

# MIZORAM PUBLIC SERVICE COMMISSION

## GENERAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF RESEARCH INVESTIGATOR (ARCHAEOLOGY) CONTRACT UNDER ART & CULTURE DEPARTMENT. AUGUST, 2016.

### GEOLOGY PAPER-I

Time Allowed : 2 hours

Full Marks : 150

*All questions carry equal mark of 2 each. Attempt all questions.*

1. Correct order of stages of cooling and crystallization of a magma is:

- (a) Orthomagmatic, pneumatolytic, hydrothermal and pegmatitic
- (b) Orthomagmatic, pegmatitic, pneumatolytic and hydrothermal
- (c) Pegmatitic, pneumatolytic, orthomagmatic and hydrothermal
- (d) Hydrothermal, pegmatitic, orthomagmatic and pneumatolytic

2. Match the following:

#### I

- (1) Basalt
- (2) Granite
- (3) Limestone
- (4) Sandstone

#### II

- (i) Marble
- (ii) Quartzite
- (iii) Rhyolite
- (iv) Gabbro
- (v) Syenite

- (a) 1- iii, 2- iv, 3- i, 4- v
- (c) 1- v, 2- iii, 3- i, 4- ii

- (b) 1- iv, 2- iii, 3- ii, 4- i
- (d) 1- iv, 2- iii, 3- i, 4- ii

3. The main source of marble used in Taj Mahal is:

- (a) Aspur marble, Rajasthan
- (b) Banswara marble, Rajasthan
- (c) Makrana marble, Rajasthan
- (d) Katni marble, M.P.

4. Metamorphism involves process of:

- (a) liquid-state recrystallization
- (b) solid-liquid state recrystallization
- (c) solid-gas state recrystallization
- (d) solid-state recrystallization

5. Which mineral cannot be represented in the ACF diagram?

- (a) Calcite
- (b) Diopside
- (c) Na- feldspar
- (d) K- feldspar

6. Crystallization of minerals in discontinuous reaction series with falling temperature:

- (a) Olivine- orthopyroxene- clinopyroxene- Amphibole- Biotite
- (b) Olivine- clinopyroxene- orthopyroxene- Amphibole- Biotite
- (c) Clinopyroxene- orthopyroxene- olivine- Amphibole- Biotite
- (d) Biotite- Amphibole- orthopyroxene- clinopyroxene- olivine

7. The Deccan trap basalt, as it is porphyric in nature, the phenocrysts are:
- (a) Plagioclase and clinopyroxene
  - (b) Plagioclase and olivine
  - (c) Plagioclase, olivine and clinopyroxene
  - (d) Olivine and clinopyroxene

8. Consider the following characteristics of a rock type:
- (1) Formed by the cooling and solidification of molten magma
  - (2) Molten lava when cooled forms into crystals
  - (3) Forms into lava plateaus, lava plains and lava shields

Which of the following mentioned rocks possess the above characteristics?

- (a) Metamorphic rock
- (b) Igneous rock
- (c) Plutonic rock
- (d) Sedimentary rock

9. The minerals which can be cut and powdered are known as:

- (a) Ductile
- (b) Elastic
- (c) Reptile
- (d) Sectile

10. A mineral having sharp elongated points fracture is:

- (a) Conchoidal fracture
- (b) Earthy fracture
- (c) Splintery fracture
- (d) Hackly fracture

11. Match the following:

**I**

- (1) Hematite
- (2) Chalcopyrite
- (3) Pyrite
- (4) Siderite

**II**

- (i) White streak
- (ii) Black streak
- (iii) Greenish- black streak
- (iv) Cherry-red streak
- (v) Brownish streak

- (a) 1-ii, 2- iii, 3- iv, 4- i
- (c) 1-v, 2- i, 3- iii, 4- iv

- (b) 1-iv, 2- iii, 3- ii, 4- i
- (d) 1- i, 2- ii, 3- v, 4- iii

12. How many cleavage sets are found in quartz mineral?

- (a) One
- (b) Two
- (c) Three
- (d) Absent

13. Mica belongs to

- (a) Inosilicate
- (b) Nesosilicate
- (c) Phyllosilicate
- (d) Sorosilicate

14. In feldspars the cleavage planes are parallel to

- (a) (100) face and (010) face
- (b) (001) face and (010) face
- (c) (010) face and (010) face
- (d) Cleavage is absent

15. The hardness of finger nail in Mohr's scale is

- (a) 1.5
- (b) 2.5
- (c) 3.5
- (d) 4.5

16. Sediments grain size between 0.1mm to 2mm is:

- (a) Conglomerate
- (b) Sandstone
- (c) Shale
- (d) Siltstone

17. Match the following:

**I**

- (1) Cross bedding
- (2) Flaser bedding
- (3) Graded bedding
- (4) Lenticular bedding

