldehyde 3. Phenol 4. Peracetic acid
- a. 2,3 b. 2,4 c. 1,2,3,4 d. 1,3

Which of the following items cannot be sterilised in autoclave?

1. Surgical instruments 2. Bronchoscopes 3. Culture media 4. Paraffin oil
- a. 3 and 4 b. 2,3,4 c. 1 and 3 d. 2 and 4

Which of the following are heterophile agglutination tests?

1. Widal test 2. Paul Bunnell test 3. Cold agglutination test 4. Weil – Felix reaction
- a. 1 and 4 b. 2 and 4 c. 2,3 and 4 d. 1 and 2

Which one is a dimorphic fungi?

1. Candida albicans 2. Penicillium marneffeii 3. Sporothrix schenckii 4. Trichophyton mentagrophytes
- a. 2,3 and 4 b. 2 and 4 c. 2 and 3 d. 1 and 4



Single response

Urinary schistosomiasis is caused by

a. Schistosoma japonicum b. Schistosoma haematobium c. Schistosoma mansoni d. Schistosoma mekongi

Which of the following is not a selective media

a. Thiosulphate citrate bile salt sucrose agar b. potassium tellurite agar c. Selenite F broth d. Lowenstein – Jensen medium

Transfer of a portion of DNA from one bacterium to another by a bacteriophage is called

a. Transduction b. Transformation c. Conjugation d. Transposition

Causative agent of eumycetoma include all except

a. Madurella b. Nocardia c. Pseudoallescheria d. Aspergillus

The scientist who introduced sterilization techniques

a. Robert Koch b. Joseph Lister c. Louis Pasteur d. Edward Jenner

A – In malaria, thin smear is used to for speciating the parasite

R - Schizont of plasmodium falciparum is banana shaped Answer C

A - Carbapenems cannot be used to treat MRSA infections

R - MRSA will be resistant to all beta lactam antibiotics Answer A

A - Clindamycin can be used to treat Gram negative organisms

R - Action of Clindamycin is protein synthesis inhibition Answer D

A - Beta D glucan is a marker of invasive fungal infection

R - Beta D glucan is not found on the cell wall of zygomycetes Answer B

A – Negative staining of CSF specimen is done to demonstrate capsule

R – Cryptococcus neoformans is a capsulated parasite which causes meningitis Answer C

HIC +GM+ Immun – 8

Bacteriology – 1





## AMALA INSTITUTE OF MEDICAL SCIENCES

Second Professional MBBS Prelims – Paper II - 2023 Regulars

### MICROBIOLOGY

**Time: 3 hours.**

**Maximum Marks: 100**

*(Answer all questions. Draw diagrams wherever necessary)*

#### Long Essays

**(2x10=20 marks)**

2. A 30- years old male present to medical casualty with fever headache and vomiting. He gives history of chronic liver disease. O/E he was febrile, neck rigidity present. CSF Gram staining showed pus cells and grampositive diplococci. (1+1+2+2+3+1=10 marks)
  - a) What is the diagnosis?
  - b) Name the causative organism.
  - c) Discuss the pathogenesis of the above condition.
  - d) Discuss the laboratory diagnosis.
  - e) Name the vaccines available and the schedule
  - f) Name two drugs used for treatment.
  
3. A 25-years old lady presented to medicine O.P with fever sore throat and breathlessness. One of her family members is a health care worker who was on medical ICU duty. (1+1+2+3+2+1=10)
  - a) What is the provisional diagnosis?
  - b) Name two viruses responsible for this condition.
  - c) Discuss the pathogenesis of this condition.
  - d) How do you confirm the laboratory diagnosis?
  - e) How do you manage the patient
  - f) Discuss about the prophylaxis of the above condition.

#### Short Essays

**(6x6= 36 Marks)**

4. Discuss the pathogenesis, laboratory diagnosis and prophylaxis of Tetanus. (2+2+2=6 Marks)
5. Discuss the laboratory diagnosis of Hepatitis B infection.
6. Discuss the pathogenesis and laboratory diagnosis of Hook worm infection (3+3=6)
7. Name the vaccines used and discuss the current vaccination schedule for Polio. (2+4=6)
8. Discuss about Pathogenesis and lab diagnosis of Cholera. (3+3=6 Marks)
9. Describe in detail Viral gastroenteritis.

#### Short Answers

**(6x4= 24 Marks)**

10. Name four fungi causing respiratory infections.
11. Discuss about lung fluke.
12. Name four parasites causing hepatic infections.
13. Informed consent
14. Enumerate 4 bacteria causing community acquired Pneumonia
15. Name four Bactericidal Antituberculous drugs.





