

03 JAN 2023

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Deccan Education Society's
FERGUSON COLLEGE (Autonomous) Pune-4
Affiliated to Savitribai Phule Pune University
M.Sc.-I (Semester: I)

Subject: Geology
Paper Title: Principles of Stratigraphy and Palaeontology
Paper Code: GLY 4102
2019 Pattern (4 Credits)

[Time: 3 Hours]

[Max. Marks : 50]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.

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|-----|---|-------------------------|-------------|
| Q1) | Answer the following questions (Any Five). | Two Marks Each | 10 M |
| | a) Explain the term 'biozone'.
b) Define index fossil.
c) Define lithofacies.
d) State the law of order of superposition.
e) Describe sinistral coiling in gastropods.
f) Enlist any two silicious microfossils. | | |
| Q2) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) Write in brief the concept of stratigraphic correlation.
b) Write a note on chronostratigraphy.
c) Write a note on significance of fossils.
d) Write a note on role of microfossils in climatic studies. | | |
| Q3) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) Write a note on the concepts of cyclostratigraphy.
b) Write a note on magnetostratigraphy.
c) Describe types of septa in corals.
d) Write a note on significance of ichnofossils. | | |
| Q4) | Answer the following questions (Any Three) | Three Marks Each | 9M |
| | a) Write a note on magnetostratigraphy.
b) Write in brief biofacies analysis.
c) Describe in brief the evolutionary trends in humans.
d) Describe morphological features of coralline algae. | | |
| Q5) | Answer the following questions (Any Two) | Four Marks Each | 8 M |
| | a) Write a note on biostratigraphy.
b) Describe in brief the surface methods of establishing stratigraphic column.
c) Write a note on hard part morphology of bivalves. | | |
| Q6) | Answer the following questions (Any One) | Five Marks Each | 5 M |
| | a) Write a note on sequence stratigraphy.
b) Write a note on hard part morphology of cephalopods. | | |

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Deccan Education Society's
FERGUSON COLLEGE (Autonomous) Pune-4
Affiliated to Savitribai Phule Pune University
M.Sc.-II (Semester: III)

Subject: Geology
Paper Title: Hydrogeology and Watershed Development & Management
Paper Code: GLY5304
2019 Pattern (4 Credits)

[Max. Marks : 50]

[Time: 3Hours]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.

Q1) Answer the following questions (Any Five).

Two Marks Each

10 M

- a) What is connet water?
- b) Define Darcy's Law.
- c) Draw neat diagrams of influent and affluent streams.
- d) State any four schemes relater to ground water by State Government.
- e) Define specific yield.
- f) What is perched aquifer?

Q2)

Answer the following questions (Any Three) Three Marks Each

9 M

- a) What is aquifuge?
- b) Define porosity. Comment on factors influencing porosity.
- c) State role of Toposheets and Aerial Photographs in hydrogeological investigations.
- d) Describe any two water conservation structures.

Q3)

Answer the following questions (Any Three)

Three Marks Each

9 M

- a) Discuss types of springs according to their origin.
- b) Discuss types of tracers and their applications in ground water investigation.
- c) Write on Electric Resistivity method used for ground water exploration.
- d) Write on artificial recharge technique through dug wells.

Q4)

Answer the following questions (Any Three)

Three Marks Each

9M

- a) Write on vertical distribution of ground water.
- b) Discuss factors governing quality of ground water.
- c) Discuss methodology and implications of pumping test.
- d) Enlist characteristics of watershed and explain Size as characteristic.

Q5)

Answer the following questions (Any Two)

Four Marks Each

8 M

- a) Write on structural control on ground water occurrence.
- b) Write on ground water provinces of Maharashtra.
- c) Discuss need of people's participation in watershed development and management.

Q6)

Answer the following questions (Any One)

Five Marks Each

5 M

- a) What is hydrogeological cycle? Explain the processes involved.
- b) Discuss sea water ingress and its implication regarding ground water.

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Deccan Education Society's
FERGUSON COLLEGE (Autonomous) Pune-4
 Affiliated to Savitribai Phule Pune University
M.Sc.-I (Semester : I)
Subject: Geology
Paper Title: Sedimentology
Paper Code: GL4103
2019 Pattern (4 Credits)

[Max. Marks : 50]

[Time: 3Hours]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.

- Q1) **Answer the following questions (Any Five).** **Two Marks Each** **10 M**
- a) Describe the types of orthoconglomerates
 - b) Define accommodation space, base-level, relative, and absolute sea levels.
 - c) Define lysocline and CCD
 - d) What are aulacogens?
 - e) Describe the various types of carbonate cement.
 - f) Explain progradational and retrogradational stacking patterns of facies
- Q2) **Answer the following questions (Any Three) Three Marks Each** **9 M**
- a) Describe the various compositional contents of carbonate sediments.
 - b) Explain Dott's scheme of sandstone composition.
 - c) Describe the various varieties of shales
 - d) What are evaporate deposits?
- Q3) **Answer the following questions (Any Three) Three Marks Each** **9 M**
- a) Discuss how carbonate deposits are formed in non-marine settings with examples.
 - b) Describe the sedimentary structures of the Tidal Flat environment.
 - c) Discuss the criteria to recognize unconformities in the sedimentary record.
 - d) Explain the formation of Banded Iron Formations during the Precambrian.
- Q4) **Answer the following questions (Any Three) Three Marks Each** **9M**
- a) What are cratonic basins? Describe the nature of their sedimentary fill.
 - b) Discuss the origin and characters of the pull-apart basin.
 - c) Describe the sedimentary fill of an intra-arc basin.
 - d) Write a brief note on mixed-mode basins with suitable examples.
- Q5) **Answer the following questions (Any Two) Four Marks Each** **8 M**
- a) Describe the various tools used for provenance analysis.
 - b) Discuss how directional and orientation data is collected, analyzed, and presented for paleocurrent analysis.
 - c) What are facies associations? How are they useful in interpreting depositional environments? Explain with a suitable example.
- Q6) **Answer the following questions (Any One) Five Marks Each** **5 M**
- a) Describe in detail the subenvironments, processes, and facies of the coastal barrier bar system.
 - b) Explain the origin, tectonic style, structure, subsidence, and sediment fill of passive margin basins.

Deccan Education Society's
FERGUSON COLLEGE (Autonomous) Pune-4
Affiliated to Savitribai Phule Pune University
M.Sc.-I (Semester : I)

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Subject: Geology
Paper Title: Geomorphology, Remote Sensing and GIS
Paper Code: GLY4106
2019 Pattern (4 Credits)

[Time: 3Hours]

[Max. Marks : 50]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.

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| Q1) | Answer the following questions (Any Five). | Two Marks Each | 10 M |
| | a) What is River terrace? | | |
| | b) Describe different zones of soil. | | |
| | c) What are Eskers? | | |
| | d) Enlist sensor in IRS-P6. | | |
| | e) Explain the term Adjacency and Containment? | | |
| | f) What is GNSS? | | |
| Q2) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) Explain the process of peneplanation. | | |
| | b) Write a note on Endogenic forces. | | |
| | c) Give evidence of neotectonism. | | |
| | d) Write any three concepts of Geomorphology. | | |
| Q3) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) Describe any three types of drainage pattern giving their significance. | | |
| | b) Explain the erosional landforms created by the action of rivers. | | |
| | c) Write a note on applications of geomorphology in Engineering geology. | | |
| | d) Describe depositional landforms created by the action of glaciers. | | |
| Q4) | Answer the following questions (Any Three) | Three Marks Each | 9M |
| | a) Write a note on Microwave remote sensing and its applications? | | |
| | b) What is Map Projection? Discuss Planer projection in details | | |
| | c) Write a note on spectral resolution. | | |
| | d) Discuss the types of sensors used in Resourcesat 1. | | |
| Q5) | Answer the following questions (Any Two) | Four Marks Each | 8 M |
| | a) Write a note on types of digitizing errors in GIS | | |
| | b) Write a note on Raster Analysis. | | |
| | c) Give a brief account on GIS data model? | | |
| Q6) | Answer the following questions (Any One) | Five Marks Each | 5 M |
| | a) Explain the role of tectonics in landform development. | | |
| | b) What is electromagnetic radiation? Explain energy interaction with atmosphere? | | |

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Deccan Education Society's
FERGUSON COLLEGE (Autonomous) Pune-4
Affiliated to Savitribai Phule Pune University
M.Sc.-II (Semester: III)
Subject: Geology
Paper Title: Mining Geology and Oil Field Practices
Paper Code: GLY5309
2019 Pattern (4 Credits)

[Time: 3Hours]

[Max. Marks : 50]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.

