RRB PHARMACIST 2024

MODEL PAPER -87

TIME:-
9:00 P.M

40 QUESTIONS

WITH DETAILED EXPLANATION

SUBJECT -

MODEL PAPER DISCUSSION

VIDEO DEKHNE KE LIYE BANNER PAR CLICK KARE

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WHATSAPP & TELEGRAM SE JUDNE KE LIYE ICONS PAR CLICK KARE

1. Rotosort is an equipment used

(a) To separate filled capsules
(b) To fix the cap and body of the capsules after filing
(c) To separate the improper tablets
(d) To adjust the required compression for the table

1. Rotosort is an equipment used

(a) To separate filled capsules

(b) To fix the cap and body of the capsules after filing

(c) To separate the improper tablets

(d) To adjust the required compression for the table

Explanation -

EQUIPMENTS USED IN CAPSULE FORMULATION

S. NO.	EQUIPMENTS	PURPOSE
1.	Rotofill	For filling of pellets
2.	Rotosort	New filled capsule sorting machine
3.	Rotoweigh	Automatic capsuke weighing machine
4.	Vericap-1200	Capsule weighing machine
5.	Quali-seal	Filling of liquids
6.	Erweka KEA	Dusting and Polishing machine
7.	Seidenader PM60	For Cleaning & Polishing.

2. 330 mg of aspirin is to be filled in hard gelatin capsules. Which is the appropriate capsule size

(a) 1
(b) 2
(c) 0
(d) 3

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(a) 1
(b) 2
(c) 0
(d) 3

CAPSULE SIZE WITH THEIR QUANTITIES

CAPSULE SIZE	BP(ml)
000	1.37
00	0.95
0	0.68
1	0.50
2	0.37
3	0.30
4	0.21
5	0.15

TRICK = to learn the BP (ml) quantity go to decreasing order which is highlighted like 7,5,4,3,2,1 and after these digits 5 is common in every number

3. 000 represents

(a) Dose of a tablet in a day
(b) Three tablets per dose
(c) Tablet size
(d) Capsule size

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(a) Dose of a tablet in a day

(b) Three tablets per dose

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(d) Capsule size

000 represents capsule size.

4. The bloom strength of capsule should be in the range of

(a) 100 to 300 gm
(b) 10 to 30 mg
(c) 100 to 150 gm
(d) 150 to 250 gm

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BLOOM STRENGTH :- It is measure of cohesive strength of the cross-linking that occur between gelatin molecules, and it gives an indicator of the firmness of the gel. It is determined by measuring the weight in grams required to move a standard plunger that is 0.5 inches in diameter, a fixed distance of 4 mm deep into 6.66% W/V gel held at 10 C for 17 hours. Bloom strength in the range of 150-250 gm is considered suitable for capsule.

5. Smallest size of capsule most widely used

(a) 0
(b) 5
(c) 1
(d) 000

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3	0.30
4	0.21
5	0.15

000 → Largest and 5 → Smallest size

6. Match the following

Capacity	Capsule size
[P] 0	[I] 0.15 ml
[Q] 1	[II] 0.30 ml
[R] 3	[III] 0.50 ml
[S] 5	[IV] 0.68 ml

(a) [P]-IV, [Q]-III, [R] -II, [S] -I
(b) [P]-IV, [Q] -I, [R] -II, [S] -III
(c) [P]-III, [Q]-II, [R]-I, [S]-IV
(d) [P]-IV, [Q]-I, [R] -II, [S] -III

6. Match the following

Capacity	Capsule size
[P] 0	[I] 0.15 ml
[Q] 1	[II] 0.30 ml
[R] 3	[III] 0.50 ml
[S] 5	[IV] 0.55 ml

(a) [P]-V, [Q]-III, [R] -II, [S] -I
(b) [P]-IV, [Q] -I, [R] -II, [S] -III
(c) [P]-IV, [Q]-II, [R]-I, [S]-III
(d) [P]-I, [Q]-IV, [R] -II, [S] -III

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7. Green bone is a source of

(a) Type A Gelatin
(b) Type B Gelatin
(c) Both (a) and (b)
(d) None of these

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(a) Type A Gelatin

(b) Type B Gelatin

(c) Both (a) and (b)

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GELATIN

Gelatin derived from hydrolytic extraction of animal collagen. Common source of gelatin is skin, bones , white connective tissue frozen ,pork skin.