**II**

- (i) ripple bedform
- (ii) coarse grains at bottom and fine grains at top
- (iii) isolated ripples of sand
- (iv) downstream migration of bedforms
- (v) isolated thin drapes of mud

- (a) 1- iv, 2- iii, 3- v, 4- iii
- (c) 1- iv, 2- v, 3- ii, 4- iii

- (b) 1- iv, 2- iii, 3- ii, 4- iii
- (d) 1- iii, 2- i, 3- ii, 4- v

18. Which of the following does not belong to siliceous deposits?

- (a) Agate
- (b) Chert
- (c) Gypsum
- (d) Jasper

19. Ripple marks are developed under:

- (a) Deep water conditions
- (b) Shallow water conditions
- (c) Both deep and shallow water conditions
- (d) Very deep water conditions

20. A term used for heterogeneous weathered material lying on top of the bedrock:

- (a) humus
- (b) laterite
- (c) regolith
- (d) soil

21. Consider the following statements:

- (1) Rocks of different compositions weather at different rates
- (2) The presence of soil slows down the weathering of the underlying bedrock
- (3) The longer a rock is exposed the surface, the more weathered it becomes

Which of the statements given above are correct?

- (a) 1 & 2 only
- (b) 1 & 3 only
- (c) 2 & 3 only
- (d) 1, 2 & 3

22. A common mineral group produced by a chemical weathering is:

- (a) Clay
- (b) Feldspar
- (c) Mica
- (d) Silica

23. A sandstone composed of 25% or more of the sand grains of feldspar is:

- (a) Arkose- sandstone
- (b) Lithic- sandstone
- (c) Graywacke
- (d) Quartz- sandstone

24. A conglomerate, having angular fragment, crushed pieces, slickenside blocks is:

- (a) Oligomictic conglomerate
- (b) Polymictic conglomerate
- (c) Diamictite
- (d) Breccia

25. Roundness of a particle is determined by using the formula:

- (a)  $\sigma = V/N$  (b)  $\sigma = R/N$   
(c)  $\sigma = rR/N$  (d)  $\sigma = rN/R$

26. Colour of sedimentary rocks are determined by:

- (a) iron (b) nitrogen  
(c) bacteria (d) calcium carbonate

27. Sediment always carried above the river bed in the moving current is:

- (a) bed load (b) episodic load  
(c) solution load (d) suspended load

28. 33-65% proportion of clay-size constituents with beds >10mm thick is:

- (a) Bedded siltstone (b) Claystone  
(c) Clay- shale (d) Mudstone

29. Microcrystalline calcitic deposits of a size range from 0.001 to 0.004mm is:

- (a) Biomicrite (b) Dismicrite  
(c) Micrite (d) Pelmicrite

30. A.S.T.M Mesh No. 70 to 120 or phi size 2.25 to 3.00 is related with:

- (a) Medium sand (b) Fine sand  
(c) Very fine sand (d) Silt

31. Mountain formation is not related to:

- (a) Deformation (b) Plate tectonic  
(c) Sedimentation (d) Volcanic activity

32. Match the following:

- | I                              | II                             |
|--------------------------------|--------------------------------|
| (1) Himalaya                   | (i) erosion mountain           |
| (2) Sierra Nevada              | (ii) fold mountain             |
| (3) Mount St. Helens           | (iii) fault- block mountain    |
| (4) Catskill Mountain          | (iv) volcanic mountain         |
|                                | (v) dome mountain              |
| (a) 1- ii, 2- v, 3- iii, 4- i  | (b) 1- ii, 2- iii, 3- iv, 4- i |
| (c) 1- ii, 2- iii, 3- iv, 4- v | (d) 1- ii, 2- i, 3- iv, 4- iii |

33. The features of the crescent shaped deposits at inside bends of a river channel:

- (a) Alluvial fans (b) Deltas  
(c) Point bars (d) Natural levees

34. The streams showing a branching tree like arrangement is:

- (a) Dendritic pattern (b) Trellis pattern  
(c) Rectangular pattern (d) Parallel pattern

