POST GRADUATE COMMON ENTRANCE TEST-2019

DATE and TIME	COURSE	SUBJECT
20-07-2019 2.30 p.m. to 4.30 p.m.	ME/M.Tech/M.Arch/ courses offered by VTU/UVCE/UBDTCE	ENVIRONMENTAL ENGINEERING
MAXIMUM MARKS	**TOTAL DURATION**	**MAXIMUM TIME FOR ANSWERING**
100	150 Minutes	120 Minutes

MENTION YOUR PGCET NO.	QUESTION BOOKLET DETAILS	
	VERSION CODE	SERIAL NUMBER
	B	120002

DOs :
1. Candidate must verify that the PGCET number & Name printed on the OMR Answer Sheet is tallying with the PGCET number and Name printed on the Admission Ticket. Discrepancy if any, report to invigilator.
2. This question booklet is issued to you by the invigilator after the **2ⁿᵈ bell i.e., after 2.25 p.m.**
3. The Version Code of this Question Booklet should be entered on the OMR Answer Sheet and the respective circle should also be shaded completely.
4. The Version Code and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :
1. **The timing and marks printed on the OMR answer sheet should not be damaged / mutilated / spoiled.**
2. The **3ʳᵈ Bell rings at 2.30 p.m.**, till then;
   - Do not remove the paper seal / polythene bag present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 75 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the **3ʳᵈ Bell is rung at 2.30 p.m.**, remove the paper seal / polythene bag on the right hand side of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 120 minutes:
   - Read each question (item) carefully.
   - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **only one response** for each item.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALLPOINT PEN against the question number on the OMR answer sheet.**

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD	ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHODS

4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last Bell is rung at 4.30 p.m.**, stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Handover the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet (KEA copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year**.
9. Only **Non-programmable** calculators are allowed.

Marks Distribution	
PART-1 : 50 QUESTIONS CARRY ONE MARK EACH (1 TO 50)	
PART-2 : 25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)	

EN - B

ENVIRONMENTAL ENGINEERING
PART - 1

Each question carries one mark. (50 × 1 = 50)

1. The average annual rainfall of a country is a figure, which is averaged over a period of :
   - (A) 10 years
   - (B) 15 years
   - (C) 35 years
   - (D) 100 years

2. A geological formation, which not only stores water, but can yield it in sufficient quantity, is known as :
   - (A) aquiclude
   - (B) aquitard
   - (C) aquifer
   - (D) aquifuse

3. Strainer type tubewells are unsuitable for :
   - (A) hard strata
   - (B) fine sandy strata
   - (C) coarse gravel
   - (D) clayey strata

4. The devices, which are installed for drawing water from different water sources, are called :
   - (A) filters
   - (B) intakes
   - (C) outlets
   - (D) inlets

5. Which one of the following practices, causes reduction in the per capita water consumption ?
   - (A) good quality water
   - (B) hotter climate
   - (C) modern living
   - (D) metering system

6. The pipe mains carrying water from the source to the reservoir are designed for the :
   - (A) maximum daily draft
   - (B) average daily draft
   - (C) maximum hourly draft of the maximum day
   - (D) maximum weekly draft

7. The Pump suitable for lifting water from very deep tubewells of the order of 100 to 150 m deep is :
   - (A) Submersible pump
   - (B) jet pump
   - (C) air-lift pump
   - (D) hydraulic ram

Space For Rough Work

8. Hazen – William's formula is

(A) $H_L = \dfrac{n^2 V^2 L}{R^{4/3}}$

(B) $V = 0.85\, C_H\, R^{0.63}\, S^{0.54}$

(C) $h_f = \dfrac{flv^2}{2gd}$

(D) $V = \dfrac{1}{N}\, R^{2/3}\, S^{1/2}$

9. Safe water is the one, which does not contain

(A) