



# UNIVERSITY OF THE PUNJAB

Part-I A/2017  
Examination:- M.A./M.Sc.

Roll No. ....

Subject: Mountain Conservation and Watershed Management  
PAPER: I (Database Management Information System & Applications  
of Remote Sensing and Geographical Information System)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 75

**NOTE: Attempt only FIVE questions. Q.1 (Objective) is Compulsory. Attempt at least TWO questions from each section. All question carry equal marks.**

Q.1	<u>Objective</u>	(8+ 7=15)
	a) Fill in the blanks with appropriate answer.	(08)
1	If primary key is made of two or more keys it is called _____ key.	01
2	Cardinality is _____.	01
3	Projection means the selection of _____.	01
4	“Where” clause restricts the number of _____ to display.	01
5	The distance(in km)from the satellite to the mean surface level of the earth is called _____.	01
6	In _____ projection,the latitude scale at any point was stretched by the same amount as the longitude scale.	01
7	In Non-selective scattering, since all the wavelengths are scattered equally so cloud appears _____.	01
8	The data which describes the location of the specific geographic feature and is related to its shape is called _____.	01
	b) Mark “√”against the correct statement and “x” against the wrong statement.	(07)
9	DB uses structured query language( SQL).	01
10	Keyword for choosing unique records is 'like'.	01
11	Anything to be displayed is written in “FROM” clause in a query.	01
12	The first software developed by ESRI was Arc Info.	01
13	The distance between two successive wave crests or troughs is called Amplitude.	01
14	The common boundary between adjacent polygons must be recorded twice once for each polygon in Spaghetti data model.	01
15	8bit digital data of remote sensing possess 128 DN values.	01

P.T.O.

<b>SECTION-I : Database Management Information System(DBMS)</b>																						
Q.2	Define the following terms: 1. Record 2. Composite Key 3. Foreign Key 4. Database 5. Primary key	5*3= 15																				
Q.3	Differentiate the following: 1. Weak entity and strong entity 2. Primary Key and Composite Key 3. Degree And Cardinality	3*5= 15																				
Q.4	Write a note on the following: (a) Give the union of these two tables <table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th>ID</th> <th>Name</th> <th>Age</th> </tr> </thead> <tbody> <tr> <td>S1</td> <td>Ahmad</td> <td>23</td> </tr> <tr> <td>S2</td> <td>Salman</td> <td>34</td> </tr> <tr> <td>S4</td> <td>Tanq</td> <td>29</td> </tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr> <th>Department</th> <th>NIC</th> </tr> </thead> <tbody> <tr> <td>Sales</td> <td>255-79-256369</td> </tr> <tr> <td>Admin</td> <td>245-71-325370</td> </tr> <tr> <td>Sales</td> <td>245-68-345371</td> </tr> </tbody> </table> (b) Discuss 4 major data types for attributes in DB.	ID	Name	Age	S1	Ahmad	23	S2	Salman	34	S4	Tanq	29	Department	NIC	Sales	255-79-256369	Admin	245-71-325370	Sales	245-68-345371	7+8= 15
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S1	Ahmad	23																				
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Q.5	Define DBMS. Show the first name, family name, total assets, from table family and whose family name was "MACHIAVELL" (i.e. Machiavelli), sort the list by 'total assets' in descending order.	2+13=1 5																				
<b>SECTION-II: Remote Sensing and Geographical Information System (RS/GIS)</b>																						
Q.6	Define the following terms: i. Passive Remote sensing ii. Swath iii. Resolution iv. Reference of Ellipsoid v. Thematic Map	5*3= 15																				
Q.7	Differentiate the following: i. Raster and Vector Spatial Data Models ii. Remote sensing and GIS iii. Accuracy and Precision	3*5= 15																				
Q.8	Write a note on the following : i. Landsat ii. Universal Transverse Mercator iii. TIN Data Model	3*5= 15																				
Q.9	Define EM spectrum. Explain in detail with diagram all wavelength regions of Electromagnetic Spectrum and describe which regions are mostly used in remote sensing.	2+13= 15																				

# UNIVERSITY OF THE PUNJAB



Part-I A/2017  
Examination:- M.A./M.Sc.

Roll No. ....

Subject: Mountain Conservation and Watershed Management  
PAPER: II (Forestry and Ecology)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 100

**NOTE:** Attempt any FIVE questions in all. Q.1 (Objective) is Compulsory. Attempt at least TWO questions from each section of Subjective. Write to the point with the clear concept. All question carry equal marks.