- 35.** Potholes in river bedrock are formed by:
- (a) the impact of a large rock moved by a strong current which makes a crater
  - (b) the grinding action of a pebble or cobble in a swirling eddy
  - (c) cascading water from a waterfall which wears away the rock
  - (d) none of the above
- 36.** Well sorted and uniformly graded materials are the deposition features of:
- (a) Alluvial fans
  - (b) Deltas
  - (c) Point bars
  - (d) Natural levees
- 37.** Which of the following statements about fluid flow is false?
- (a) the viscosity of most fluids increases as temperature increases
  - (b) as the velocity of a stream increases, laminar flow may change to turbulent flow
  - (c) most streams and rivers are turbulent
  - (d) the more viscous the fluid, the more likely the flow is laminar
- 38.** A stream in its youth exhibits which of the following sets of characteristics?
- (a) broad meanders and a wide floodplain
  - (b) few rapids and waterfalls and a U- shaped valley
  - (c) steep gradient and a V- shaped valley
  - (d) low gradient and the presence of oxbow lakes
- 39.** Removal of small pieces of disintegrated rock is called:
- (a) chemical weathering
  - (b) mechanical weathering
  - (c) erosion
  - (d) transportation
- 40.** Which of the following mass movement is the fastest?
- (a) debris avalanche
  - (b) earthflow
  - (c) mudflows
  - (d) soil creep
- 41.** Consider the following statements:
- (1) Weathering changes the character of the rock without dislocating it.
  - (2) Crystalline rocks are more susceptible to physical weathering than sedimentary rocks
- Which of the statements given above is/ are correct?
- (a) 1 only
  - (b) 2 only
  - (c) Both 1 and 2
  - (d) Neither 1 nor 2
- 42.** Wide and open valley, meandering pattern with numerous oxbow lakes are the characteristics of:
- (a) Youth stage valley
  - (b) Mature stage valley
  - (c) Old stage valley
  - (d) Mature and Old stages
- 43.** Peneplain and monadnocks are exhibited in which stage of erosion?
- (a) Youth stage
  - (b) Mature stage
  - (c) Old stage
  - (d) Mature and Old stages
- 44.** 'Slope replacement' in the slope development model is proposed by:
- (a) W.M. Davis, 1899
  - (b) W. Penck, 1924
  - (c) L.C. King, 1948
  - (d) John T. Hack, 1960

45. Which of the following slopes is least stable?
- (a) a slope where the sedimentary layers dip parallel to the slope
  - (b) a slope where the sedimentary layers are horizontal
  - (c) a slope where the sedimentary layers dip perpendicular to the slope
  - (d) all of these slopes have the same stability
46. In Survey of India toposheet, how many meters are represented by 1cm in 1:50,000 scale?
- (a) 1000m
  - (b) 500m
  - (c) 250m
  - (d) 100m
47. Match the following:
- | I           | II                        |
|-------------|---------------------------|
| (1) Scale   | (i) rock exposure         |
| (2) Relief  | (ii) topographic map      |
| (3) Contour | (iii) R.F.                |
| (4) Outcrop | (iv) roughness of terrain |
|             | (v) equal elevation       |
- (a) 1- ii, 2- iii, 3- ii, 4- i
- (b) 1- ii, 2- v, 3- iv, 4- i
- (c) 1- ii, 2- iv, 3- i, 4- v
- (d) 1- iii, 2- iv, 3- v, 4- i
48. Which will be the R.F. of a map 2cm to 1km?
- (a) 1:50000
  - (b) 1:5000
  - (c) 1:200000
  - (d) 1:20000
49. The direction a line formed by the intersection of the bedding and the horizontal plane:
- (a) anticline
  - (b) dip
  - (c) strike
  - (d) syncline
50. The apparent dip of any bed towards any direction is:
- (a) equal to the true dip
  - (b) less than true dip
  - (c) greater than true dip
  - (d) above conditions depend upon the amount of dip
51. Younger beds found in the:
- (a) direction of dip
  - (b) direction of strike line
  - (c) opposite direction of dip
  - (d) inclined direction of dip and strike
52. Consider the following statements:
- (1) With steepening dip, the outcrop pattern is increasingly subdued.
  - (2) The amount of dip increases as the direction of dip moves towards strike direction.
- Which of the statements given above is/ are correct?
- (a) 1 only
  - (b) 2 only
  - (c) Both 1 and 2
  - (d) Neither 1 nor 2

