

**102105T4HSS**

**HEALTH SERVICE SUPPORT PROVIDERS LEVEL 5**

**MED/CU/HSS /CR/01/5/A**

**PARTICIPATE IN INFECTION PREVENTION AND CONTROL**

**THE KENYA NATIONAL EXAMINATIONS COUNCIL**

**ASSESSOR WRITTEN ASSESSMENT**

**Time: 3 hours**

## INSTRUCTIONS TO CANDIDATES

*Maximum marks for each question are indicated in brackets ( ).*

*This paper consists of* ***THREE*** *sections: A, B and C.*

**This paper consists of THIRTEEN (13) printed pages**

**Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing**

**SECTION A (20 Marks)**

***(Each question in this section is 1 mark)***

1. When serving patients in the ward with a chronic infection, a new organism may set up to introduce another infection this is called; (1 Mark)
2. Primary infection
3. **Secondary infection**
4. Tertiary infection
5. Chronic infection
6. The following microorganism can be removed by routine hand hygiene; (1 Mark)
7. **Transient flora**
8. Transmittable flora
9. Contagious flora
10. Residual flora
11. One of the following disease is spread by rats; (1Mark)
12. Cholera
13. Malaria
14. Tuberculosis
15. **Plaque**
16. Hospital instruments are made of different materials which require special methods of sterilization. The sets of instruments that can be autoclaved are; (1 Mark)
17. Needle holders, retractors, syringes
18. Dissecting forceps, syringes, needles
19. **Retractors, needle holders, dissecting forceps**
20. Needle holders, needles, retractors
21. The correct way of drying hands after hand washing is; (1 Mark)
22. In a circular motion covering wrist to finger tips in one direction
23. **In a circular motion covering all areas of the finger downwards to the wrist**
24. Lightly part and allow hands to dry from the wrist to the fingers
25. Dry hands thoroughly
26. The risk of instruments to cause diseases are classified according to their level of invasion in the patient’s body. High risk instruments are: (1 Mark)
27. Instruments that come into contact patients intact skin
28. Instruments that penetrate patients intact skin but do not come in to contact with mucous membrane
29. **Instruments that penetrate patient’s inner tissues cells**
30. Instruments that involve removal of soil and organic material
31. The physical barriers used to prevent transmission of infection to health care workers include: (1Mark)
32. **Face masks, gloves**
33. Windows, gowns
34. Antiseptics and disinfectants
35. Hand washing
36. Virulence is: (1 Mark)
37. Pathogens ability to establish an infection
38. Multiplication of microorganism within a host
39. **The ability of a microorganism to cause damage to the host**
40. Host ability to fight against an infection
41. Waste segregation is the process of sorting hospital waste into different categories for disposal. It is done at; (1 Mark)
42. The disposal site
43. The end point
44. **The generation point**
45. The collection point
46. A Carrier in infection cycle is: (1 Mark)
47. The pathogens capacity/ability to establish an infection
48. **An organism infected with an infectious disease agent but displays no symptoms**
49. An infectious agent that is capable of being transmitted to a client by direct or indirect contact
50. Invasion and multiplication of micro – organisms in body tissue that results in cellular injury.
51. To avoid spread of infectious diseases one is expected to use one of the following thermometers; (1 Mark)
52. Mercury thermometer
53. Digital thermometer
54. **Infrared thermometer**
55. Rectal thermometer
56. Standard precautions are followed in hospitals because: (1 Mark)

A. Hospitals are extremely clean and this precaution is required

B. **Most patients in the hospital are a source of infection**

C. Health care workers are the only susceptible hosts of infections from patients

D. It has been said by the WHO

1. The following statement is correct regarding a patient who has been suspected to have acquired a nosocomial infection. (1 Mark)
2. **Acquired the infection while in hospital**
3. Should not be monitored following departure from hospital
4. Should be considered non-infectious by health workers
5. Should be treated at home
6. The process of eliminating all microorganisms including their spores from an object is; (1 Mark)
7. Sanitation
8. **Sterilization**
9. Disinfection
10. Decontamination
11. Disease transmission is continuous in nature. The three factors necessary for a disease transmission cycle to be complete are: (1 Mark)
    1. Host, soil, insect
    2. Reservoir, mosquitoes, people
    3. **Agent, host, environment**
    4. Environment, water, food
12. Gloves used to change a patient’s bed linen are disposed in; (1Mark)
13. Red bin
14. **Yellow bin**
15. Green bin
16. Black bin
17. Guidelines for Disposal of Medical Waste states that: (1 Mark)
18. **Keep containers in convenient places**
19. Keep containers in a hidden place
20. Remove the waste if not in the proper bin
21. Do not Use washable, leak-proof containers
22. Select a high level disinfectant used in health facilities from the choices given; (1 Mark)
23. Iodine
24. Chlorhexidine
25. Isopropyl
26. **Cidex**
27. The color coded bin for disposing paper wrappings in the hospital is: (1 Mark)
28. **Black**
29. Blue
30. Red
31. Yellow
32. The multiplication of microorganism on or within a host that results in cellular injury is; (1 Mark)
33. Colonization
34. **Infection**
35. Normal flora
36. Transient flora

