MAHARASHRATRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Sc. (Hons.) Horticulture

Semester	:	III (New)	**Academic Year**	:	2019-20
Course No.	:	**H/PATH – 231**	**Title**	:	**Fundamentals of Plant Pathology**
Credit	:	2(1+1)	**Time**	:	
Day & Date	:		**Total Marks**	:	40

Note :
1. Solve **ANY FIVE** questions from **SECTION"A"**
2. All questions from **SECTION"B"** are compulsory
3. All questions carry equal marks
4. Draw neat diagrams wherever necessary

MODEL ANSWER
SECTION 'A'

Q. 1 Define fungus. Describe economic importance and general characters of fungi.

Ans : Fungus : A lower plant lacking chlorophyll, having thallus composed of hyphae with demonstrable nuclei, reproducing sexually and asexually

Economic Importance

The study of fungi is important for alleviating losses to our food, fodder, fiber and other plant production.

- Late blight of potato resulted famine at Ireland
- Coffee rust - Wiped out coffee plantation in Sri Lanka
- *Sigatoka*of banana - Threatened banana industry in central of South America.
- Bengal famine - *Helmithosporiumoryzae*(1942).

General characters of Fungi

1) Achlorophyllus
2) Unicellular or Multicellular
3) Cell wall is made up cellulose or chitin
4) Reproduce Sexually or asexually
5) Beneficial as well as harmful
6) Habitat
7) Absorption

Q. 2 Classify plant diseases on the basis of cause with one suitable example.

Ans : **Classification on the basis of causes**

Parasitic (Biotic/animate)

Fungi : Rust, Smut, Blight etc
Bacteria : Citrus canker
Virus : Mosaic of papaya
Algae : Red rust

Mycoplasma : Little leaf of brinjal

Non Parasite (Abiotic)

i) Environment : Black heart of potato
ii) Deficiencies : Mottle leaf of citrus
iii) Soil Condition eg. Wilt.
iv) Accumulation of gases, injuries, chemicals, smoke Ex. Chlorosis, 2,4D injury of cotton

Protozoa : Phloem necrosis of coffee
Viroid : Spindle tuber of potato

Q. 3 Write short notes on (Any Two)

1) Perpetuation of plant pathogens

Ans: Perpetuation means the survival of plant pathogen during off season in absence of main host

Different modes of survival are

1) Facultatism
2) By persistent mycelium
3) Perpetuation in propogative part
4) By dormant mycelium in seed
5) By resistant spores
6) By sclerotia
7) On another host (a) Alternate host (b) Collateral host
8) By polymorphism

2) Dissemination of plant pathogens

Ans : Dissemination means spread of pathogens

A) Continuous dissemination
   i) Autonomous
   ii) Natural agencies like air or wind
   iii) Water
   iv) Animals
   v) Birds
   vi) Insect
   vii) Nematodes
   viii) Mites
   ix) Agril. Implements
B) Discontinuous dissemination
   1) Man
   2) Seed and Propagative material
   3) Soil

3) Plant Disease Forecasting

Ans :

- Methods of disease forecastig
- Survey and surveillance
- Forecasting models
- Satellite imaginary forecasting

Q. 4 Enlist different plant pathogenic organisms with one example of disease caused by them and write important characters of bacteria .

Ans : Following are the plant pathogenic organisms with one example of disease caused by them.

1) Fungi : Club root of cabbage (*Plasmodiophorabrassicae*)
2) Bacteria : Citrus canker (*X. campestris*pv.*citri*)
3) Virus : Yellow vein mosaic of bhindi
4) Phytoplasma : Little leaf of brinjal
5) Algae : Red rust of plantation crop.
6) Protozoa : Phloem necrosis of coffee.
7) Viriod : Spindle tuber of potato

Important characters of bacteria should include

1) Shape
2) Reproduction
3) Thermostability
4) Survival
5) Gram reaction
6) Oxygen requirement
7) Susceptible to bacteria phase
8) Ability of infecting plants
9) Flagellation
10) Endospore formation
11) Slime formation
12) Toxigenic

Q. 5 Describe various formulations of fungicides with suitable example

Ans : Any four formulation of following alongwith one example

Emulsifiable Concentrates (EC)

These are liquid formulations which can be diluted with water before application. The active ingredient is dissolved in a solvent with an emulsifying agent or water dispersible oil

Wettable Powders (WP)

The modern wettable powders are water-dispersible which have the quality to wet easily and disperse well in water. They are also called as Water-Dispersible Powders (WDP). The active ingredient is incorporated, with a finely ground inert dust (filler) such as Kaolin, a wetting agent and a suspending agent.