- 53.** The instrument which has two spirit levels used in geological field study is:
- (a) Clinometer compass
  - (b) Freiberg compass
  - (c) Brunton compass
  - (d) Silva compass
- 54.** Which of the following is not involved in use of stereographic projection?
- (a) Plotting a plane, line and pole of a plane
  - (b) Intersecting planes, lines, plunge and pitch
  - (c) Measurement of angles between line and plane
  - (d) Measurement of angles between two lines/ planes
- 55.** The diagram used in stereographic projection is:
- (a) Pi diagram
  - (b) Beta diagram
  - (c) Contour diagram
  - (d) Stereonet
- 56.** Altitude of a bed can be measured by:
- (a) Reading the position of the magnetic needle on the outer circle
  - (b) Reading the angle by clinometer compass
  - (c) Finding strike direction by compass and dip by clinometer compass
  - (d) Finding strike and dip direction by compass and angle or dip by clinometer compass
- 57.** Which of the following statements is false?
- (a) Hill contours are usually V- shaped or closed.
  - (b) Contours overlap on top of each other in vertical cliff.
  - (c) Higher contours cross over the lower in overhanging cliff.
  - (d) The closer the contours, the steeper the slope.
- 58.** Width of outcrop of a bed on the ground depends upon:
- (a) thickness of the bed
  - (b) dip of the bed
  - (c) slope of the ground
  - (d) all of the above
- 59.** Aizawl city falls under Survey of India topo-sheet of:
- (a) 84A/09, 84A /10 & 84A/13
  - (b) 84A/08, 84A/10 & 84A/14
  - (c) 84A/09, 84A/11 & 84A/13
  - (d) 84A/08, 84A/10 & 84A/13
- 60.** The R.F. of 1:50,000 in Survey of India map cover an area of:
- (a) 1° latitude x 1° longitude
  - (b) 4° latitude x 4° longitude
  - (c) 15' latitude x 15' longitude
  - (d) 7'1/2 latitude x 7'1/2 longitude
- 61.** Sloping sides of a fold from crest to trough is:
- (a) Axial plane
  - (b) Axis of fold
  - (c) Limbs
  - (d) Syncline

62. Match the following:

**I**

- (1) Chevron fold
- (2) Fan fold
- (3) Class 1A fold
- (4) Isoclinal fold

- (a) 1- iv, 2- iii, 3- i, 4- v
- (c) 1- iv, 2- iii, 3- i, 4- v

**II**

- (i) dip isogon lengths increase on limbs
- (ii) dip isogons parallel to axial plane
- (iii) negative interlimb angles
- (iv) crest and trough angular
- (v) parallel limbs

- (b) 1- iv, 2- v, 3- ii, 4- iii
- (d) 1- v, 2- iii, 3- ii, 4- v

63. At convergent plate boundaries one would expect to find:

- (a) folds
- (b) faults
- (c) folds and faults
- (d) neither folds nor faults

64. Laboratory experiments on folding indicate that:

- (a) most igneous rocks are more deformable than most sedimentary rocks
- (b) most igneous rocks are less deformable than most sedimentary rocks
- (c) basement rocks are more ductile than young sediments
- (d) young sediments are very brittle and not easily deformed

65. Rocks exposed beneath the fault plane is:

- (a) Footwall
- (b) Hanging wall
- (c) Slip
- (d) Throw

66. If a fault plane is inclined with an angle of  $35^\circ$ , then the hade will be:

- (a)  $145^\circ$
- (b)  $125^\circ$
- (c)  $55^\circ$
- (d)  $45^\circ$

67. A fault characterised by movement both along strike and along dip is:

- (a) normal fault
- (b) oblique- slip
- (c) strike slip
- (d) reverse fault

68. What type of fault is a thrust fault?

- (a) low- angle normal fault
- (b) low- angle reverse fault
- (c) high- angle reverse fault
- (d) low- angle strike- slip fault

69. Consider the following statements:

- (1) Folds and faults form structural traps for valuable mineral deposits.
- (2) Fault zones are generally weak and unstable.

Which of the statements given above is/ are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

70. Older and younger tectonics events are distinguish by:

- (a) Fault
- (b) Fold
- (c) Joint
- (d) Unconformity

- 71.** Joints formed due to compressional forces in folding and faulting of rocks are:
- (a) Dip Joints
  - (b) Strike Joints
  - (c) Shear Joints
  - (d) Tension Joints
- 72.** Older beds tilted, deformed and eroded before the deposition of younger beds in:
- (a) Angular unconformity
  - (b) Disconformity
  - (c) Nonconformity
  - (d) Overlap
- 73.** An extension of younger bed beyond the edge of the immediate older bed below in a conformable sequence is:
- (a) Inlier
  - (b) Outlier
  - (c) Overlap
  - (d) Unconformity
- 74.** An area of younger rock completely surrounded by older rocks is:
- (a) Inlier
  - (b) Outlier
  - (c) Overlap
  - (d) Unconformity
- 75.** Mat fault in Mizoram is an example of:
- (a) Dextral strike slip fault
  - (b) Sinistral strike slip fault
  - (c) Oblique slip fault
  - (d) Strike fault

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