Discipline : Agricultural Physics

Discipline Code : 05   Roll No

PART – I (General Agriculture)

Multiple choice questions (No. 1 to 30). Choose the correct answer (a, b, c or d) and enter your choice in the circle (by shading with a pencil) on the OMR - answer sheet as per the instructions given on the answer sheet.

1. Which of the following crops have been approved for commercial cultivation in India?
   a) Bt cotton and Bt brinjal
   b) Bt cotton and Golden Rice
   c) Bt maize and Bt cotton
   d) Bt cotton only

2. This year (2010-11) the expected food grain production in India is
   a) 212 million tonnes
   b) 220 million tonnes
   c) 235 million tonnes
   d) 250 million tonnes

3. The genome of which of the following crops is still not completely sequenced?
   a) Rice
   b) Soybean
   c) Sorghum
   d) Wheat

4. According to the Approach Paper to the 12th Five Year Plan, the basic objective of the 12th Plan is
   a) Inclusive growth
   b) Sustainable growth
   c) Faster, more inclusive and sustainable growth
   d) Inclusive and sustainable growth

5. To address the problems of sustainable and holistic development of rainfed areas, including appropriate farming and livelihood system approaches, the Government of India has set up the
   a) National Rainfed Area Authority
   b) National Watershed Development Project for Rainfed Areas
   c) National Mission on Rainfed Areas
   d) Command Area Development and Water Management Authority

6. Which of the following sub-schemes are not covered under the Rashtriya Krishi Vikas Yojana?
   a) Extending the Green Revolution to eastern India
   b) Development of 60,000 pulses and oilseeds villages in identified watersheds
   c) National Mission on Saffron
   d) National Mission on Bamboo

7. The minimum support price for the common variety of paddy announced by the Government of India for the year 2010-11 was
   a) ₹ 1030
   b) ₹ 1000
   c) ₹ 980
   d) ₹ 950

8. According to the Human Development Report 2010 of the United Nations, India's rank in terms of the human development index is
   a) 119
   b) 134
   c) 169
   d) 182

9. Which of the following does not apply to SRI method of paddy cultivation?
a) Reduced water application
b) Reduced plant density
c) Increased application of chemical fertilizers
d) Reduced age of seedlings

10. Which organic acid, often used as a preservative, occurs naturally in cranberries, prunes, cinnamon and cloves?
a) Citric acid
b) Benzoic acid
c) Tartaric acid
d) Lactic acid

11. Cotton belongs to the family
a) Cruciferae
b) Anacardiaceae
c) Malvaceae
d) Solanaceae

12. Photoperiodism is
a) Bending of shoot towards source of light
b) Effect of light/dark durations on physiological processes
c) Movement of chloroplast in cell in response to light
d) Effect of light on chlorophyll synthesis

13. Ergot disease is caused by which pathogen on which host?
a) Claviceps purpurea on rye
b) Puccinia recondita on wheat
c) Drechlera sorokiniana on wheat
d) Albugo candida on mustard

14. Rocks are the chief sources of parent materials over which soils are developed. Granite, an important rock, is classified as
a) Igneous rock
b) Metamorphic rock
c) Sedimentary rock
d) Hybrid rock

15. Which one of the following is a Kharif crop?
a) Pearl millet
b) Lentil
c) Mustard
d) Wheat

16. The coefficient of variation (C.V.) is calculated by the formula
a) (Mean/S.D.) × 100
b) (S.D./Mean) × 100
c) S.D./Mean
d) Mean/S.D.

17. Which of the following is commonly referred to as muriate of potash?
a) Potassium nitrate
b) Potassium chloride
c) Potassium sulphate
d) Potassium silicate

18. Inbred lines that have same genetic constitution but differ only at one locus are called
a) Multi lines
b) Monohybrid
c) Isogenic lines
d) Pure lines

19. For applying 100 kg of nitrogen, how much urea would one use?
a) 45 kg
b) 111 kg
c) 222 kg
d) 333 kg

20. The devastating impact of plant disease on human suffering and survival was first realized by epidemic of
a) Brown spot of rice in Bengal
b) Late blight of potato in USA
c) Late blight of potato in Europe
d) Rust of wheat in India

21. The species of rice (Oryza) other than O. sativa that is cultivated is
a) O. rufipugon
b) O. longisteminata
c) O. glaberrima
d) O. nivara