# AMALA INSTITUTE OF MEDICAL SCIENCES

## Second Professional MBBS Prelims – Paper I1 - 2023 Regulars

1. MCQ.

(20X 1=20 marks)

### Questions i-v are single response type

- i. Food poisoning by preformed toxin is caused by  
A. Shigella flexneri. B. Staphylococcus aureus. C. Salmonella enteritidis D. Vibrio cholerae
- ii. Drug of choice for Mycoplasma pneumoniae is  
A. Doxycycline B. Gentamicin C. Ciprofloxacin D. Penicillin
- iii. All are dimorphic fungi causing systemic infection EXCEPT  
A. Histoplasma capsulatum. B. Blastomyces dermatitidis C. Candida albicans D. Coccidioides immitis
- iv. The infective form of intestinal taeniasis  
A. Egg. B. Cercariae C. Metacercariae D. Cysticercus
- v. Acute Hemorrhagic conjunctivitis is caused by  
A. Enterovirus 70 B. Enterovirus 72 C. Coxsackie B D. Herpes simplex.

### Questions vi-x are case scenario based

Read the following clinical history and select the most appropriate response.

A 30 years old male patient presented to medical casualty with fever, altered behavior and hydrophobia. He gives a history of bite by a stray dog one month back.

- vi. Most probable clinical diagnosis is  
A. Pyogenic meningitis. B. Encephalitis. C. Rabies. D. Tetanus.
- vii. The test most commonly used for confirmation of clinical diagnosis is  
A. IgM Antibody detection. B. PCR. C. Viral isolation. D. IgG detection.
- viii. The specimens collected include all the following EXCEPT  
A. Skin biopsy from nape of neck B. CSF C. Saliva. D. Blood
- ix. Non neural vaccine used for prophylaxis include the following EXCEPT  
A. Human Diploid Cell. B. Semple C. Chick Embryo. D. Vero Cell
- x. The most important commonly affected site in brain is  
A. Cranial nerves. B. Anterior horn cells. C. Hippocampus. D. Pons

Question numbers xi-xv consists of two statements-Assertion (A) and reason (R). Answer these questions by selecting the appropriate options given below.

- A. Both A and R are true, and R is the correct explanation of A  
B. Both A and R are true, and R is not the correct explanation of A  
C. A is true but R is false  
D. A is false but R is true

- xi. A. Exotoxin is the virulence factor for Diphtheria.



- R. It acts by protein synthesis inhibition. A
- xii. A. Trophozoite is the infective form for acute amoebic dysentery.  
R. Trophozoite with ingested RBC in stool confirms acute amoebic dysentery. D
- xiii. A. Syphilis is transmitted from mother to child.  
R. Congenital syphilis infection is diagnosed by demonstrating IgM antibody in neonatal serum. B
- xiv. A. In Trichomoniasis, both partners are treated simultaneously  
R. Trichomoniasis is a sexually transmitted disease.. A
- xv. A. Japanese encephalitis is a zoonotic disease.  
B. Man to man transmission occurs by culex mosquito. C

**Question numbers xvi-xx are Multiple Response type questions. Read the statements & mark the answers appropriately.**

xvi. Examples of live viral vaccines include

1. Measles. 2. Rubella. 3. BCG. 4. Mumps

A. 1,2,4 are correct. B. 1,2,3 are correct. C. 2,3,4 are correct. D. 1, 2,3, 4 are correct

xvii. All are vector borne bacterial infections

1. Plague. 2. Relapsing fever. 3. Scrub typhus. 4. Dengue

A. 1,2, are correct. B. 1,2,4 are correct. C. 2,3,4 are correct. D. 1,2, 3 are correct.

xviii. All the following parasites infect liver

1. Entamoeba histolytica 2. Echinococcus granulosus 3. Fasciola hepatica. 4. Clonorchis sinensis

A. 1,2,3, are correct. B. 1,2,4 are correct. C. 1,2,3,4 are correct. D. 2,3,4 are correct.

xix. All the following are causative agents of bacterial STDs.

1. Neisseria gonorrhoeae. 2. Haemophilus ducreyi 3. Klebsiella granulomatis. D. Klebsiella pneumoniae.

A. 1,2 are correct. B. 1,2,3 are correct. C. 2,3,4 are correct. D. 1,3,4 are correct.

xx. All are intestinal nematodes

1. Ascaris. 2. Ancylostoma. 3. Trichinella spiralis. 4. Trichuris trichiura.

A. 1,2,3,4 are correct. B. 1,2,3 are correct. C. 1,3,4 are correct. D. 1,2,4 are correct.



## Answer Key Paper II

### Essays

#### 2a) Pyogenic meningitis

- a) *S. pneumonia*
- b) Virulence factors, Source, Mode of entry, how it reaches brain, predisposing factors.
- c) Specimen, Culture media, Identification, AST, Other tests
- d) Name the two vaccines and the schedule
- e) Any two drugs ( Penicillin, Ceftriaxone, Vancomycin).