**SECTION B** (40 marks)

***The following answers are to be used as a guide***

1. State **Three (3)** general policies for health workers when handling sharps. (3 Marks)

* **Do not pick up a handful of sharp instruments simultaneously.**
* **Position the sharp end of instruments away from self and others.**
* **Exercise caution when rotating instruments are in use.**
* **Wear heavy-duty or strong utility gloves while decontaminating, cleaning, and disinfecting instruments.**
* **Dispose of used sharps immediately in designated puncture- and leak-proof containers labelled with a biohazard symbol.**
* **Prevent access to used needles and syringes, and other sharps while awaiting transport for final disposal.**
* **If injured by sharps, contact the supervisor immediately.**

***(Award 1 Mark for each correct response to a maximum of 3)***

1. Outline **Three (3)** precautions one should observe when storing sterile instruments. (3 Marks)

* **Keep the storage area clean, dry, dust-free, and lint-free.**
* **Keep the temperature approximately 24⁰C and the relative humidity below 70%when possible.**
* **Do not use cardboard boxes for storage.**
* **Date and rotate the supplies (first in, first out)**
* **Should be stored 8 inches above the floor in an area (to facilitate cleaning and prevent splashing of items when floor is cleaned)**
* **Store sacks and containers with sterile (or high-level disinfected) items 20-25 centimeters off the floor,45-50 centimeters from the ceiling, and 15-20 centimeters from an outside wall.**

***(Award 1 Mark for each correct response to a maximum of 3)***

1. State the difference between antiseptic solution and disinfectants solutions used in hospital giving **one (1)** example for each. (4 Marks)

* **An antiseptic is a chemical agent used on the skin and mucous membrane to remove or kill micro-organisms without causing damage or irritation to the skin and mucous membranes. Example: Chlorhexidine, povidone**
* **Disinfectants are chemical agents used to kill micro-organisms on inanimate objects, such as instruments and surfaces. They are not meant to be used on the skin or mucous membranes. Example: Sodium hypochlorite, endozyme**

***(Award 1 mark for each correct definition and 1 mark for example)***

1. Highlight **Three** **(3)** importance of decontamination of instruments in a health care facility. (3 Marks)

* **Prevents post procedure infections**
* **Results in high-quality, safe services**
* **Prevents infections in staff**
* **Protects the community**
* **Prevents the spread of antibiotic-resistant microorganisms**
* **Lowers the cost of health care**

***(Award I mark for each correct response to a maximum of 3 marks)***

1. Chlorine is the most commonly used disinfectant for decontamination. Given manufacturer’s concentration to be 10%. And the required concentration is 0.5%. Calculate the ratio of chlorine to water concentration; (4 Marks)

**Manufacturers concentration - 1**

**Required concentration**

**10/0.5 -1=19**

**Ratio : 1:19**

***(Award 1mark for the formula, 2mark for the calculation and 1 mark for the answer maximum of 4 marks)***

1. List **Three** **(3)** details that you include on a sterile pack label. (3 Marks)

* **Name of the pack**
* **Date of sterilization**
* **Expiry date**
* **Initials of the person packing**

***(Award 1 Mark for each correct item listed)***

1. Waste segregation is important to prevent contamination in the hospital. Explain the color code for the different types of hospital waste. (4 Marks)

* **Non Infectious Waste: Includes food remains, waste paper and packaging material. Disposed in a BLACK color coded bin**
* **Infectious Waste: Includes routine clinical waste e.g. gloves, gauzes and bandages. Disposed in YELLOW color coded bins**
* **Highly Infectious: This includes body tissues/ parts e.g. teeth, placenta. Disposed in RED color coded bins**
* **Sharps: Included needles and surgical blades. Disposed in a SHARPS BOX. The container should be at arm’s length**

***(Award 1 mark for each correct explanation.)***

1. Outline **Three (3)** factors affecting the efficacy of disinfection and sterilization of hospital instruments. ( 3 Marks)
   * **Number and Location of Microorganisms**
   * **Innate Resistance of Microorganisms**
   * **Concentration and Potency of Disinfectants the more concentrated the disinfectant, the greater its efficacy and the shorter the time necessary to achieve microbial kill.**
   * **Physical and Chemical Factors: temperature, pH, relative humidity, and water hardness**
   * **. Organic and Inorganic Matter: Organic matter in the form of serum, blood, pus, or fecal or lubricant material can interfere with the antimicrobial activity of disinfectants , organic material can protect microorganisms from attack by acting as a physical barrier**
   * **Duration of Exposure**

***(Award 1 mark for each correct response to a maximum of 3 marks)***

1. Hand washing is essential in the prevention of infection in a hospital. List **Two (2)** moments of hand washing in a hospital. ( 2 Marks)

* **After arriving at work**
* **Before and after examining each client**
* **After touching anything that might be contaminated**
* **Before putting on gloves for clinical procedures**
* **After removing gloves**
* **Before leaving work**

***(Award 1mark for each correct response)***

1. When decontaminating hospital apparatus, we use different types of chemicals almost daily. Explain **Four** **(4)** personal precautions to be observed while using chemicals in hospital. ( 4 marks)