22. The enzyme responsible for the fixation of CO_2 in mesophyll cells of C-4 plants is
a) Malic enzyme
b) Phosphoenol pyruvate carboxylase
c) Phosphoenol pyruvate carboxykinase
d) RuBP carboxylase

23. Which one of the following is a 'Vertisol'?
a) Black cotton soil
b) Red sandy loam soil
c) Sandy loam sodic soil
d) Submontane (Tarai) soil

24. What is the most visible physical characteristic of cells in metaphase?
a) Elongated chromosomes
b) Nucleus visible but chromosomes not
c) Fragile double stranded loose chromosomes
d) Condensed paired chromosomes on the cell plate

25. All weather phenomena like rain, fog and mist occur in
a) Troposphere
b) Mesosphere
c) Ionosphere
d) Ozonosphere

26. Which of the following elements is common to all proteins and nucleic acids?
a) Sulphur
b) Magnesium
c) Nitrogen
d) Phosphorous

27. Silt has intermediate characteristics between
a) Sand and loam
b) Clay and loam
c) Loam and gravel
d) Sand and clay

28. Certified seed is produced from
a) Nucleus seed
b) Breeder seed
c) Foundation seed
d) Truthful seed

29. Seedless banana is an
a) Autotriploid
b) Autotetraploid
c) Allotriploid
d) Allotetraploid

30. Which one of the following is used to test the goodness-of-fit of a distribution?
a) Normal test
b) t-test
c) Chi-square test
d) F-test

PART – II (Subject Paper)

Multiple choice questions (No. 31 to 130). Choose the correct answer (a, b, c or d) and enter your choice in the circle (by shading with a pencil) on the OMR - answer sheet as per the instructions given on the answer sheet.

31. Which of the following statements is true regarding the origin of x-rays and gamma rays?
a) Both are nuclear radiations
b) Only gamma rays are nuclear radiations
c) Only x-rays are nuclear radiations
d) Both are not nuclear radiations

32. Phosphors-32 radio isotope is
a) Obtained by neutron irradiation of phosphorus-31
b) Produced in cyclotron
c) Obtained by neutron irradiation of natural sulphur
d) Obtained by neutron irradiation of nickel

33. For studying the structure of atom
a) Gamma rays are used
b) Microwaves are used
c) X-rays are used
d) α rays are used

34. Quantum sensors are sensitive to changes in
a) Incident photon flux
b) Atmospheric pressure
c) Air temperature
d) Wavelength of radiation in IR region

35. Irradiance means
a) Radiant energy incident on a surface per unit area per unit time
b) Radiant energy emitted from a surface per unit area per unit time
c) Radiant energy transmitted per unit surface area per unit time
d) Radiant energy reflected per unit surface area per unit time

36. At room temperature, black bodies
a) Emit mostly red wavelengths
b) Absorb mostly red wavelengths
c) Emit mostly infrared wavelengths
d) Emit mostly UV wavelengths

37. Law which describe the spectral radiance of electromagnetic radiation at all wavelengths emitted in the normal direction from a black body at a temperature T as a function of frequency is
a) Plank's law
b) Wien's law
c) Stefan-Boltzman law
d) Doppler law

38. Tritium activity is generally measured by
a) Proportional counter
b) Electric counter
c) Centrifuge
d) Liquid scintillation counter

39. Mass spectrometer separates different isotopes of an element on the basis of
a) Their Masses
b) Their mass to charge ratio
c) Their Charges
d) Radiations emitted by them

40. Puddling or wet tillage
a) Destroys structure and makes the soil more dispersed
b) Improves structure by making uniform microaggregates
c) Temporarily destroys structure, which regains its initial condition in due course
d) Improves water retention capacity of soil

41. Microwaves are produced by
a) Photodiode
b) Thermopile
c) Wave guide
d) Triode

42. In a thermistor, made up of a semiconductor
a) Resistance increases with increase in temperature
b) Resistance decreases with increase in temperature
c) Resistance does not change with temperature
d) No definite relation between resistance and temperature can be established