#### 3a). Acute viral pharyngitis, Influenza like syndrome COVID 19, H1N1 infection

- b). SARS CoV- 2, Influenza A virus (H1N1,H3N2)
- c). Pathogenesis of either. Mode of transmission, receptor, further spread and complications.
- d) Specimen, Transport, Tests.
- e) Specific drugs and supportive therapy
- f) Vaccines and other measures

#### Q4. Pathogenesis, lab diagnosis and prophylaxis of Tetanus

**Pathogenesis:** causative agent – *Clostridium tetani*; mode of infection – through injury, surgery without sepsis, otitis media, neonates following delivery and unhygienic practices, abortion

**Virulence factor** – Tetanospasmin (plasmid coded) – prevents presynaptic release of inhibitory neurotransmitters Glycine and GABA leading to spastic muscle contraction

**Lab diagnosis :** specimen – excised tissue; Gram stain – with diagram, culture and toxigenicity test

**Prophylaxis:** TT/ DPT/ Pentavalent vaccine/Td/TdaP – explain with schedule

Pregnancy and post injury vaccination

#### Q5. Lab diagnosis of Hep B infection

**Specimen:** Blood

**Antigen detection:** HbsAg, HbeAg, HbcAg(in hepatocytes)

**Antibody detection:** AntiHbc, AntiHbs, AntiHbe

**Graph showing various serological markers of HBV against time**

**Molecular:** HBV DNA detection by PCR

**Non specific markers** like elevated liver enzymes, bilirubin



#### Q6. Pathogenesis and lab diagnosis of Hookworm infection

Pathogenesis: mode of infection – skin penetration; infective stage – L3 filariform larva, life cycle description.  
Pathogenicity – sucks blood from intestine after secretion of anticoagulants and hydrolytic enzymes leading to anaemia

Lab diagnosis: specimen – stool, microscopy: diagnostic stage – egg with features and diagram

Molecular: PCR; Other tests – anemia, hypoalbuminemia, eosinophilia

#### Q7. Vaccines used for Polio and the current vaccination schedule

Oral Polio Vaccine (Sabin)

Injectable Polio Vaccine (Salk)

IPV – 2 f-IPV (0.1 mL/dose) ID 6<sup>th</sup> and 14<sup>th</sup> week along with OPV

OPV – bivalent (1&3) – 2 doses/dose – At birth, 6, 10, 14 weeks; booster dose at 16-24 months

PPV – 2 doses 6 weeks apart every year for all children under 5 yrs of age irrespective of their vaccination status.

#### Q8: Pathogenesis and lab diagnosis of Cholera

The vibrios enter orally through contaminated water or food. Vibrios are highly susceptible to acids, and gastric acidity provides an effective barrier against small doses of cholera vibrios. Achlorhydria predisposes to cholera.

- Mode of transmission - Ingestion of contaminated water or food
- Infective dose - high infective dose of 10<sup>8</sup> bacilli
- Crossing of the protective layer of mucus: motility, Secreting mucinase and other proteolytic enzymes, Secreting hemagglutinin protease (cholera lectin) - Cleaves the mucus and fibronectin
- Adhesion and colonization - Facilitated by a special type IV fimbria called toxin-coregulated pilus (TCP)
- Gene for cholera toxin (CTX): Cholera toxin is phage coded -
- Cholera toxin (CT)
- The toxin molecule consists of two peptide fragments—A and B.
- Fragment B is the binding fragment. Fragment A is the active fragment, causes ADP ribosylation of G protein - accumulation of cyclic adenosine monophosphate (cAMP). Increase in cyclic AMP - accumulation of sodium chloride in intestinal lumen - Water moves passively into the bowel lumen - accumulation of isotonic fluid (watery diarrhea) Loss of fluid and electrolytes - shock (due to profound dehydration) and acidosis (due to loss of bicarbonate)
- Lab diagnosis
- Specimens: Watery stool or rectal swab (for carriers) Transport media: VR medium, Cary-Blair medium  
Direct microscopy: with flagella, Motility Culture & Identification – Enrichment and selective media  
Biotyping, Serogrouping: To differentiate O1 and O139, Serotyping, Antigen detection, Molecular method, Antimicrobial susceptibility testing



Qn9: Viral Gastroenteritis

Agents causing viral gastroenteritis -explain about rotavirus – pathogenesis, lab diagnosis, treatment prevention and vaccine.