## OBJECTIVE SECTION

Q.1A) Fill in the blanks with suitable words: (5)

- Forest is derived from a Latin word \_\_\_\_\_.
- \_\_\_\_\_ supports the crown for useful wood.
- \_\_\_\_\_ is center of a trunk
- The most frequently Quadrat size being used is \_\_\_\_\_
- All the energy in a food chain originates from \_\_\_\_\_

Q.B) Mark as true /false (5)

- Symbiosis is example of autecology. T/F
- Aphotic zone is depths which less than 1% of sunlight penetrates T/F
- Plants growing on saline soils are called xerophytes. T/F
- Biodiversity' is defined as physical factors on an environment. T/F
- Communication and senses are how an organism perceives the world T/F

Q.C) Choose the correct answer (10)

- The forest with trees differ in age from each other is called:  
a) Full forest c) Uneven aged forest  
b) Even aged forest d) None of these
- Total percentage of forest resources in Pakistan is:  
a) 8.3% c) 4.8%  
b) 3.8% d) 10%
- That helps in absorption of solar heat during evaporation and transpiration  
a) Forests c) Tress  
b) Even aged forest d) Plantation
- The study of interaction between the living organism and environment is called  
a) Ecosystem c) Ecology  
b) Phytogeography d) phytosociology
- Water available to plant is  
a) Runoff water c) Hydrosopic water  
b) Gravitational Water d) Capillary water
- An organism such as bacteria and fungi that breaks down dead organisms and their wastes is a:  
a) Producer c) Decomposer  
b) Parasite d) All of above

- vii. The arrows in a food chain show
- a) Who eats who  
b) The flow of energy  
c) Symbiosis  
d) Loss of energy
- viii. Visual communication transmits information to others through
- a) Shape  
b) Colour  
c) Movement  
d) All of above
- ix. Mountain systems cover about the world's land
- a) 27%  
b) 18%  
c) 35%  
d) 10%
- x. The mountain communities of Gilgit-Baltistan are totally dependent on
- a) Forests  
b) Natural resources  
c) Minerals  
d) Water resources

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**Section I (Forestry)**

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- Q.2 A) discuss the consequences of the Deforestation? Discuss also its solution? (10)  
B) Define the term MRV? Explain aspects of measurement under the MRV? (10)
- Q.3 A) Forests in Pakistan can be classified according to climate and geographical location. Discuss? (10)  
B) What are the forest resources in the consequence of the global context? Discuss? (10)
- Q.4 A) Write a note on the followings: Stock, Fluxes, Carbon Cycle, Reforestation, Forestry? (10)  
B) How Climate change impact alters the distribution, extent and frequency of any disturbances in forests. Discuss? (10)
- Q.5 A) What is an Ecosystem? Briefly discuss the forest ecosystem in the context of Pakistan? (10)  
B) What are the barriers to sustainable forest management in Pakistan? (10)

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**Section II (Ecology)**

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- Q.6 A) Describe in detail stratified sampling. What interval should be used in transects? (10)  
B) Write a comprehensive note on Wetland Communities and Ecosystems. (10)
- Q.7 A) Discuss climate change in Gilgit-Baltistan (10)  
B) Write a detailed note on Himalayan subtropical pine forests. (10)
- Q.8 A) Describe critically threatened ecosystems in Pakistan (10)  
B) How organisms adapt themselves to the extreme conditions? (10)
- Q.9 A) What are the guiding principles of Biodiversity Action Plan? (10)  
B) Why we conserve Biodiversity? (10)

# UNIVERSITY OF THE PUNJAB



Part-I A/2017  
Examination:- M.A./M.Sc.

Roll No. ....