43. Both ^{32}P and ^{14}C are
a) α emitters
b) β emitters
c) γ emitters
d) Positron emitters

44. During day time, maximum soil temperature at surface generally arrive
a) Earlier than the maximum soil temperature at 15 cm
b) At the same time as the maximum soil temperature at 15 cm
c) Later than the soil temperature at 15 cm
d) May arrive sooner or later depending on atmospheric conditions

45. Optical spectro pluviometer measures
a) Sunshine hours
b) Rain drop size and rain drop velocity
c) Air temperature
d) Soil heat flux

46. Jet streams are
a) Hot water springs
b) Fast flowing narrow air currents located near tropopause
c) Low pressure area near equator
d) Cold water springs

47. Wind speed of one knot is equal to
a) 1 km per sec
b) 2 km per minute
c) 1.85 km per hour
d) 4 m per sec

48. Advective gas transport in soil can be described by
a) Fick's law
b) Hooks' law
c) Darcy's law
d) Dusty's gas model

49. Aridity index in moist climate is
a) Potential evapotranspiration (PE) in cm
b) Annual water surplus taken as percentage of annual PE
c) Seasonal water deficit
d) Annual water deficit taken as a percentage of annual PE

50. Isotachs connect points that have
a) Equal pressure
b) Equal temperature
c) Equal rainfall
d) Equal wind speed

51. Ravines are mostly confined to
a) Plains
b) Hills
c) Deserts
d) Dry lands

52. Both universal soil loss equation (USLE) and water erosion prediction programme (WEPP) measure
a) Only inter rill erosion
b) Rill and inter rill erosion
c) Inter rill, rill and gully erosion
d) Only gully erosion

53. Critical limit of soil penetration resistance at which the root growth of most of the crops reduce by 50% is
a) 2 MPa
b) 500 kPa
c) 2 kN/m^2
d) 15 bar

54. The initial depth of penetration of 5 cm rain water in soil with bulk density 1.5 gm/cc and field capacity soil water content 20% (w/w) for 0-60 cm soil is
a) 100 cm
b) 50 cm
c) 16.6 cm
d) 12 cm

55. Raised and sunken bed technology is most suited to
a) Alluvial soils
b) Black soils
c) Red soils
d) Lateritic soils

56. Crusting is the major problem of
a) Semi-arid soils with loam texture
b) heavy rainfall areas of black soils
c) Acid soils
d) Low rainfall areas of red soils

57. Using time domain reflectometry method for soil water measurement, time of travel of microwave pulse along the wave guide buried in soil will be
a) More if the soil is saturated
b) Less if the soil is saturated
c) Will be same under both wet and dry conditions
d) More if the soil is unsaturated

58. Median particle size represent
a) The size for which 50% particles have smaller size and 50% particles have bigger size
b) Average size of particles
c) Maximum size of particles
d) Weighted average of sizes in different classes

59. Air permeability in soil is measured by
a) Field respirometer
b) Constant pressure variable volume permeameter
c) Oxygen diffusion rate
d) Redox potential

60. Oxygen diffusion rate meter
a) At low soil water content does not give accurate measurement of oxygen diffusing in the soil
b) At high soil water content does not give accurate measurement of oxygen diffusing in the soil
c) At all soil water contents give accurate measurement of oxygen diffusing in the soil
d) Does not measure aeration status of soil

61. Proctor bulk density of sand is
a) Les than that of clay and it occurs at relatively higher soil water content
b) More than that of clay and it occurs at relatively low soil water content
c) Same as that of clay
d) Independent of soil water content

62. Another name for 'Inter-tropical convergence zone' is
a) Tropical high
b) Doldrums
c) Horse latitude
d) None of the above

63. In a double ring infiltrometer, outer ring is flooded simultaneously with inner ring to ensure
a) Vertical movement of water in inner ring
b) Horizontal movement of water in inner ring
c) Both horizontal and vertical flows in inner ring
d) To increase the area of infiltration

64. Graded bunds for soil and water conservation are put in
a) Any soil type with slope between 1-3%
b) Any soil with slope between 6-13%
c) High rainfall areas or impermeable soils with slope <6%
d) Sandy soils with slope <6%

65. The test to determine the optimal soil wetness at which compaction of a given soil can be achieved most effectively by a given force, is called
a) Proctor test
b) Atterberg limits
c) Van-Shear test
d) Kneading test