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Aspergillus, Penicillium, Mucor, Histoplasmosis, Blastomycosis, Coccidioidomycosis

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Paragonimus westermani is a trematode, also known as oriental lung fluke, Lifecycle , pathogenesis,clinical features,lab diagnosis, treatment prevention

12. E. histolytica

Echinococcus

Fasciola hepatica, Fasciola gigantica, Clonorchis

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Occult filariasis

Capillaria hepatica

13. Informed consent definition – types written, verbal

14. CAP : S. pneumoniae                      Atypical - Legionella , Chlamydia psittaci

H. influenzae                                      & Mycoplasma pneumoniae

15. Isoniazid, Rifampin

Pyrazinamide

Fluoroquinolones

Ethambutol

Streptomycin, Bedaquiline, Delamanid





**(2020 MBBS Batch New Scheme) Part Completion Test – III October 2024**

Time: 3 Hours

Total Marks: 100

- Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers
- Indicate the question number correctly for the answer in the margin space
- Answer all parts of a single question together. Leave sufficient space between answers
- Draw table/diagrams/flow charts wherever necessary

Questions i-v are single response questions

- In foetal circulation, which vessel carries deoxygenated blood back to the placenta?  
a) Umbilical vein    b) Descending aorta    c) Umbilical artery    d) Pulmonary artery
- A 3-month-old baby with infantile hypertrophic pyloric stenosis has multiple episodes of non bilious vomiting. What metabolic abnormality does it result in?  
a) Hypochloremichypokalemic acidosis    c) Hypochloremic hypokalemic alkalosis  
b) Hypokalemic hyperchloremic alkalosis    d) Hyperchloremic hypokalemic acidosis.
- 10-year-old child with recurrent pulmonary infections now presents with bulky stools and steatorrhea. Which among the following is true of this condition?  
a) Serum shows hyponatremia    c) Sweat chloride excretion >60 meq/l  
b) Defective gene in chromosome17    d) Cardiomyopathy can be seen.
- What is the preferred drug for treating the condition characterised by jerking movements of limbs towards the body, regression of developmental milestones and hysarrythmia on EEG in a 10 month old baby?  
a) Phenytoin    b) Zonisamide    c) ACTH    d) Leviteracetam.
- A 11 year old boy was brought with complaints of multiple episodes of passing blood in urine. Which of the following is not associated with this symptom?  
a) Berger's disease    c) Idiopathic hypercalciuria  
b) Thin glomerular basement membrane disease    d) Renal tubular acidosis.

Question numbers vi – x are case scenario -based questions.

A 2-year-old boy is brought with c/o fever, vomiting, loose watery stools and poor oral intake of three days' duration. O/E he is found to be irritable, P.R- 150/min, R.R-26/min, temp-99.5°F, B.P- 90/60 mmHg, oral mucosa dry, skin turgor decreased, urine output reduced.

- Which of the following correctly describes assessment of his hydration status?  
a) ADD- no dehydration    c) ADD-some dehydration  
b) ADD- severe dehydration    d) ADD- impending shock
- Which of the following is NOT TRUE regarding the composition of ORS?  
a) Na<sup>+</sup>-75mmol/l    b) Cl<sup>-</sup>- 60 mmol/l    c) K<sup>+</sup>-20mmol/l    d) Glucose- 75 mmol/l.
- Which of the following metabolic derangements is NOT usually seen in ADD?  
a) Hyponatremia    c) Hyponatremia  
b) Metabolic acidosis    d) Hyperkalemia.
- Which of the following is appropriate initial fluid therapy for correction of dehydration in this child according to WHO guidelines?  
a) ORS 75ml/kg over 4 hours.    b) Ringer Lactate 75ml/kg over 6 hours.  
c) ORS 50 ml/kg over 6 hours.    c) Ringer Lactate 50ml/kg over 4 hours.
- Which of the following is NOT an indication for antibiotic therapy in ADD?  
a) Acute Dysentery    c) Severely malnourished child with diarrhoea  
b) ADD with severe dehydration    d) Giardiasis.



For questions xi – xv, there are two statements marked as -Assertion (A) and Reason (R). Mark your answer as per the options provided.