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|-----|---|-------------------------|-------------|
| Q1) | Answer the following questions (Any Five). | Two Marks Each | 10 M |
| | a) Define Reserves and resources | | |
| | b) Enlist the topographic features used for locating the ore bodies. | | |
| | c) What is slip and cut? Explain in brief the procedure and importance. | | |
| | d) What are the two methods of performing a pit drill? | | |
| | e) Explain the concept of ringed target in mining geology. | | |
| | f) Briefly explain kick-off point and landing point. | | |
| Q2) | Answer the following questions (Any Three) Three Marks Each | | 9 M |
| | a) With suitable examples explain stratigraphic guides for ore deposit. | | |
| | b) How mining plan is prepared? Add a note on mining scheme. | | |
| | c) Write in brief about | | |
| | 1. Color of Gossan | | |
| | 2. Void shapes in Gossan. | | |
| | d) Write a note on Fractures/fault and contact as guide for reserve identification. | | |
| Q3) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) Write in brief about MMDR at 1957 and other important mining laws. | | |
| | b) Describe National Mineral policy. Add a note on Indian Bureau of Mines. | | |
| | c) What are different guides for ore based on mineralogical criteria? | | |
| | d) What is percussion drill? Explain different drilling methods. | | |
| Q4) | Answer the following questions (Any Three) | Three Marks Each | 9M |
| | a) What are the three parameters to get an idea of abnormal pressures. | | |
| | b) Explain six basic functions of the drilling fluid. | | |
| | c) What is a safe window for drilling a well? | | |
| | d) What is the procedure of retrieving, laying out and marking of cores? | | |
| Q5) | Answer the following questions (Any Two) | Four Marks Each | 8 M |
| | a) Explain in detail the importance and procedure of analyzing sample using a calcimeter and a microsol. | | |
| | b) What are the four important functions when using motor and MWD? Explain in detail. | | |
| | c) Write in detail about MDT including the parts of the tool, parameters measured and two different types of MDT. | | |
| Q6) | Answer the following questions (Any One) | Five Marks Each | 5 M |
| | a) Explain zoning of mineral and its uses as ore guide. | | |
| | b) What are the advantages and disadvantages of LWD as compared to wireline logging? | | |

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Deccan Education Society's
FERGUSON COLLEGE (Autonomous) Pune-4
 Affiliated to Savitribai Phule Pune University
M.Sc.-II (Semester :III)
Subject: Geology
Paper Title: Exploration Methods
Paper Code:GLY5302
2019 Pattern (4 Credits)

[Time: 3Hours]

[Max. Marks : 50]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.

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|-----|---|-------------------------|-------------|
| Q1) | Answer the following questions (Any Five). | Two Marks Each | 10 M |
| | a) What is drift correction?
b) Define magnetic inclination.
c) What is fundamental difference between EM and MT?
d) What is Geophone?
e) What is importance of Maxwell's equation in EM?
f) What is geochemical province? | | |
| Q2) | Answer the following questions (Any Three) Three Marks Each | | 9 M |
| | a) What is zero length spring used in gravimeters?
b) What is remnant magnetism? Explain its role in magnetic survey.
c) Describe various methods applied to calibrate a gravimeter.
d) Describe any three types of magnetometers. | | |
| Q3) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) Explain Non explosive methods in seismic operations.
b) Explain the principle of Seismic Refraction method. How reflection from a two layered model is represented?
c) Discuss the principles of seismic refraction methods.
d) Give application of seismic reflection methods. | | |
| Q4) | Answer the following questions (Any Three) | Three Marks Each | 9M |
| | a) Describe instruments and field procedure in S.P.Method.
b) Give the application of electromagnetic method.
c) Describe field procedures involved in resistivity survey.
d) Give applications of magneto telluric methods. | | |
| Q5) | Answer the following questions (Any Two) | Four Marks Each | 8 M |
| | a) Write a note on Geobotinical indicators.
b) Explain sampling procedure involved in geochemical survey.
c) Write a note on path finder minerals. | | |
| Q6) | Answer the following questions (Any One) | Five Marks Each | 5 M |
| | a) Explain the steps involved in processing of seismic data
b) Describe Secondary dispersion pattern with suitable examples. | | |

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Deccan Education Society's
FERGUSON COLLEGE (Autonomous) Pune-4
Affiliated to Savitribai Phule Pune University
M.Sc.-I (Semester :I)
Subject: Geology
Paper Title: Mineralogy
Paper Code:GLY4101
2019 Pattern (4 Credits)

[Time: 3Hours]

[Max. Marks : 50]

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.