66. The total pore space is more in
a) Sandy soil
b) Clay soil
c) Loam soil
d) Sandy clay loam soil

67. Which of the following is not a RCT (resource conserving technology)?
a) Laser leveller
b) Raised bed system of planting
c) Chiesel ploughing
d) Residue mulching

68. Actual evapotranspiration can be determined by
a) Field water balance
b) US class A pan evaporimeter
c) Sunken pan evaporimeter
d) Hygrometer

69. The thermalized neutrons in soil from neutron moisture probe have energy
a) 0.003 eV
b) 0.03 eV
c) 0.3 eV
d) 3 eV

70. The dielectric property of soil water is used for soil water content determination by
a) Neutron moisture meter
b) γ-ray attenuation method
c) Gypsum block method
d) Time domain reflectrometry

71. Infrared range of electromagnetic spectrum is
a) 0.4 to 0.7 μm
b) 0.7 to 100 μm
c) 0.7 to 7 μm
d) <0.4 μm

72. Maximum ionization is produced by
a) Gamma ray
b) Beta ray
c) Alpha ray
d) X-ray

73. Which component in Bragg's equation ($n\lambda = 2d \sin\theta$) is used to identify clay mineral through x-ray diffraction?
a) n
b) λ
c) d
d) θ

74. In which stage of crop growth, the Vegetation Index is highest?
a) Crown root initiation
b) Tillering
c) Booting
d) Harvest

75. Under a given soil and weather condition, total water lost from a grass land into the atmosphere is called
a) Potential evapotranspiration
b) Actual evapotranspiration
c) Pan evaporation
d) Crop transpiration

76. Advection is the process by which
a) Heat energy backscattered from cloud to ground
b) Heat energy radiated from surface to atmosphere
c) Heat energy transferred vertically within the atmosphere
d) Heat energy transferred horizontally within the atmosphere

77. Precipitation in winter is maximum in
a) Maritime climate
b) Continental type of climate
c) Tropical climate
d) Monsoon type climate

78. Ideal climatic condition for cultivation of wheat is
a) Cool and moist climate during entire growth period
b) Warm and dry climate during entire growth period
c) Warm and dry climate during vegetative, but cool and moist during ripening stage
d) Cool and moist climate during vegetative, but warm and dry during ripening stage

79. If the soil moisture content (%, W/w) is 16 and bulk density is 1.32 Mg m^{-3}, assuming the particle density as 2.65 Mg m^{-3}, the air-filled porosity is
a) 20%
b) 21%
c) 25%
d) 29%

80. The average gravimetric water content in 0-15 cm soil layer was 10 and 30% before and after irrigation, respectively. Calculate the amount of water increased in the layer, the bulk density of which was 1.5 Mg m^{-3}.
a) 5.0 cm
b) 4.5 cm
c) 4.0 cm
d) 3.5 cm

81. The thermal conductivity of a soil is 16 cal cm^{-1} hr^{-1} °C^{-1}; the volumetric water content is 0.25 cm^3 cm^{-3} and the bulk density is 1.25 Mg m^{-3}. The thermal diffusivity (cm^2 hr^{7}) would be
a) 28
b) 32
c) 36
d) 40

82. Carbon-14 (^{14}C) is used for C dating. What is the half life of ^{14}C?
a) 8370 years
b) 5730 years
c) 1620 years
d) 13 years

83. Atoms having same proton, but differing in mass number are
a) Isotopes
b) Isotones
c) Isobars
d) Isohyets

84. Which of the following is a weather system?
a) Net radiation
b) Barometric pressure
c) Cyclone
d) PAR

85. Which one is true for a freely falling body from a certain height?
a) Kinetic energy increases and potential energy decreases
b) Kinetic energy increases but potential energy remains same
c) Kinetic energy decreases and potential energy increases
d) Kinetic energy decreases but potential energy remains same

86. Amount of energy emitted from a body is proportional to
a) T^4
b) T^{-4}
c) T
d) T^{-1}

where, T is the absolute temperature of the body

87. The CO_2 built up around roots will flow from soil to atmospheric air mainly through the process of
a) Diffusion
b) Oxidation
c) Mass flow
d) Convection

88. Three types of water erosion are recognized; which one of the following is correct in terms of increasing severity?
a) Gully, rill, sheet
b) Sheet, gully, rill
c) Rill, sheet, gully
d) Sheet, rill, gully