- xi. (A): Ventricular septal defects usually clinically manifest by around 6 weeks of age.  
(R): Pulmonary vascular resistance steadily increases after birth till around 6 weeks, leading to increased pulmonary blood flow and left to right shunt.  
a) Both A & R are correct and R is the reason for A    c) A is correct R is incorrect.  
b) A is incorrect R is correct    d) Both A & R are correct but R is not reason for A.
- xii. (A): The sixth cranial nerve is most commonly involved as a false localising sign of raised ICP.  
(R): The sixth cranial nerve is susceptible to traction by virtue of its intracranial course.  
a) Both A & R are correct and R is the reason for A    c) A is correct R is incorrect.  
b) A is incorrect R is correct    d) Both A & R are correct but R is not reason for A.
- xiii. (A): Short acting B2 agonists should not be used alone in asthma exacerbation.  
(R): Overuse of short acting B2 agonists may indicate poor asthma control.  
a) Both A & R are correct and R is the reason for A    c) A is correct R is incorrect.  
b) A is incorrect R is correct    d) Both A & R are correct but R is not reason for A.
- xiv. (A): Heavy proteinuria in nephrotic syndrome causes frothing of urine.  
(R): Protein in urine is amphiphilic and decreases surface tension.  
a) Both A & R are correct and R is the reason for A    c) A is correct R is incorrect.  
b) A is incorrect R is correct    d) Both A & R are correct but R is not reason for A.
- xv. (A): Nacetyl cysteine is the specific antidote for paracetamol poisoning.  
(R): It depletes glutathione stores in liver facilitating excretion of toxic metabolite of Paracetamol.  
a) Both A & R are correct and R is the reason for A    c) A is correct R is incorrect.  
b) A is incorrect R is correct    d) Both A & R are correct but R is not reason for A.

Question numbers xvi - xx are multiple response questions. Read the statements and mark the answers appropriately.

- xvi. Allergic manifestations in an atopic child with multiple allergies include  
1) Allergic salute    2) Allergic shiners    3) Dennie Morgan folds    4) Allergic cluck    5) Allergic whistle.  
a) 1,2 &3    b) 1,2,3,4 &5    c) 1,2,3 &4    d) 1 & 2
- xvii. Which of the following conditions are associated with hypotonia?  
1) Spinal muscular atrophy    2) Hemiplegic cerebral palsy    3) Down syndrome  
4) Duchenne muscular dystrophy    5) Congenital myopathy  
a) 1,2,3&5    b) 1,3,4 &5    c) 3,4 &5    d) 1,2,3 &5
- xviii. Which are the components of Nada's criteria for diagnosis of congenital heart disease?  
1) Cyanosis    2) Exertional dyspnoea    3) Congestive cardiac failure  
4) Clubbing    5) Systolic murmur grade 3 or more.  
a) 1,2, 3 &5    b) 2,3 &5    c) 1,3,4 &5    d) 1,3 &5.
- xix. Which of the following are true regarding UTI in children?  
1) E.coli is the most common organism causing UTI in children  
2) Complicated UTI refers to UTI not responding to initial antibiotic treatment.  
3) Positive dipstick for leukocyte esterase and nitrite is confirmatory for UTI.  
4) 50% children with recurrent UTI have an associated urological abnormality.  
5) Prophylactic antibiotic therapy is indicated in children with recurrent UTI and grade 3 or more Vesicoureteric reflux.  
a) 1,2,4 &5    b) 1,4 &5    c) 1,3 &5    d) 1,2 &5.
- xx. Which of the following are true regarding constipation in children?  
1) A stool frequency of <4/week is abnormal for all ages.  
2) The most common cause of constipation in children is hypothyroidism.  
3) Growth failure, blood in stools are red flag signs.  
4) Hypercalcemia can cause constipation  
5) Polyethylene glycol is a first line agent used in treatment.  
a) 1,2,3,4 &5    b) 2,3,4    c) 3,4 &5    d) 1,3,4 &5.



### Long essays

2. A 4 year old child is brought to ED with h/o high grade fever, cough, breathing difficulty, unable to feed. O/E his HR-160/min, RR- 70/min, Spo2 85% in room air; he has grunting & severe chest indrawing, decreased breath sounds and crackles on auscultation over right lower anterior chest.
  - a) What is the diagnosis?
  - b) How will you manage this child?
  - c) List the complications associated with this condition.
3. A 5-year-old girl presents to paediatric Op with h/o generalised oedema, frothing of urine and decreased urine output of 5 days duration. O/E generalised oedema present, B.P-98/60 mmHg, shifting dullness present, other systems normal.
  - a) What is the likely diagnosis? How will you confirm the diagnosis?
  - b) Outline management plan for this child.
  - c) Give 4 differential diagnosis for generalised oedema in a child.

### Short essays

4. Describe the management of acute glomerulonephritis and mention the important complications.
5. Describe the management of acute asthma exacerbation in a 10-year-old child.
6. Enumerate the CSF findings and treatment of a 2-year-old child with suspected pyogenic meningitis.
7. Explain the serological markers in acute viral hepatitis B.
8. Describe the clinical signs in large VSD, mention salient points in management.
9. List the important causes of hepatomegaly in a child. Write briefly on liver function tests.

### Short answers

10. Modified Jones criteria for diagnosis of rheumatic fever.
11. List the classification of cerebral palsy.
12. Define haematuria in children. Mention 4 common causes of gross haematuria in children.
13. Draw flow chart – Status Epilepticus management.
14. Describe the investigations to diagnose UTI in a child.
15. Describe the causes of stridor in a child.