Subject: Mountain Conservation and Watershed Management  
PAPER: III (Integrated Watershed Management)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 100

**NOTE: Attempt only FIVE questions. Q.1 (Objective) is Compulsory. Attempt at least TWO from each section of subjective. Write to the point with the clear concept.**

## OBJECTIVE SECTION

**Q.1: (a) Each question has four options. Encircle the correct answer: [10]**

- i. Natural processes at work in a watershed can provide which of the following benefits:
  - a) Habitat for fish and other life
  - b) Drinking water for people and other living organisms
  - c) Assimilation of contaminants
  - d) All the these
- ii. Units of measures are:
  - a) Cusecs: flow of cubic feet per second
  - b) Cumecs: flow of cubic meter per second
  - c) Acre feet: volume of water required to cover one acre to a depth of one foot
  - d) All of the these
- iii. The process of managing human activities and natural resources in an area defined by watershed boundaries is called:
  - a) Hydrology
  - b) IWM
  - c) Soil conservation
  - d) Water conservation
- iv. SWAT model is:
  - a) physically based event time distributed
  - b) physically based continuous time distributed
  - c) both a and b
  - d) None of these
- v. A watershed having the geographical area more 50,000 Hectare is called:
  - a) Milli-watershed
  - b) Macro-watershed
  - c) Sub-watershed
  - d) Micro-watershed
- vi. Which of the following is not one of the common elements of successful watershed management frameworks:
  - a) Stakeholder involvement
  - b) Geographic management units
  - c) A fishing license
  - d) A management cycle of activities
- vii. Which one of the following is not included in the physical problems of watershed problems are :
  - a) Steep slopes
  - b) Soil erosion
  - c) Bad Lands
  - d) Weak geology
- viii. Fan shaped catchment when compared with the fern leaf catchment usually give:
  - a) Greater runoff
  - b) Lesser runoff
  - c) Equal runoff
  - d) Greater or less runoff, depending upon the number of drainage channels

- ix. The stream which does not have any base flow contribution is called
- a) perennial stream
  - b) intermittent stream
  - c) ephemeral stream
  - d) none of the above
- x. The surface Run-off is the quantity of water
- a) that reaches the stream channels
  - b) intercepted by buildings and vegetative cover
  - c) absorbed by soil
  - d) required to fill surface depressions

- Q.1: (b) Write whether the statement is true or false:** [05]
- i. Rain during summer season will produce less runoff, while that during winter will produce more. **True/False**
  - ii. Direct runoff is the sum of overland flow and interflow. **True/False**
  - iii. Integrated watershed management allows us to address single issues and objectives **True/False**
  - iv. Soil erosion is one of the most important land degradation issues in the watershed. **True/False**
  - v. The compactness coefficient is independent of the size of the catchment and is dependent only on the slope. **True/False**

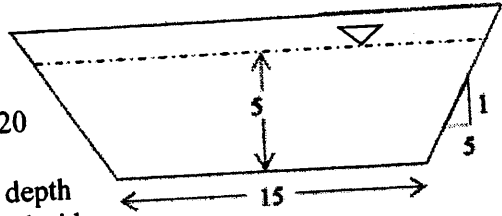
- Q.1: (c) Fill in the blanks:** [05]
- i. A water resources project designed solely for flood control, also serves irrigation and water supply needs of the area, the project will be called as -----
  - ii. The basin lag is the time difference between the center of mass of the rainfall and the center of the mass of the -----
  - iii. One cumec day is equal to -----
  - iv. Ratio of basin area to square of basin length is -----
  - v. Overland flow also known as -----

## SUBJECTIVE SECTION

### Section-1: Hydrology of Upland

- Q.2** a) Differentiate between the following: (6)
- i. Cumec and Cusec
  - ii. Influent stream and Effluent Stream
  - iii. Evapotranspiration and Consumptive use
- b) What is meant by "runoff" and how does it produce? Also Discuss the various factors, which affect the runoff from a basin? (8)
- c) In a certain alluvial basin of  $100 \text{ km}^2$ ,  $90 \text{ Mm}^3$  of ground water was pumped in a year and the ground water table dropped by about 5 m during the year. Assuming no replenishment, estimate the specific yield of the aquifer. If the specific retention is 12%, what is the porosity of the soil? (6)
- Q.3** a) Give short answers with clear concept: (6)
- i. What are the objectives of Snowmelt study?
  - ii. What is the application of ground water hydrology?
  - iii. Enlist the factors, which affect the runoff from a snowmelt?
- b) Discuss critically the statement "Thorough knowledge of hydrology is a must for any watershed management". (8)
- c) Find the discharge of Lahore Canal which is taken from Bambawali Ravi-Bedian (BRB) Canal passing within the Punjab University from following data measured during the experiment. (6)

- i. Length of canal reach from Campus Bridge to Jinnah Bridge is 2 kilometer.
- ii. Time of float travel for this reach is 20 minutes.
- iii. The bottom width of canal is 15 feet; depth of water flowing in canal is 5 feet and side slope is 1:5