89. Which experiences the least electrical force in an electrical field?
a) Electron
b) Beta particle
c) Gamma ray
d) Alpha particle

90. The wind system which covers the maximum ocean area on earth is
a) Trade winds
b) Monsoons
c) Westerlies
d) Doldrums

91. Behaviour of soil mass to external forces like tillage may be quantified by
a) Yoder's apparatus
b) Psychrometer
c) Guelph permeameter
d) Casagrande apparatus

92. Calcium carbonate is commonly absent in soils having pH less than
a) 7.0
b) 7.5
c) 8.0
d) 8.5

93. Organic matter content of most of the soils of India is in the range of
a) 0-1%
b) 1-2%
c) 204%
d) >4%

94. Average cation exchange capacity (cmol (p^+) kg^{-1}) of vermiculite is
a) 10-40
b) 80-150
c) 100-150
d) >200

95. Stability of minerals to weathering follows the sequence
a) Quartz > feldspars > biotite > gypsum
b) Quartz > biotite > feldspars > gypsum
c) Quartz > feldspars > gypsum > biotite
d) Gypsum > feldspars > biotite > quartz

96. Matric potentials at 50 and 150 cm depth below surface soil are −20 and −10 m, respectively. Taking 200 m depth as reference point, what will be the potential difference between these two points?
a) 900 cm
b) 950 cm
c) 1000 cm
d) 1500 cm

97. A 0.8 m deep soil has a volumetric water content of 0.12. Find the quantity of water required to bring the water content to 0.30:
a) 14.2 cm
b) 14.3 cm
c) 14.4 cm
d) 14.5 cm

98. A lysimeter decreased in weight by 100 kg over a period when irrigation and rain together was 3 cm. What was the evapotranspiration by the crop during this time? Lysimeter height and surface area were 1 m and 1 m^2, respectively.
a) 130 cm
b) 13 cm
c) 1.3 cm
d) 13 mm

99. In a cropped field (albedo 0.78), what will be the net radiation, if the global radiation (average for a day) and the average net longwave radiation are 349 and -58.18 Wm^{-2}, respectively?
a) 228 Wm^{-2}
b) 226 Wm^{-2}
c) 225 Wm^{-2}
d) 224 Wm^{-2}

100. Which of the following is not true?
a) The sum of direct and scattered solar radiation is called global radiation
b) The net longwave radiation is mostly dependent on climatic conditions of an area
c) The radiation measured at weather stations is generally net radiation and not global radiation
d) When the soil dries, the ratio of the latent heat of evapotranspiration and net radiation decreases

101. Hysteresis effect of water retention is
a) Greater in red soil than black soil
b) Equal in both the soils
c) Greater in black soil than red soil
d) Can't be determined for both the soils

102. In neutron moisture meter, effective volume of soil increases with
a) Increase in soil moisture content
b) Decrease in soil moisture content
c) Remains the same always
d) No apparent relation was established

103. Half-life of ^{32}P is
a) 14.3 years
b) 14.3 days
c) 14.3 hours
d) 14.3 minutes

104. The effective height of a capillary fringe above a deep ground water table depends on
a) Depth of water table
b) Pore size distribution
c) Rate of infiltration
d) Soil temperature

105. According to Stockes' law, the terminal velocity of a spherical particle settling under the influence of gravity in a fluid of a given density and viscosity, is proportional to
a) r^2
b) r^3
c) r^4
d) r

106. In a laminar flow of a liquid through a tube of radius r, the volume flow rate is proportional to
a) r
b) r^2
c) r^3
d) r^4

107. Beta rays emitted by a radioactive material are
a) Electromagnetic radiation
b) Electrons orbiting around the nucleus
c) Charged particles emitted by the nucleus
d) Neutral particles emitted by the nucleus

108. The intensity of insolation depends on
a) Altitude
b) Latitude
c) Nature of the earth surface
d) Wind

109. Widely spaced isobars indicate a
a) Steep change in pressure
b) Weak change in pressure
c) No change in pressure
d) None of the above

110. High clouds are
a) Stratus
b) Alto-stratus
c) Alto-cumulus
d) Cirro-stratus

111. The emitted energy peak from earth surface is in
a) Visible region of e.m. spectrum
b) Thermal infrared region of e.m. spectrum
c) Microwave region of e.m. spectrum
d) Radiowave region of e.m. spectrum