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**THIRD MBBS PART I FIRST AVERAGE EXAMINATION**  
**2020 regular batch MBBS**  
**PEDIATRICS AND NEONATOLOGY**

**Time: 3 Hours**

**Total Marks: 100**

- Answer all questions
- Draw diagrams wherever necessary

**I. ESSAY: LONG ESSAY**

1. 8 month old Aishwarya was brought to the OPD with complaints of fever of 5 days duration, followed by a maculopapular rash. On examination, the child is sick looking with reddish discoloration of eyes, cough and runny nose. Vitals: PR- 110/mt; RR-60 /mt; Temp 100.6, SCR+ ICR+ on auscultation- Chest B/L crackles.
  - a) What is your probable diagnosis and what complication does this child have? (2)
  - b) Differential diagnosis of fever with rash (3)
  - c) What are the major complications seen in this condition? (4)
  - d) How can you prevent this? (2)
  - e) Elaborate the National Immunization schedule (4)
2. 3 year old Manu was admitted for evaluation of delayed development. The child has attained head control at 6 months sitting with support by 10 months now, can move by bottom shuffling; he cannot stand or walk .He can scribble and he feeds self with spilling; he can speak and communicate his needs , says his name and knows his gender.
  - a) Comment on the child's development (3)
  - b) What is the probable diagnosis? (3)
  - c) What is global developmental delay? (2)
  - d) Enumerate the aetiological factors causing developmental delay (5)
  - e) Name few treatable /preventable causes of intellectual disability (2)

**II. SHORT ESSAYS**

**(5x8=40)**

3. Rules of Development
4. Enteric fever
5. BFHI
6. Short stature
7. Nutritional Rickets

**III. SHORT ANSWERS**

**(5x4=20)**

8. Development at 2 years
9. Clinical features of iron deficiency anemia
10. Breath holding spells
11. Low osmolar ORS
12. Failure to thrive

**IV. BRIEF ANSWERS**

**(10x1=10)**

13. Causes of microcephaly
14. Optional Vaccines
15. Name 4 primitive reflexes
16. IAP classification of malnutrition
17. Define SAM
18. Vitamin A Prophylaxis
19. Pneumococcal vaccine- schedule, dose & route
20. 4 signs of good attachment in breast feeding
21. Benefits of colostrums
22. 2 age independent indices of nutritional assessment





**2020 MBBS Batch( New Scheme) Prelims**

Time: 3 Hours

Total Marks: 100

- Answer all questions to the point neatly and legibly • Do not leave any blank pages between answers
- Indicate the question number correctly for the answer in the margin space
- Answer all parts of a single question together. Leave sufficient space between answers
- Draw table/diagrams/flow charts wherever necessary

The Answers to MCQ questions (Q.No. i to Q.No. xx) shall be written continuously on the first two writing sheets (ie Page No. 3 & 4) only

Questions (i-v) are single response type questions

**1. Multiple Choice Questions**

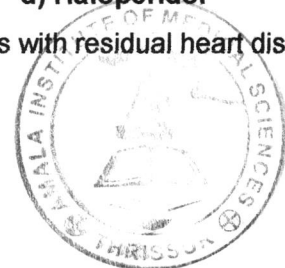
(1x20=20)

- PDA is seen in all of the following except
  - Congenital Rubella Syndrome
  - Fetal Hydantoin syndrome
  - Treacher Collins syndrome
  - William syndrome**
- Which of the following is not a feature of complex febrile seizure
  - Duration more than 15 min
  - Focal seizure
  - Generalized tonic clonic seizure**
  - recurrence within 24 hours
- Object permanence developmental milestone develops by
  - 6 months
  - 9 months**
  - 12 months
  - 18 months
- The first sign of puberty in females
  - Menarche
  - Thelarche**
  - Andrache
  - Pubarche
- The first lab parameter to improve after starting treatment in iron deficiency anemia is
  - Hb
  - MCV
  - Reticulocyte count**
  - MCHC

**Question (vi-x) are case scenario-based questions:**

A 9 year month old boy presented with history of sore throat 1 month back followed by fever and migratory poly arthritis, suggestive of rheumatic fever.