- Q.4 a) Give short answers with clear concept: (6)
- i. Enlists the types of glacier?
  - ii. Draw a single-peaked hydrograph and indicate its various parts and components?
  - iii. Explain degree day w.r.t snowmelt process with any example? (8)
- b) What are different precipitation losses, explain briefly these. (8)
- c) The average snowline is at 2000 m elevation and temperature index located at 2500 m elevation indicated a mean daily temperature of 7°C on certain day. Assuming a temperature decrease of 1°C per 200 m increase in elevation and degree day factor of 3mm/degree-day. Compute the snowmelt runoff for that day. An area 800 Km<sup>2</sup> is between freezing point and snowline from the elevation curve for the basin. (6)

- Q.5 a) Define the following terms: (6)  
Infiltration; Stream Gauging; Glacier; Aquifer; Specific Yield; Flood Routing
- b) Describe the process of glacier ice formation from snow. (8)
- c) Assume that Mangla Reservoir has surface area of 39 sq. km in the beginning of a certain month and the water depth is 76.20 m for this whole surface of the lake. Further assume that sides of reservoir are nearly vertical. Now in that month the reservoir received an average inflow of 226.50 cumec as a direct runoff, and direct precipitation of 125 mm. The outflow from the reservoir was 170 cumec and evaporation and seepage losses were estimated to be 113 mm during that month. Find out depth of reservoir at the end of that month and total increase or decrease in the storage. (6)

### Section II: Integrated Watershed Management

- Q.6 a) Define the following terms: (6)  
Integrated Watershed Management; sustainable watershed management; Watershed Planning; Watershed Rehabilitation; Watershed Evaluation; Watershed degradation
- b) Describes the integrated and participatory watershed management approach for enhancement of resources use productivity and poverty alleviation. (8)
- c) The areas between different contour elevations for a watershed are given below. Determine the mean and the median elevation for the basin. (6)

Contour Elevation (m)	<225	225-300	300-375	375-450	450-525	525-600	>600
Area between contour (km <sup>2</sup> )	181	723	1144	814	216	46	140

- Q.7** a) Differentiate between the following: (6)
- i.** Structural measures and Vegetative measures
  - ii.** Micro catchment and Macro catchment rainwater harvesting
  - iii.** Catchment area and Command area
- b) Describes the classification of watershed based on area, shape, slope, soil and precipitation. (8)
- c) Design a rainwater harvesting system for meeting water requirement of 50m<sup>2</sup> garden and five-member family living in a building with a rooftop area of 100 m<sup>2</sup>. The average annual rainfall in the region is 600 mm. Daily drinking water requirement per person (drinking and cooking) is 10 liters. The irrigation system for the garden provides the equivalent of 6 litres/m<sup>2</sup> per use, and has an irrigated area of 50 m<sup>2</sup>. The water is irrigated three times per week. (6)

- Q.8** a) Give short answer with clear concept: (6)
- i.** What are the causes of watershed degradation?
  - ii.** What are the different maps, statistics and interpretations used to identify and analyze the watershed problems/issues?
  - iii.** Enlist the four levels of watershed planning?
- b) Describes the important watershed characteristics which used for management and conservation of watershed resources. (8)
- b) Compute the mean bifurcation ratio, stream density and drainage density from following watershed data which derived from the 90×90m DEM through GIS:  
Area of Watershed = 4200Km<sup>2</sup>

Stream Order	1	2	3	4	5
Stream Number	146	38	9	2	1
Stream Length	536	188	136	60	943

- (6)
- Q.9** a) Give short answer with clear concept: (6)
- i.** Write down the stages of a watershed project cycle?
  - ii.** What are goals of watershed modeling?
  - iii.** Write the problems associated with watersheds?
- b) Describes rainwater harvesting technologies for small scale rain-fed agriculture in arid and semi-arid areas. (7)
- c) Describes the role/responsibility of different departments/organizations for management of mountainous watershed in Pakistan. (7)



# UNIVERSITY OF THE PUNJAB



Part-I A/2017  
Examination:- M.A./M.Sc.

Roll No. ....