TYPES OF GELATIN

TYPE A	TYPE B
Pharma gel A (cationic)	Pharmagel B (anionic)
By acid treatment	By alkali treatment
Isoelectric point (pH-9)	Isoelectric (pH-4.7)
Processing of an acid bone gelatin , isoelectric point pH – 5.5 -6	From green bones

8. Ingredients used for capsulation so capsule should flow by gravity at a temperature not exceeding

(a) 35°C
(b) 30°C
(c) 25°C
(d) 20°C

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Vehicles used in soft gelatin capsules are of two main groups :

1. **Water immiscible, volatile or more likely more volatile liquids such as vegetable oils, mineral oils, mediumchain triglycerides and acetylated glycerin.**
2. **Water miscible, nonvolatile liquids such as low molecular weight PEG have come in to use more recently recently because because of their ability ability to mix with water readily and accelerate dissolution of dissolved or suspended drugs.**

- **All liquids used for filling must flow by gravity at a temperature of 35^0C or less.**
- **The sealing temperature of gelatin films is 37-40^0C.**

9. Which lubricant is used for the capsule filling operation

(a) Sodium starch glycolate
(b) Croscarmellose
(c) Crospovidone
(d) Magnesium stearate

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ADDITIONAL COMPONENTS

Ingredient	Concentration	Purpose
Methylparaben (4 parts), propyl paraben (1 part)	0.2%	Prservative
FD&C and D&C water soluble dyes ,certified lakes , pigments and vegetable colors alones or in a combination	q.s	Colorants
Titanium dioxide	0.2 to 1.2%	Opacifier
Ethyl vanillin	0.1%	Flavoring for odour and taste
Essentials oils	Upto 2 %	Flavoring for odor and tatse
Sugar (sucrose)	Upto 5 %	To produce chewable shell and taste
Fumaric acid	Upto 1 %	Aids solubilty :reduces aldehydic tanning of gelatin
Lubricant	qs	Magnesium stearate

10. Coacervation phase separation technique is used for

(a) Capsule
(b) Liposomes
(c) Microencapsulation
(d) Sustained release drug formulation

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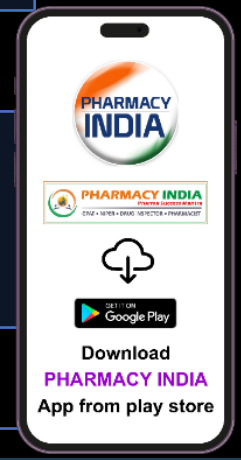
Classification of Microencapsulation Techniques

METHOD	NATURE	SIZE RANGE (μ)
Coacervation phase separation	Solid and liquid	2-5000
Air suspension	Solid	35-5000
Multiorifice centrifugal process	Solid and liquid	1-5000
Solvent evaporation	Solid and liquid	5-5000
Spray drying & spray congealing	Solid and liquid	5-600
Pan coating	Solid	600-5000



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11. RAD is the

(a) Unit of radioactivity
(b) Unit absorbed dose
(c) Unit of ionizing radiation
(d) Unit of exposure

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(c) Unit of ionizing radiation

(d) Unit of exposure

The radiation-absorbed dose (rad) is the amount of energy (from any type of ionizing radiation) deposited in any medium (e.g., water, tissue, air). An absorbed dose of 1 rad means that 1 gram of material absorbed 100 ergs of energy (a small but measurable amount) as a result of exposure to radiation.

12. Which is the most effective gaseous sterilizing agent ?

(a) Dibromsalan
(b) Tribromsalan
(c) Propiolactone
(d) Chlorhexidine

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Gaseous sterilization

Alkylating agent

β-propinolactone- It has bactericidal activity. Mostly effective at **2-4 mg/L** and temperature above 24° C **having a relative humidity of 70% and exposed for a period of atleast 2 hrs. It has poor penetrability power.**

- **Ethylene oxide -** Highly flammable and admixed with 90% CO_2 to make it non flammable and (freons) fluorinated hydrocarbon. 30% or more relative humidity is essential for effective antibacterial activity.