- Which of the following statement is true regarding polyarthritis
  - Typically involves small joints
  - Deforming arthritis
  - Inverse Relationship between severity of arthritis and carditis**
  - Occurs in 50% of pts with rheumatic fever
- Carditis is associated with murmur and
  - Tachycardia**
  - Syncope
  - Chest pain
  - Tachypnoea
- Patient with carditis with cardiomegaly should receive
  - Steroid
  - IVIG
  - Steroid + Aspirin on tapering steroid**
  - Only Penicillin
- First line treatment for Sydenham chorea is
  - Aspirin
  - Prednisolone
  - Penicillin
  - Haloperidol**
- Duration of prophylaxis with penicillin in patients who had carditis with residual heart disease
  - 5 years or till 21 years which ever is longer
  - 5 years or till 40 years which ever is longer
  - 10 years or till 21 years which ever is longer
  - 10 years or till 40 years which ever is longer**

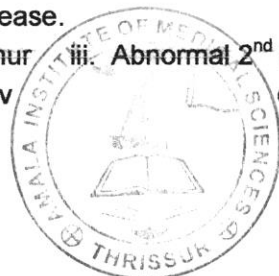


Question numbers (xi-xv) consists of two statements - Assertion (A) and Reason (R). Answer these questions by selecting the appropriate options given below.

- xi. (A) : Bone age is less than the chronological age in constitutional delay of growth and puberty  
(R): IgF1 levels tend to be low for chronological age but normal for bone age in these patients  
a) **Both A and R are true, and R is the reason for A**  
b) Both A and R are true, and R is not the reason for A  
c) A is correct but R is incorrect  
d) A is incorrect but R is correct
- xii. (A): Main treatment for Breathholding spell is iron supplementation  
(R): Breathholding spell is a type of seizure .  
a) Both A and R are true, and R is the reason for A  
b) Both A and R are true, and R is not the reason for A  
c) **A is correct but R is incorrect**  
d) A is incorrect but R is correct
- xiii. (A): Glucose is one of the main constituents of ORS  
(R): Glucose helps to correct dehydration and electrolyte abnormalities  
a) **Both A and R are true, and R is the reason for A**  
b) Both A and R are true, and R is not the reason for A  
c) A is correct but R is incorrect  
d) A is incorrect but R is correct
- xiv.(A): Iron deficiency anemia is macrocytic anemia.  
(R) : Macrocytic anemia is due to impaired DNA synthesis.  
a) Both A and R are true, and R is the reason for A  
b) Both A and R are true, and R is not the reason for A  
c) A is correct but R is incorrect  
d) **A is incorrect but R is correct**
- xv.(A): Vit K is given to all newborns at birth  
(R) Hepatitis B vaccine is given to all newborns at birth  
a) Both A and R are true, and R is the reason for A  
b) **Both A and R are true, and R is not the reason for A**  
c) A is correct but R is incorrect  
d) A is incorrect but R is correct

Question numbers (xvi-xx) are multiple response type questions. Read the statements and mark the answers appropriately.

- xvi. Biochemical changes in Rickets include  
i. Low phosphate    ii. Low calcium    iii. High AlkPO4    iv. low PTH  
a) i, ii, iii    b) i, iii, iv    c) i, ii, iv    d) ii, iii, iv
- xvii. BCG vaccine  
i. Live attenuated vaccine    ii. Can be used up to 4 hours after reconstitution  
iii. Route of administration is subcutaneous    iv. It is light sensitive  
a) i, ii, iii    b) i, iii, iv    c) i, ii, iv    d) ii, iii, iv
- xviii Multi drug resistant typhoid is defined as resistance to the following drugs  
i. Ampicillin    ii. TMP-SMX    iii. Chloramphenicol    iv. Cefixime  
a) i, ii, iii    b) i, iii    c) i, ii, iv    d) ii, iii, iv
- xix. The common clinical manifestation of extrahepatic portal hypertension are  
i. Jaundice    ii. Variceal bleeds    iii. Spleenomegaly    iv. No symptoms  
a) i, ii, iii    b) i, iii, iv    c) i, ii, iv    d) ii, iii, iv
- xx. Which of the following features suggest a heart disease.  
i. Any Systolic murmur    ii. Any Diastolic murmur    iii. Abnormal 2<sup>nd</sup> HS    iv. Cyanosis  
a) i, ii, iii    b) i, ii, iv    c) i, iii, iv    d) ii, iii, iv



Long essays

(2x10=20)

2. A 1.5 year -old girl admitted with fever and cough for 2 days. Mother has noticed fast breathing and chest retractions previous night. O/E RR was 58/min with subcostal and intercostal retractions. Child was drowsy and not feeding well. Based on your knowledge answer the following questions:

- a) Name the likely diagnosis (2) Ans Pneumonia with danger signs-Severe pneumonia
- b) What are the danger signs to look for in this condition? (3)

Ans Altered sensorium, seizures, feed refusal, persistent vomiting, Stridor in calm child, Severe acute malnutrition, cyanosis or low SaO<sub>2</sub> on pulse oximetry

- c) How will you manage this child as per ARI control program(3) Ans immediate referral after one dose oral or parenteral antibiotic, first line penicillin or ampicillin/genta (as less than 2 years) second line Ceftriaxone ,O<sub>2</sub>, Supportive care
- d) What can you do to prevent this disease? (2)

Ans Case management, Improve nutrition, Hand hygiene, Control indoor pollution, exclusive breast feeding and Vit A , zinc supplementation, vaccination with penta valent and conjugated pneumonia vaccine

3. A 3 year old relatively well child is admitted with history of sudden onset bleeding spots over limbs for 1 day. This morning child had bleeding from gums while brushing teeth. There is history of AURI 2 weeks back.