Subject: Mountain Conservation and Watershed Management  
PAPER: IV (Mountain Environment)

TIME ALLOWED: 3 hrs.  
MAX. MARKS: 100

**NOTE: Attempt any FIVE questions. Q.1 (Objective) is compulsory. Attempt at least TWO questions from each section of Subjective. Write to the point with the clear concept.**

## OBJECTIVE SECTION

**Q.1: (a) Each question has four options. Encircle the correct answer: [10]**

- i. If the average annual rainfall is less than 40 cm then climate will be:
  - a) Arid
  - b) Semi-Arid
  - c) Humid
  - d) None of above
- ii. Climate has deep an impact on the:
  - a) Food of people
  - b) Living of people
  - c) Dress of people
  - d) All of above
- iii. Climate change leads to higher temperatures which results in:
  - a) lower moisture of soil
  - b) faster evaporation
  - c) higher water demand
  - d) all of these
- iv. The Pakistan Government approved the National Policy of Climate Change in:
  - a) 2010
  - b) 2012
  - c) 2014
  - d) 2016
- v. The important elements of climate are:
  - a) Temperature and pressure
  - b) Humidity of air
  - c) All of above
  - d) Winds and rain fall
- vi. According to the Fourth Assessment Report of IPCC the annual mean temperature in HKH is expected to increase by the middle of the century by:
  - a) 1.9 0C
  - b) 2.0 0C
  - c) 2.1 0C
  - d) 2.9 0C
- vii. Mass movements are classified based on:
  - a) The type of materials
  - b) The rate of movement
  - c) All of above
- viii. These mountains are formed due to the convergent movement of plate tectonics:
  - a) Fold
  - b) Block
  - c) Residual
  - d) Volcanic
- ix. The downward movement of material under the influence of gravity is known as:
  - a) Earthquake
  - b) Flood
  - c) Mass wasting
  - d) Market
- x. Mixed forests are found in this zone of the Himalayas:
  - a) Foothills Zone
  - b) Nival Zone
  - c) Subalpine Zone
  - d) Montane Zone

- Q.1: (b) Write whether the statement is true or false:** [05]
- i. Internally consistent and plausible description of a possible future state of the world is called Prediction. True/False
  - ii. Mountains in continental regions experience less precipitation than maritime mountains. True/False
  - iii. Sea level would be accelerated of 0.2 m to 0.6 m or more by 2100. True/False
  - iv. The Himalayas, Rockies and Andes Mountains belong to Alpine age. True/False
  - v. The river basins are an important source of food and energy. True/False

- Q.1: (c) Fill in the blanks:** [05]
- i. Monsoon season in Pakistan starts in July and end in -----
  - ii. If the amount of carbon dioxide were doubled instantaneously, with everything else remaining the same, the outgoing infrared radiation would be reduced by about-----
  - iii. Socio-economic scenarios for Pakistan was developed in-----
  - iv. Shallow focus of an earthquake ranges from----- deep.
  - v. Phonological changes and changing the cropping patterns by local communities are good indicators of-----.

## SUBJECTIVE SECTION

### Section-I: Mountain Climate

- Q.2**
- a) Define the following terms: (6)  
Air mass; Climate hazard; Climate adaptation; Heat island; Weather; Convection.
  - b) Explain the simulation procedure for generation of climate change scenario using SDSM (Statistical downscaling model). (6)
  - c) Explain the types of precipitation which are experiences in different climate zone of Pakistan. (8)
- Q.3**
- a) Give short answers with clear concept: (6)
    - i. What is adiabatic process?
    - ii. What effect does the climate have on mountains?
    - iii. Enlist elements of weather and climate.
  - b) Write a detailed note on Global wind circulation pattern (7)
  - c) Describes the components of the global climate system, their processes and interactions with the schematic map? (7)
- Q.4**
- a) Differentiate between following terms: (6)
    - i. Humid regions and arid regions
    - ii. Climate variability and Climate change.
    - iii. Latent heat transfer and sensible heat transfer
  - b) Briefly explain the possible adaptation measures, initiatives, or strategies to mitigate the threats of climate change in water resources, biodiversity, and agriculture and forestry sector for the mountain region in perspective of Pakistan's National Climate Change Policy. (8)

- c) With reference to temperature and rainfall, identify and explain the differences in the climatic zones of Pakistan. (6)
- Q.5 a) Give short answers with clear concept: (6)
- i. Why do mountains receive more rainfall?
  - ii. How does atmospheric pressure change with altitude?
  - iii. Enumerate the world climate zone according to Koppen climate classification.
- b) Describe the procedure for detection of trends in hydro-climatic variable at spatio-temporal scale. (7)
- c) Mountain climates are governed by Continentality, latitude, altitude and topography. Explain the relative influences of these factors on mountain climate. (7)