Table 22.7: Exposure conditions used with ethylene oxide mixtures at a temperature of 55°C (131°F)*

Commercial name	Mixture content (%)	Ethylene oxide concentration (mg/L)	Chamber pressure (Psig)	Minimum exposure period (h)
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13. Which is the most common sterilization process used in healthcare facilities

(a) Dry heat
(b) Heat steam
(c) Phenols
(d) Radiation

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Physical Method

Thermal Method

a. Dry heat sterilization

Dry heat - Thermal inactivation/oxidation of cell constituents

Equipment required for dry heat sterilization:

- **Flaming(Burner):** used for sterilization of forceps, needles, scalpels, metallic spatula etc. this method is not reliable for sterilizing greasy or oily materials.
- **Hot air oven:-** Substances that are not heat labile and can tolerate temperatures of **140-260ºC** are sterilized in an hot air oven.

Sterilization for **45 min at 260°C or 2hrs. at 180°C –** kills spores & vegetative form of all microorganism.

- Kills microorganism by **oxidizing proteins , affecting particularly the reproductive process.**
- **Method used for -** Petroleum Jelly, mineral oil, grease, waxes, talcum powder, glassware etc.
- **Incineration –** Instrument heated directly over flame.
- **Instrument used : Hot Air Oven.**

14. Which among the following pathogens is NOT destroyed by sterilization at 100^0celsius

(a) Clostridium perfringens
(b) Vibrio cholera
(c) E. coli
(d) Candida albicans

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The spores of C. perfringens differ widely in their resistance to heat, and heat-sensitive and heat-resistant strains have been observed. Heat-resistant spores have been shown to survive 100 °C for 1 h. Also, cooked meat exerts a protective effect and enhances the heat resistance of spores.

15. Which of the following best describes the disinfection process

(a) Reduction or elimination of microorganisms and bacterial spores

(b) Elimination of all forms of bacterial spores

(c) Reduction or elimination of many microorganisms and some bacterial spores

(d) Elimination of all types of microorganisms and bacterial spores

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- **Sterilization-** It is the process designated to produce a sterile state.
- **Sterility –** Condition in which complete freedom from viable microorganism.
- **Aseptic –** Indicates a controlled process or condition in which the level of microorganism contamination is reduced.
- **Disinfectants –** Chemical agent used to destroy harmful microorganism usually in inanimate (non living) objects.
- **Antiseptics –** Chemical agent usually applied to living tissue in humans or animals in order to destroy harmful microorganisms.

16. Which product is involved in the sterilization of plastic containers

(a) Butanol
(b) Ethylene oxide
(c) Bleach
(d) Propylene

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(b) Ethylene oxide

(c) Bleach

(d) Propylene

EtO also has the unique ability to penetrate packaging and plastic without damaging them and effectively sterilize otherwise hard-to-sterilize product configurations (e.g., inside tubing, products that have two touching surfaces, connectors, etc.).

17. The solvent contained in Dimercaprol Injection is

(a) Dimethylformamide
(b) Ethyl acetate
(c) Alcohol
(d) Benzyl benzoate

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(a) Dimethylformamide
(b) Ethyl acetate
(c) Alcohol
(d) Benzyl benzoate

Dimercaprol Injection USP is a colorless or almost colorless liquid chelating agent having a disagreeable, mercaptan-like odor. Each 1 mL sterile BAL in Oil (Dimercaprol Injection USP) contains: 100 mg Dimercaprol in 200 mg Benzyl Benzoate and 700 mg Peanut Oil.

18. How much temperature should be maintained during moist heat sterilization

(a) 91°C
(b) 121°C
(c) 181°C
(d) 151°C

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(a) 91°C

(b) 121°C

(c) 181°C

(d) 151°C

Moist Heat Sterilization

S.no	Temperature	Pressure lb/sq.inch	Minimum holding times(in minutes)
1	115-116	10	30
2	121-123	15	15
3	126-129	20	10
4	134-138	32	3

19. Which of the following chemicals is used in the gaseous method of sterilization

(a) Ethylene oxide
(b) Halogen
(c) Cresol
(d) Phenol

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(a) Ethylene oxide
(b) Halogen
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Gaseous sterilization

Alkylating agent

β-propinolactone- It has bactericidal activity. Mostly effective at **2-4 mg/L** and temperature above 24° C **having a relative humidity of 70% and exposed for a period of atleast 2 hrs. It has poor penetrability power.**

- **Ethylene oxide -** Highly flammable and admixed with 90% CO_2 to make it non flammable and (freons) fluorinated hydrocarbon. 30% or more relative humidity is essential for effective antibacterial activity.