- a) What is the probable diagnosis and differential diagnosis in this child? (2)

Ans Immune Thrombocytopenic purpura, other DD Henoch Schoenlein purpura, VWD disease coagulation disorders, platelet function disorders, if fever leukemia

- b) What are the investigations you will do to prove your diagnosis? (3)

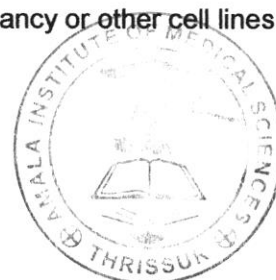
Ans For first episode - Hemogram to demonstrate normal HB.WBC and low platelets, Mean platelet volume to look platelet size, Peripheral smear to rule out blasts /atypical cells, BT/CT PT/APTT/INR/LFT to rule out coagulopathy. Platelet function tests if necessary

- c) What are the treatment strategies available for this condition? (3)

Ans Observation .short course high dose oral steroids, IVIG indication .Platelet transfusion specific indication

- d) When will you do a bone marrow study in this child? (2)

Ans Bone Marrow only if clinical suspicion of malignancy or other cell lines involved



**Short Essays:**

**(6x6=36)**

4. Natural history of VSD including complications

**Ans** VSD natural closure, closure by prolapse of leaflet, development of AR, Development of infundibular PS (Gazul), Gerbode VSD(communication with RA thro tricuspid valve) IE, CCF, REC ALRI,PAH, Eisenmenger complex,FTT(12x1/2)

5. Assessment of Dehydration in ADD and management with severe dehydration.

**Ans** Ask, Look, Feel – classify as no, some, severe dehydration. Management is relevant investigations + treatment of dehydration, ongoing losses and maintenance, for infant and bigger child, Zinc and supportive treatment(3+3)

6. Counsel parents of a child with first episode of Nephrotic syndrome regarding treatment , follow up and outcome.

**Ans** Counsel regarding the pathology-losing protein in urine therefore edema, may have less urine output. Outline treatment schedule. Regarding recurrent nature of illness in 40-60% patients after remission but generally decreases as child gets older. Possible complications of disease. Possible complications of drugs. Diet. Vaccination both routine and special vaccines. Monitor urine albumin, growth, BP, Eye check up on FU. If comes acutely ill stress dose to be given.(12x1/2)

7. Definition of Severe Acute Malnutrition and management of complicated SAM.

**Ans** SAM definition as per WHO- wt for ht < -3SD on WHO growth chart; bipedal edema; MAUC<11.5cm above 6 months of age; if severe edema, failed test/low appetite, medical complications or one or more danger signs as per imnci need inpatient care.10 steps in 2 phases Stabilization & rehabilitation.(2+4)

8. Clinical features and Risk stratification in Acute Lymphoblastic Leukemia

**Ans** At least 6 clinical features and risk stratification at least 6 features(3+3)

9. Causes of jaundice in newborn.

**Ans** At least 8-12 causes divided into physiological and pathological-direct vs indirect (2 for classification+4 for causes)

**Short Notes**

**(6x4=24)**

10. Undescended Testes in an infant.

**Ans**(1 mark for each point) Importance -treat by one year , rule out endocrine cause Evaluation including usg, hcg sti test, Complications, Treatment

11. Live vaccines in National immunization schedule.

**Ans** BCG, OPV,ROTA,MR few sentences on each (1 mark for each)

12. Enumerate causes of fever with rash in infants.

**Ans** Classify – maculopapular, vesicular, hemorrhagic, urticarial etc or infection inflammation etc .Atleast 8 causesx1/2 marks

13. Measurement of height and causes of short stature.

**Ans** Stadiometer, position(1) ,proportionate /disproportionate short stature, familial CDGP(3)

14. Enumerate the causes of seizures in a 3 year old child.

**Ans** Febrile seizure, meningitis, head injury, epilepsy, ICSOL, metabolic causes, vascular,thrombosis (1/2x8)

15. Diagnosis and treatment of congenital hypothyroidism.

**Ans** Tsh at birth nb screening algorithm (3) treatment(1)

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