Dusts (D)

Dust formulations usually contain 1-10% active ingredient for direct application in dry forms. They are manufactured in such a way that they are light enough to be carried by a slight breeze for a considerable distance. The finely divided particle of active ingredient is carried on a carrier particle.

Granules (Pellets)

Pellets are the formulations of the fugicide with inert materials formed into particles about the size of coarse sugar. The granules normally contain 3-10% of the active ingredient. Granules have the advantage they can be measured in dry form more easily and acurately than dusts or wettable powders.

Suspension or slurries

These are formulation in which a dry form of the active ingredient is mixed with a liquid. Such formulations usually contain a high percentage of active ingredient similar to wettable powders.

Solutions

True solutions are formulations in which active ingredient or a combination of active ingredients and a solvent is dissolved in water Solutions have the advantage of requiring no agitation after formulation is added in water.

Q. 6 Enlist various principles of plant disease management. How will you manage plant diseases by eradication.

Ans:- Principles of plant disease management

Exclusion
Avoidance
Eradication
Protection
Resistance

Eradication

Phytosanitation
Destruction of alternate &colateral hosts
Rogueing
Different cultural practices
Bicontrol agents
Physical methods

Q.7 Quote important contribution of the following Scientists (Any Four).

Ans Any one important contribution can be considered apart from this

Anton de Bary	-	First proved that Late blight of potato was caused by fungus
Anton van Leeuwenhoek	-	Simple lenses, first microscope.
Robert Hook	-	Compound microscope
K.C. Mehta	-	Physiology & epidemics of cereal rust.
W. M. Stanley	-	TMV isolated in crystalline form
B.B.Mundkar	-	Wilt of cotton.

Q.8 What is Plant disease epidemiology? Describe in details factors responsible for plant disease epidemic.

Ans : Epidemiology means study of Plant diseases in Population

Factors responsible for plant disease epidemic

i) Distance of susceptible host from the source of inoculum
ii) Abundance of susceptible host
iii) Disease proneness in the host due to environment
iv) Presence of suitable alternate or collateral host
v) Presence of aggressive isolate of the pathogen
vi) High birth rate of pathogen
vii) Low death rate of pathogen
viii) Easy and rapid disposal of pathogen
ix) Adoptibility of the pathogen
x) Optimum weather condition

Decline of epidemic:

1) Saturation of pathogen into the host
2) Decline of proneness in the host :
3) Reduction in aggressiveness of the pathogen:

Q.9 Define symptoms. Classify the symptoms in different category and describe Necrosis in detail with suitable examples.

Ans Symptoms are expressions of diseased conditions.

Symptoms can be classified into followimg categories

1) Hypoplasia
2) Hyperplasia
3) Necrosis
4) Teratological phenomenon

Necrosis : Should contain Description with one example of

1. BLIGHT :
2. SPOT :
3. TAR SPOTS AND STREAKS OR STRIPES :
4. BLAST :
5. DIE BACK :
6. EXUDATION :
7. ANTHRACNOSE :
8. BLACK HEART :
9. SHOT HOLE :
10. RUSTS :
11. WILTS :
12. DAMPING OFF :
13. ROTS : a) Dry rot b) Soft rot c) Red rot d) Wet rot e) Root rot f) stem rot g) collar rot h) rhizome rot i) brown rot j) black rot etc.

Q.10 What is penetration? Describe different avenues of penetration

Ans : Penetration : Initial invasion of pathogen into the host

Avenue of penetration

Direct though surface		(Indirect though Openings)	
Cutinized	Non-cutinized	Natural opening	Artificial
Surface	**surface**	**a) stomata**	**a) Wound**
Epidermis	a)Root hairs	b) Lenticels	b)Stalk ends
	b) Needles	c) hydathode	c) insect injury.
	c) Nectories		
	d) Buds		
	e) Stigma ends		
	f) Anthers.		

SECTION 'B'

Q. 11 Fill in the blanks.

1) Virion
2) *Orobanche*
3) Animalia.
4) M. W. Beijerinck

Q. 12 Match the pairs.

Group 'A'	Group 'B'
1) Galls or tumors	d) Hypertrophy
2) Oxygen deficiency	c) Non-parasitic cause
3) Bacterium without flagellum	a) Atrichous
4) Systemic fungicide	b) Carbendazim

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