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20. A commonly used integrity test for high efficiency particulate air filter is the

(a) Bubble point test
(b) Bacterial challenge test
(c) Dioctyl phthalate test
(d) Diffusion test

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(a) Bubble point test

(b) Bacterial challenge test

(c) Dioctyl phthalate test

(d) Diffusion test

PARAMETERS	CONDITIONS
HEPA (High Efficiency Particulate Air Filters)	
Efficiency	99.97%
Particle size	0.3 µm
Efficiency testing	DOP (Dioctyl phthalate) test
Conc. of DOP	66.6 ppm
Alternative to DOP	Liquid paraffin
Reagent used to check efficiency	Hydrocarbon vapours
Flow rate	20 ± 5 ft/min.
Air velocity	100 ± 20 ft/min.

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21. Which of the following is a method of sterilization of blood bags

(a) Using gamma radiation and ethylene oxide
(b) Autoclaving
(c) Using a hot air oven
(d) Filtration

21. Which of the following is a method of sterilization of blood bags

(a) Using gamma radiation and ethylene oxide

(b) Autoclaving

(c) Using a hot air oven

(d) Filtration

Autoclaving at 15 lbs pressure for 2 hours uniformly inactivated the vegetative forms and B. stearothermophilus spores. Thus, autoclaving of PVC blood bags is a safer and reliable method compared to chemical disinfection.

22. Fractional sterilization is also known as

(a) Autoclaving
(b) Tyndallization
(c) Pasteurization
(d) Incineration

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(a) Autoclaving

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(c) Pasteurization

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Tyndallization

Tyndallization, also called fractional **sterilization** and discontinuous heating, is a form of **sterilization** that involves boiling the goods to be **sterilized** in their cans or jars at 100 degrees Centigrade for about 15 to 20 minutes a day, for three days in a row.

23. Sterilization by Autoclave is an example for

(a) Radiation sterilization
(b) Moist Heat Sterilization
(c) Gaseous sterilization
(d) Dry Heat sterilization

23. Sterilization by Autoclave is an example for

(a) Radiation sterilization

(b) Moist Heat Sterilization

(c) Gaseous sterilization

(d) Dry Heat sterilization

Moist heat sterilization

- Mechanism - Coagulation of protein
- Moist heat is more effective than dry heat for thermal sterilization.
- Autoclaving/ steam sterilization is most widely used method.
- Steam kills the microorganism by coagulation or denaturation of protein.
- Applied for –Ampoule containing aqueous solution, glassware, filters.

24. The pathogenic organism in milk is killed by

(a) Tyndallization
(b) Pasteurization
(c) Autoclaving Dettol is used as
(d) Dry heat sterilization

24. The pathogenic organism in milk is killed by

(a) Tyndallization

(b) Pasteurization

(c) Autoclaving Dettol is used as

(d) Dry heat sterilization

Pasteurization : is not a sterilization method in true sense because it only reduces the viable count by 97 to more than 99% but does not kills spores. It is principally applied to milk and dairies.

25. Dettol is used as

(a) Antimicrobial
(b) Disinfectant
(c) Antiseptic
(d) Antibiotic.

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(b) Disinfectant

(c) Antiseptic

(d) Antibiotic.

Dettol

- Dettol Liquid Antiseptic Disinfectant is a proven effective concentrated antiseptic disinfectant that kills bacteria and provides protection against bacteria which can cause infection and illness. It can be used for gentle antiseptic wound cleansing and disinfection and antiseptic skin cleansing.

26. Which among the following method is used for the sterilization of surgical dressings

(a) Dry heat sterilization
(b) Moist heat sterilization
(c) Gaseous sterilization
(d) Radiation sterilization

26. Which among the following method is used for the sterilization of surgical dressings

(a) Dry heat sterilization

(b) Moist heat sterilization

(c) Gaseous sterilization

(d) Radiation sterilization

Moist heat sterilization is the most efficient biocidal agent. In the pharmaceutical industry it is used for: Surgical dressings, Sheets, Surgical and diagnostic equipment, Containers.