112. Which can be used as an index of looseness and compaction?
a) Dry specific volume
b) Air filled porosity
c) Degree of saturation
d) Particle density

113. Dielectric constant of pure water and dry soil, respectively, are
a) 4 and 80
b) 60 and 10
c) 80 and 2-5
d) 60-80 and 2-10

114. About 50% of the atmosphere lies below the altitude of
a) 30 km
b) 15.6 km
c) 10.6 km
d) 5.6 km

115. Presence of water vapour in grams per kilogram of air gives us
a) Relative humidity
b) Absolute humidity
c) Specific humidity
d) Any of the above

116. Stable isotopes can be detected by
a) NMR
b) Mass spectrometer
c) GM counters
d) Spectrometer

117. The giant weather machine of our globe is driven by
a) The Sun
b) Temperature gradient
c) The hydrolithosphere
d) The terrestrial atmosphere

118. The equilibrium vapour pressure on the free water surface of a calm pond is
a) Higher than the equilibrium vapour pressure over a water drop
b) Lower than the equilibrium vapour pressure over a water drop
c) Equal to the equilibrium vapour pressure over a water drop
d) Lower than the equilibrium vapour pressure over a capillary

119. For climatological studies, the meteorological parameters are regularly collected at the Meteorological Stations by gadgets mounted at a height of
a) 0.5 m above the ground
b) 1 m above the ground
c) 1.5 m above the ground
d) 2 m above the ground

120. Poiseuille's law can be applied to evaluate the viscosity of a liquid by
a) Laminar flow of the liquid through parallel linear capillaries
b) Laminar flow of the liquid through bundles of tortuous capillaries
c) Turbulent flow of the liquid through parallel linear capillaries
d) Turbulent flow of the liquid through bundles of tortuous capillaries

121. What spectacular effect the water molecule would have produced on earth, had its molecular structure been linear symmetric $(H - O - H)$?
a) The weak intermolecular interaction force would have been absent
b) Water would not have existed in liquid form at normal terrestrial temperature
c) Water molecules would have been found in gaseous form (like methane) in the atmosphere
d) Evolution of water-based living organisms would have been impossible on earth

122. The volume of convective flux of soil air is driven by the force
a) Soil air concentration gradient
b) Soil air pressure gradient
c) Soil air temperature gradient
d) Soil air moisture gradient

123. In the following radiometric and photometric quantities, which one has unit different from others?
a) Radiant flux density
b) Radiant power
c) Reflected flux
d) Spectral radiant flux

124. If the lens of the remote sensing camera has a diameter of 60 cm and wavelength it is sensing is 6000 Å, the instantaneous field of view of the camera will be
a) 6000 radian
b) 122 radian
c) 1.22×10^{-6} radian
d) 122×10^{-6} radian

125. In an optical system, the ability to distinguish between signals from spatially near points is known as
a) Selection
b) Magnification
c) Differentiation
d) Resolution

126. A nucleus of $^{9}_{4}Be$ absorbs an alpha particles and emits a neutron. The resulting nucleus will be
a) $^{12}_{6}C$
b) $^{8}_{4}Be$
c) $^{12}_{5}B$
d) $^{13}_{6}C$

127. Which of the following describes the nuclear forces that holds the nucleons together
a) Weak and long range
b) Weak and short range
c) Strong and long range
d) Strong and short range

128. Basis of Köppen's classification is
a) Precipitation and temperature
b) Evaporation and rainfall
c) Temperature and evaporation
d) Temperature and moisture

129. A large widespread homogeneous body of air with uniform properties of temperature and humidity is called
a) Cloud
b) Air mass
c) Cyclone
d) Anti-cyclone

130. Damping depth (d) is related to the thermal properties of the soil and the frequency of the temperature fluctuation as follows
a) $d = \left(\dfrac{2c}{kw} \right)^{\frac{1}{2}}$
b) $d = \left(\dfrac{2k}{cw} \right)^{-\frac{1}{2}}$
c) $d = \left(\dfrac{2c}{kw} \right)^{-\frac{1}{2}}$
d) $d = \left(\dfrac{2k}{cw} \right)^{\frac{1}{2}}$

Matching type questions (No. 131 to 140); all questions carry equal marks. Choose the correct answer (a, b, c, d or e) for each sub-question (i, ii, iii, iv and v) and enter your choice in the circle (by shading with a pencil) on the OMR - answer sheet as per the instructions given on the answer sheet.