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|-----|---|-------------------------|-------------|
| Q1) | Answer the following questions (Any Five). | Two Marks Each | 10 M |
| | a) What is rotation symmetry operation? | | |
| | b) Enlist the crystal systems belonging to Biaxial class | | |
| | c) What are Pyroxenoids? | | |
| | d) What are Ca amphiboles? | | |
| | e) What is unit cell? | | |
| | f) Explain the phenomenon of birefringence. | | |
| Q2) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) What are accessory plates? Explain the use of gypsum plate. | | |
| | b) Explain Biaxial indicatrix. | | |
| | c) Explain Uniaxial interference figure. | | |
| | d) Explain scheme of pleochroism with suitable examples. | | |
| Q3) | Answer the following questions (Any Three) | Three Marks Each | 9 M |
| | a) Draw the stereographic projection of Orthorhombic System, Type Baryte. | | |
| | b) Explain the Hexagonal Bravais's Lattices. | | |
| | c) Explain the concept of Point groups with suitable examples. | | |
| | d) Define space groups. Explain symmorphous space groups. | | |
| Q4) | Answer the following questions (Any Three) | Three Marks Each | 9M |
| | a) Give structure and paragenesis of Garnets. | | |
| | b) What are Alkali pyroxenes? | | |
| | c) Give the paragenesis of Alumino silicates. | | |
| | d) Give paragenesis of Amphiboles. | | |
| Q5) | Answer the following questions (Any Two) | Four Marks Each | 8 M |
| | a) Write a note on alteration of feldspars. | | |
| | b) Give the paragenesis of Clay minerals. | | |
| | c) Give the structure and uses of Zeolites. | | |
| Q6) | Answer the following questions (Any One) | Five Marks Each | 5 M |
| | a) Compare the structure and Paragenesis of Amphiboles and Pyroxenes. | | |
| | b) Give structure, paragenesis of Micas. | | |

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Deccan Education Society's
Fergusson College (Autonomous), Pune-4

M.Sc.-II (Semester III)
Subject: Geology
(GLY5301) Indian Stratigraphy (2019 pattern)

Time: 3 Hours

Max. Marks: 50

Instruction to candidates:

- i) All questions are compulsory
- ii) Figures to the right indicate full marks
- iii) Draw neat labeled diagram wherever necessary.

- Q.1 Attempt any five questions: [2 x 5 = 10]
- a) Write about Bundelkhand Granite.
 - b) Write about Rajmahal Traps.
 - c) Write a note on Karakoram granite batholiths.
 - d) Write a note on Panchet Group.
 - e) Give the Significance of Indus-Tsangpo Suture zone.
 - f) Write a note on tectonics affecting the Siwalik Super Group.
 - g) Write about Gondwana flora.
- Q.2 Attempt any three questions: [3 x 3 = 9]
- a) Give the Lithostratigraphy of Vindhyan basin.
 - b) Write a note on Granulites of South India.
 - c) Write a note on Palaeozoics of Spiti region
 - d) Write about the younger granites of WDC.
- Q.3 Attempt any three questions: [3 x 3 = 9]
- a) Write a note on marine intercalations within the Gondwana Sequence.
 - b) Write about the Kimberlite intrusions in Vindhyan basin.
 - c) Write a note on Kolar Greenstone belt.
 - d) Write a note on Deccan Intertrappean beds.
- Q.4 Attempt any three questions: [3 x 3 = 9]
- a) Write a note on Megalodon Limestone.
 - b) Write about Bababudan Group.
 - c) Write a note on Malani igneous suite.
 - d) Write about the Infra Krol and Krol series.
- Q.5 Attempt any two questions: [4 x 2 = 8]
- a) Give the Significance of the Gondwana Stratigraphy.
 - b) Write a note on structure and tectonics of Dharwar Craton.
 - c) Write about the Palaeobiota of the Siwalik Super Group.
- Q.6 Attempt any one questions: [1 x 5 = 5]
- a) Give the classification of Dharwar Craton in detail.
 - b) Give a detailed account of the Jurassic of the Kachchh.