27. Which among the following method represent the chemical cold sterilization method

(a) Sterilization using gases
(b) Sterilization by filtration
(c) Sterilization using radiation
(d) Sterilization using moist heat

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Non- Thermal Method(COLD STERLIZATION

Radiation technique - Destruction/ Disorganisation of enzyme & DNA.

- Use of ultra violet radiation :- the maximum germicidal activity at **253.7 nm (2537 A)** wavelength.
- Sterilization by ionizing radiation - X-rays & gamma rays (Cesium-137, Cobalt 60).
- A dose of 2.5 mega raid is generally accepted.
- Applied for hospital supplies, vitamins, antibiotics, plastic syringes.

28. The membrane filters used for sterilization has the pore size of

(a) 0.02 to 0.01 µm
(b) 0.22 to 0.02 µm
(c) 0.11 to 0.01 µm
(d) 0.65 to 0.02 um

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Mechanical Method- Filtration Sterilization Physical separation of microorganism. Bacterial filter pore size -0.22 mm, Testing of filters –Bubble point test.

29. The sterilization technique in which the final container is heated at 80 °C for one hour on each of three successive days

(a) Tyndallization
(b) Pasteurization
(c) Holder method
(d) Flash method

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(b) Pasteurization
(c) Holder method
(d) Flash method

Tyndallization: An exposure of steam at 100°C for 20 minutes on three successive days is called tyndallization or intermittent sterilization. This is a fractional method of sterilization.

30. In hot air oven the heat is transferred from source to the article

(a) Conduction
(b) Convection
(c) Radiation
(d) All of these

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(a) Conduction
(b) Convection
(c) Radiation
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In a hot air oven, heat is transferred from the source to the article through a combination of conduction, convection, and radiation; the hot air circulating within the oven primarily transfers heat via convection, while direct contact with the heated surfaces contributes to conduction, and the heating elements radiate heat directly onto the item being heated.

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31. All the gases given below are used for gaseous sterilization EXCEPT

(a) Formaldehyde
(b) Ethylene oxide
(c) Nitrous oxide
(d) Beta-Propiolactone

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Alkylating agent

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32. In sterilization the time required at a given condition to achieve log reduction that is to kill 90 percent of organism is called

(a) D-value
(b) Z-value
(c) F-value
(d) Fo-value

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(a) D-value
(b) Z-value
(c) F-value
(d) Fo-value

D- Value (Decimal Reduction Time)

- The resistance of an microorganism to a sterilizing agent can be described by D value.
- It determines the time required to reduce the microbial population by one decimal point
- It is the time required for 90% reduction in microbial population
- From D value we can easily calculate the processing time required to achieve sterilization.
- Unit of D value expressed in minutes.

33. Choose the INCORRECT statements about HEPA filter

(a) It is useful for the preparation of parenteral product

(b) It has the efficiency of removing 99.97% particles of 0.3 microns or larger

(c) It is generally described as high-efficiency particulate air filter

(d) None of these

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❖ HEPA (High Efficiency Particulate Air) Filter

- High efficiency particulate air filter (HEPA) removes out particles of 0.3 microns and larger than this size with the efficiency of 99.97 %.
- e. g. - If return air contains 10,000 particles per ft^3, it concentration would be reduced down to 3 particles per ft^3 after it goes through the filter.
- HEPA is the only means for achieving class 100 clean room.
- Air velocity – 100 + 20 ft /min.

✓ Efficiency is checked by

- Bubble point test
- DOP test (Dioctyl Phthalate test)

Class 100 area	**Particle count in air is not more than 100 per cubic foot of 0.5 micron and larger size**	**Sterile and Aseptic area**
Class 10,000 area	Particle count in air is not more than 10,000 per cubic foot of 0.5 micron and larger size	**Manufacturing area**
Class 1,00,000 area.	Particle count in air is not more than 10,000 per cubic foot of 0.5 micron and larger size.	**Packaging and storage area**

34. Thermolabile powders are sterilized by

(a) Dry heat
(b) Autoclaving
(c) Ethylene oxide gas
(d) UV radiation

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- Sterilization of thermo and moisture labile materials can also be done by radioactive radiation or by exposure to ethylene oxide gas.
- Irradiation has the disadvantage that the chemical composition of the material can be affected and that a potentially dangerous radiation source is required.