131. Match the terms with sizes
i) Microaggregates   a) 10 cm or more
ii) Micropores   b) <250 µm
iii) Macropores   c) 5-30 µm
iv) Peds   d) >75 µm
v) Clods   e) Naturally formed
                           aggregates

132. Match the terms with wind types
i) Gale   a) Anti-trade winds
ii) Katabatic   b) Rain shadow winds on lee side
                   of mountain
iii) Tornado   c) Down slope winds
iv) Westerlies d) Storm with sustained winds
                   between 34-48 knots
v) Chinook   e) Violent rotating column of air
                   which is in contact with both
                   the surface of earth and
                   cumulonimbus cloud

133.
i) Soil erosion   a) ^{36}Cl
ii) Seepage   b) AM-Be
iii) Soil salinity   c) ^{13}C
iv) Soil moisture content   d) ^{2}H
v) Soil aggregate formation e) ^{137}Cs

134. Match the terms with their dimensions
i) Diffusivity   a) L^{-1}
ii) Fluidity   b) $L^{-1} T^{-1}$
iii) Sorptivity   c) L^{-2}
iv) Intrinsic permeability   d) $LT^{-0.5}$
v) Specific water capacity   e) $L^{2}T^{-1}$

135. Match the spectral ranges important for different processes
i) 1-50 cm band of e.m.   a) Crop growth
   radiation   monitoring
ii) 0.6-0.7 µm band of   b) Photosynthesis
   e.m. radiation
iii) 0.7-1.1 µm band of   c) Ozone absorption
   e.m. radiation   band
iv) 8-14 µm band of e.m. d) Surface temperature
   radiation
v) 9-10 µm band of e.m.   e) Soil moisture studies
   radiation

136. Match the meteorological parameters with the related monitoring gadgets
i) Agricultural drought   a) Lysimeter
ii) Humidity   b) Anemometer
iii) Wind speed   c) Net radiometer
iv) Evapotranspiration   d) Psychrometer
v) Albedo   e) Satellite remote sensing

137. Match the terms
i) Vinyl acetate and maleic   a) Soil crusting
   acid
ii) Modulus of rupture   b) Soil moisture
iii) Penetrometer   c) Soil conditioning
iv) Neutron moisture meter   d) Soil strength
v) Sorption and desorption   e) Soil hysteresis

138. Match the instruments with their measurements
i) Wet/dry bulb   a) Height of a place
   thermometer
ii) Altimeters   b) Measurement of dew
iii) Anemograph   c) Photosynthetically
                            active radiation
iv) Line quantum sensor d) Relative humidity
v) Duvdevani gauge   e) Wind speed reorder

139. Match the terms with their descriptions
i) Isohyets   a) Lines of equal temperature
ii) Isohalines   b) Lines of equal wind speed
iii) Isonephs   c) Line of equal salinity
iv) Isotherm   d) Lines of equal distribution of
                    rainfall
v) Isotach   e) Lines of equal cloud cover

140. Match the soil water related terms with their respective correspondence
i) Erosion   a) Slow rate and high
                       frequency
ii) Redistribution b) Curve number method
iii) Drip irrigation c) Post infiltration water
                        movement
iv) Evaporation   d) Detachment,
                       transportation and
                       deposition
v) Run-off   e) Constant rate stage

Short questions (No. 141 to 146); each question carries FIVE marks. Write answers, including computation / mathematical calculations if any, in the space provided for each question on the question paper itself.

141. Prove that for a mineral soil having 50% total porosity, the bulk density is half of its particle density.

142. Distinguish between spatial, spectral, temporal and radiometric resolution of a sensor.

143. Differentiate between soil compaction and soil consolidation.

144. What is the yield of a crop having crop ET of 450 mm given that the maximum attainable yield of the crop is 8000 kg/ha with highest ET of 650 mm and the yield response factor is 1.5?

145. Give three essential conditions for evaporation to occur and persist from a soil surface.

146. Differentiate between mountain winds and valley winds.