* **Equipment should be well prepared for sterilization**
* **Fully immerse the equipment into the solution**
* **Leave the instruments in situ for the recommended time**
* **The instruments should be removed by use of forceps and cleaned in water or normal saline**
* **Avoid the solutions from splashing to the mucous membrane and the skin**
* **Use appropriate personal protective equipment while using disinfectants**

***(Award I mark for each correct response to a maximum of 4 marks)***

1. State **Three (3)** importance of proper waste disposal. (3 marks)

* **Minimizes spread of infection to health workers, patients and the local community.**
* **Reduced risk of accidental injury to those who handle the waste.**
* **Reduced likelihood of contamination of soil, ground water etc.**
* **Reduces attraction of insects and rodents.**
* **Reduced odors.**

***(Award I mark for each correct response maximum of 3 marks)***

1. State **Four (4)** standard precautions of infection prevention according to World Health Organization as applied in the hospitals. (4 Marks)

* **Hand washing before and after contact with the patient.**
* **Wearing protective clothing to avoid contamination of the skin or mucus membrane, i.e. gloves, aprons, face masks, face shields.**
* **Safe handling and disposal of sharps**
* **Safe disposal of clinical waste**
* **Safe handling, transport and process of soiled linen**
* **Respiratory hygiene and cough etiquette**

***(Award I mark for each correct response maximum of 4 marks)***

**SECTION C (40 MARKS)**

***Answer any Two (2) questions***

1. Waste is generated during patient care in a hospital.
2. Explain FIVE categories of hospital waste. (10 marks)

* **Clinical Waste: Any material that has been in contact with patients either internally or externally**
* **Pathological Waste: Human body tissues e.g., placenta, tooth**
* **Pharmaceutical Waste: Expired drugs, containers**
* **Food remains. Cooked or uncooked**
* **General Waste: Include waste papers**
* **Sharps: Surgical blades and needles**
* **Radiation Waste: X – ray charts**

***(Award 1 mark for each correct category and 1 mark for correct explanation)***

1. Describe any **FIVE (5)** steps used in waste management. (10 Marks)

* **Generation**
* **Segregation**
* **Collection**
* **Transportation**
* **Storage**
* **Treatment**
* **Final disposal**

***(Award 1 mark for each correct step and 1 mark for the correct explanation.)***

1. Rodents and other pests are a source of infection in the hospital set up. Discuss **TEN** **(10)** procedures done in the health facility to control pests and rodents. (20 Marks)

* **Find and eliminate sources of moisture in various plumbing areas, such as leaky pipes and clogged drains.**
* **Keep food sealed and stored properly, particularly in kitchens and cafeterias.**
* **Clean high-volume areas like public eating areas and kitchenettes, where crumbs, food scraps and trash are more likely to build up daily.**
* **Dispose of garbage regularly and store in sealed containers or dumpsters.**
* **Inspect food delivery boxes before storing in the kitchen.**
* **Keep storage areas dry and well-ventilated.**
* **Seal cracks and holes on the outside of the building, including entry points for utilities and pipes**
* **Repair decaying exterior wood on buildings because some insects are drawn to deteriorating wood.**
* **Replace weather stripping and repair loose mortar around the foundation and lower-level windows.**
* **Look for rodent droppings in undisturbed areas, including closets and storage places.**
* **Trim or remove any vegetation, such as plants, shrubs and trees, and keep it at least two feet from the buildings.**
* **Regularly check for any kitchen drain clogs as well as under such appliances as refrigerators and freezers.**
* **Ensure that all entryways, especially in loading docks, are kept closed and never propped open**

***(Award 2 marks for each well explained response to a maximum of 20 marks)***

1. List **FIVE (5)** Personal Protective Equipment stating the purpose of each and two instances when it is used. (20 Marks)

* **Gowns – to protect self from infection**
  + - **Used when: Doing laundry**
      * + **Cleaning patient surfaces**
* **Gloves – protects you from contacting microorganisms using your bare hands and from spread of microorganisms.**
  + - **Used when: Touching contaminated surfaces**
      * + **When handling patients linen**
* **Face Masks- protects self from inhaling microorganisms present in air droplets and also prevents the spread of airborne microorganisms from an infected person to others.**
  + - **Used when: Taking care of patients with infections that are spread through air** 
      * + **When in a sterile environment to avoid contaminating it**
* **Boots – to protect self from getting soiled with contaminated fluids and from spillage of cleaning and disinfecting chemicals.**
  + - **Used when: Performing cleaning procedures**
      * + **Doing laundry**
* **Goggles - protect the mucous membranes in your eyes from blood and other contaminated fluids and from irritation when using chemicals**
  + - **Used when: Handling chemicals that irritate the eyes**
      * + **Doing a procedure that involves splashing of fluids**
* **Head caps- protects the hair from contamination**

**Used when: Dusting the hospital**

**Working in a sterile environment**

***(Award 1 mark for each correct PPE, 1 mark for its correct purpose and 2 marks for correct scenario when it is used. Total marks per PPE is 4 Marks × 5= 20 marks)***