35. Disposable plastic syringes are sterilized by

(a) Autoclaving
(b) Gaseous sterilization
(c) Boiling with water
(d) None of these

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(a) Autoclaving

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(c) Boiling with water

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- Ethylene oxide is a simple chemical compound that is commonly used for the gaseous sterilization of disposable healthcare products.
- Ethylene oxide sterilization is a chemical process consisting of four primary variables:
  - gas concentration
  - humidity
  - temperature
  - time.
- Ethylene oxide is an alkylating agent that disrupts the DNA of microorganisms, which prevents them from reproducing.

36. Which of the following statements is NOT TRUE for dry heat method of sterilizations

(a) Usually, sterilization is done by heating at a temperature of 160 °C for two hours

(b) Destruction of microorganism is affected by oxidation of essential cell constituents

(c) This method is not suitable for powders and oily

(d) This method is not suitable for surgical dressings

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Physical Method

Thermal Method

a. Dry heat sterilization

Dry heat - Thermal inactivation/oxidation of cell constituents

Equipment required for dry heat sterilization:

- **Flaming(Burner):** used for sterilization of forceps, needles, scalpels, metallic spatula etc. this method is not reliable for sterilizing greasy or oily materials.
- **Hot air oven:-** Substances that are not heat labile and can tolerate temperatures of **140-260ºC** are sterilized in an hot air oven.

  Sterilization for **45 min at 260°C or 2hrs. at 180°C** – kills spores & vegetative form of all microorganism.

  - Kills microorganism by **oxidizing proteins , affecting particularly the reproductive process.**
  - **Method used for -** Petroleum Jelly, mineral oil, grease, waxes, talcum powder, glassware etc.
  - **Incineration –** Instrument heated directly over flame.

37. Mechanism of killing microorganisms by gaseous sterilizations is

(a) Coagulation of proteins
(b) Alkylation of proteins
(c) Oxidation of essential cell components
(d) Nuclear destruction

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MECHANISM OF ACTION OF STERILIZATION METHODS

STERILIZATION	PRINCIPLE
Dry heat	Thermal inactivation/oxidation of cell constituents
Moist heat	Coagulation of protein
Radiation	Destruction/Disorganisation of enzyme & DNA
Gaseous	Alkylation
Filtration	Physical separation of microorganism

38. Sterilization by heating with a bactericide

(a) Can be used safely for in trathecal injections
(b) Not suitable for intravenous injection when single dose exceeds 15 ml
(c) Is performed before the preparation is transferred into the final container
(d) Not suitable for eye drops

38. Sterilization by heating with a bactericide

(a) Can be used safely for in trathecal injections

(b) Not suitable for intravenous injection when single dose exceeds 15 ml

(c) Is performed before the preparation is transferred into the final container

(d) Not suitable for eye drops

Sterilization by heating with a bactericide is Not suitable for intravenous injection when single dose exceeds 15 ml.

39. Time required to kill a specific microorganism at a given temperature under specific condition is called as

(a) D value
(b) Z value
(c) Inactivation factor
(d) Thermal death time

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F- Value (Thermal Death Time)

- This is defined as the equivalent in minutes of 121°C of all heat considered with respect to its capacity to destroy spores or particular microorganisms.
- Simply it is the time in minutes at specific temperature is needed to kill a population of cells or spores.

40. Which of the following methods is NOT used for sterilizing sutures

(a) Use of ethylene oxide
(b) Irradiation process
(c) Autoclaving
(d) Washing with soap solution

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Sutures can be sterilized using a variety of methods, including:

- Gamma radiation: This method is used to sterilize sealed packages, and is often used for natural gut and nylon sutures. However, it can degrade some absorbable sutures.
- Ethylene oxide: This is a gas sterilization method.
- Povidone iodine: Monofilament sutures, such as Prolene or Nylon/Ethilon, can be soaked in a 10% solution of povidone iodine. This method is safe for coated sutures, such as some Vicryl or Ethibond.
- Low-temperature steam formaldehyde: This method is effective against a variety of bacteria and spores.

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