## Section-II: Mountain Environment

- Q.6 a) Differentiate between following terms: (8)
- i. Differentiate between exogenetic and endogenetic forces of the earth.
  - ii. Give any two characteristics of North and Western Mountains in Pakistan.
  - iii. How does frost wedging accelerate mass movement?
  - iv. Name some of the indicators of climate change.
- b) Mountains are the more risk for earth quake. Describe the damages and the possible measures to counter the natural hazard. (12)
- Q.7 a) Give short answers with clear concept: (8)
- i. What are the preventive measures of mass movement?
  - ii. What is the difference between earthquake and tsunami?
  - iii. What is meant by biological weathering?
  - iv. With increasing latitude and altitude various biomes are found in the Himalaya. Enlist the biomes.
- b) Weathering is a phenomenon that is the major contributor shaping the mountain environment. Critically analyze with reference to its different types (12)
- Q.8 a) Give short answers with clear concept: (8)
- i. What is meant by escape route in the mountain?
  - ii. Enlist the three geological eras of mountain building.
  - iii. What are the possible threats to the mountain biodiversity?
  - iv. What is the importance of HKH with reference to mountain biodiversity?
- b) Discuss in detail the relationship of mountain biodiversity and the climate change. Also describe the adaptation strategies of the communities. (12)
- Q.9 a) Define the following terms: (8)
- i. Define slump with reference to mass movement.
  - ii. Name some of the fault block mountains of the world?
  - iii. What is meant by exfoliation?
  - iv. Enlist the vegetation zones in Himalaya.
- b) Compare and contrast between the environment of North-western and Western mountains of Pakistan with reference to the diversity of physiography, climate, soil and biodiversity. (12)



# UNIVERSITY OF THE PUNJAB

Part-I A/2017  
Examination:- M.A./M.Sc.

Roll No. ....

**Subject: Mountain Conservation and Watershed Management**  
**PAPER: V (Soil and Water Conservation)**

**TIME ALLOWED: 3 hrs.**  
**MAX. MARKS: 100**

**NOTE: Attempt only FIVE questions. Q.1 (Objective) is Compulsory. Attempt at least TWO questions from each section. All question carry equal marks.**

## Objective

**Q.1**

(Read each question carefully before you answer. Click on the letter of the best answer.)

(20)

**MCQ's**

1. **Cultivated land in Pakistan is:** 1  
a. 25 million hectares b. 20.8 million hectares  
c. 16.0 million hectares d) 51.6 million hectares
2. **Gravel size is:** 1  
a. 25 cm b. 7.5-25 cm  
c. <20 cm d. none of these
3. **Old river terrace soils are -----** 1  
a v deep b shallow  
c mod. deep d none of above
4. **Igneous primary rocks are;** 1  
a) basalt, granite b) shale sand stone, lime  
c ) slate, marble d) none of these
5. **Indus river system and its tributaries bring water annually:** 1  
a: 154 MAF b. 104 MAF  
c. 100 MAF d. none of these
6. **Soil horizon characterized by the accumulation of lime is:** 1  
a. A b. E  
c. O d. K
7. **Good quality irrigation water EC in micromohs is** 1  
a. > 1500 b. <1000  
c. > 2500 d. none of these
8. **Chashma barrage is on river:** 1  
a. Ravi b. Jhelum c. Chenab  
d) Indus
9. **Acidic soils pH is** 1  
a. 5.5-6.6 b. 8.2-8.4  
c 8.5-9.0 d. none of these
10. **western rivers are:** 1  
a. Indus, Ravi, Beas b, Beas, Ravi, Sutlej  
c. Indus, Chenab, Jhelum d. none of theses

**P.T.O.**

## True/ False

11	Chaghi kharan desert is in Punjab”?	T/F	1
12.	Presence of wide surface cracks is a character of swelling clay	T/F	1
13.	“Loess” soils are formed by the action of water.	T/F	1
14.	Increased pH reduced the availability of nutrients	T/F	1
15	Organic matter in soil in the range of 0.87 to 1.29% will be satisfactory T/F		1

### Fill in the blanks

16.	RSC stands for -----		1
17.	Artificial application of water for growing crops or trees is called----- -----		1
18.	Name three soil properties that can be measured -----		1
19	Clay particle size is-----		1
20	----- indicator is used in the field for the checkup of pH		1

### Section-1: Soil & Water Conservation

Q.2	a) Explain types of erosion and its conservation measures b) What processes do contribute in soil formation? Explain in detail		(10) (10)
Q.3	a) Explain about RUSLE and USLE. b) Describe factors of soil degradation? How these factors contribute towards the degradation of soil?		(12) (8)
Q.4	a) Explain the following:- i. Soil and Landforms map ii. Land capability and Land Suitability map iii Parameters of Saline sodic soils iv Braunification v. Micro and Micronutrients b) Define weathering. Explain types of weathering?		(10)       (10)
Q.5	a) Explain Land qualities in detail. b) Write down Soil Resources of Pakistan		(12) (8)

### Section- 2: Water Resources of Pakistan

Q.6	a) Explain Water Resources of Pakistan in detail? b) Write down about objectives of water policy		(10) (10)
Q.7	a) Brief about Tarbella and Mangla dams. b) Give short answer i) Water pollution ii) Adverse effect of sedimentation in reservoirs iii) Salient features of irrigation system of Pakistan iv) Hydrologic cycle		(8)   (12)
Q.8	a) Discuss about Pakistan losing aqua vital b) What is water harvesting? Explain its benefits.		(10) (10)
Q.9	a) Explain about beating water crises through strategic water resources management b) ) How much Indus system and its tributaries bring water annually, its utilization, losses and also brief about its management.		(12) (8)

# UNIVERSITY OF THE PUNJAB



Part-I A/2017  
Examination:- M.A./M.Sc.

Roll No. ....

**Subject: Mountain Conservation and Watershed Management**  
**PAPER: VI (Mountain Hazards & Disaster Management)**

**TIME ALLOWED: 3 hrs.**  
**MAX. MARKS: 100**

*Note: Attempt any FIVE questions. Q.1 (Objective) is Compulsory. Attempt at least TWO questions from each section of Subjective. Write to the point with the clear concept.*

## OBJECTIVE SECTION

**Q.1: (a) Each question has four options. Encircle the correct answer:**

**[10]**

- i. Moderate drought occurs when deficit of rainfall falls between:**
  - a) 5-15% of normal
  - b) 26-50% of normal
  - c) 51-75% of normal
  - d) None of above
- ii. The National Disaster Management Authority is founded in:**
  - a) August 17, 2005
  - b) August 17, 2006
  - c) August 17, 2007
  - d) August 17, 2008
- iii. Very High flood occur when:**
  - a) River partly inundating river islands/belas
  - b) River almost fully submerging islands/belas but without encroachment on the freeboard
  - c) River flowing between high banks/bunds with encroachment on the freeboard
  - d) There is imminent danger of overtopping /breaching
- iv. Initiatives taken before disasters are called as:**
  - a) Emergency response activities
  - b) Response and recovery activities
  - c) Mitigation and preparedness activities
  - d) None of above
- v. Instrument used to measure earthquake is known as:**
  - a) quake meter
  - b) quake graph
  - c) seismograph
  - d) typanicgraph
- vi. The world's second largest lake, located in Uganda, Tanzania and Kenya is:**
  - a) Lake Victoria
  - b) Lake Titicaca
  - c) Lake Saiful Maluk
  - d) Lake Asal
- vii. The Rockys mountain ranges are located in:**
  - a) Asia
  - b) Europe
  - c) North America
  - d) South America
- viii The man-made canal created as a faster route between the Atlantic and Pacific Oceans is**
  - a) Panama Canal
  - b) Onega Canal
  - c) Suez Canal
  - d) Halden Canal
- ix. Lal Suhanra National Park was established in:**
  - a) 1971
  - b) 1972
  - c) 1973
  - d) 1974
- x. Indus delta is a home to one of the few species of fresh water especially:**
  - a) Rohu
  - b) Dolphin
  - c) Thela
  - d) Mahseer

- Q.1: (b) Write whether the statement is true or false:** [05]
- i. In flood control project, 100% flood protection is provided and hence there is absolutely no flood risk. **True/False**
  - ii. Slope stability is increased when retaining structures are placed at the toe of the landslide. **True/False**
  - iii. The critical slope angle at which most snow will start to move is 38°. **True/False**
  - iv. Rush Lake is the highest lake in Pakistan, situated near Rush Pari Peak. **True/False**
  - v. Tochi pass connects Ghazni in Afghanistan with Bannu in Pakistan. **True/False**

- Q.1: (c) Fill in the blanks:** [05]
- i. NDMA stands for-----
  - ii. Powder Snow Avalanches occur when snow is-----
  - iii. Chronically drought prone area: An area with probability of drought of occurrence is more -----
  - iv. Rush Lake is the highest lake in Pakistan, situated near ----- Peak.
  - v. Lulusar-Dodipatsar National Park is located in the ----- in Mansehra District of Khyber-Pakhtunkhwa, Pakistan.

### SUBJECTIVE SECTION

**Section-I: Mountain Hazards & Disaster Management (MHDM)**

- Q.2** a) Differentiate between following terms: (6)
- i. Physical and Socio-economic vulnerability
  - ii. Hazard and Disaster
  - iii. Hydrological Drought and Meteorological Drought
- b) Briefly describe and discuss structural and non-structural measures of flood control? (8)
- c) Estimate the state (severity) of hydrological drought of the Gilgit River basin using the Standardized Precipitation Index (indices based on precipitation) from the following data. The mean annual precipitation from 30 year data period is 135 mm while the standard deviation is 50 mm. (6)

Years	2006	2007	2008	2009	2010
Precipitation (mm)	133	84	169	142	267

- Q.3** a) Give short answers with clear concept: (6)
- i. Enumerate major classes of earthquake?
  - ii. State the major causes of snow avalanches?
  - iii. State the different indices used to estimate the drought
- b) Describe the structure for Disaster Risk Management in Pakistan? (8)
- c) A watershed consist of 30% (24 acres ) rooftops area, 10% (8 acres) street and driveways area, 20% (16 acres) average lawns @ 5% slope on sandy soil and 40% (32 acres) with woodland. The time of concentration for all flow regimes (sheet flow, shallow concentrated flow and channel flow) is 40 minutes. The 2yr/24hr rainfall was 5 inches. The runoff coefficient (C) for rooftops, street and driveways area, average lawns and woodland are 0.9, 0.9, 0.15 and 0.1 respectively. Compute the peak storm water run-off for this watershed to adopt the different flood mitigation measures? (6)
- Q.4** a) Give short answers with clear concept: (6)
- i. What are the committees within the Emergency Operation Center (EOC)

- ii. What is disaster risk management cycle?
  - iii. Enumerate the hazards based on geology, water, climate and environment.
  - b) Identify major type of landslides and suggest risk reduction measures for landslide mitigation. (6)
  - c) Describes the community risk reduction measures for drought, flood, earthquake and landslide? (8)
- Q.5
- a) Define the following terms: Snow Avalanches; Glacier Lake outburst Flood (GLOF); Disaster; landslide; Earthquake; Drought; (6)
  - b) Describes the roles/responsibilities of key stakeholders for disaster risk management in mountain region of Pakistan? (8)
  - c) What are major effects and remedies measures of snow avalanches? (6)

## Section-II: Geomorphology of Pakistan

- Q.6
- a) Define the following terms: Continent; Plateau; Climate; Longitude; Volcano; Map (6)
  - b) Write a note on the Hindu Kush and the western mountains? (6)
  - c) Compare the importance of mountains and Plains in Pakistan. (8)
- Q.7
- a) Give short answers with clear concept: (6)
    - i. What do you mean by Morains?
    - ii. What kind of internal processes bring changes on the surface of earth?
    - iii. What is meant by Tectonic Plates?
  - b) What is meant by energy resources? Describe the energy resources available in Pakistan. (6)
  - c) Define Geodesy. Give some Observations as proofs about the "Shape of the Earth" or its Sphericity (8)
- Q.8
- a) Differentiate between following terms: (6)
    - i. Organic & Chemical weathering
    - ii. Erosional and Depositional Plains
    - iii. Primary and Secondary waves of earthquake
  - b) Define Soil. What types of soil are found in Pakistan? (6)
  - c) What kinds of fishing are done in Pakistan? What are the major marine harbors famous for fishing in Pakistan? (8)
- Q.9
- a) What kind of wild life is found in Pakistan? (6)
  - b) Which crops are cultivated in Rabi season in Pakistan and where they are mainly grown in all provinces of Pakistan? (6)
  - c) Define Natural Vegetation. Which forest types are found in Pakistan? (8)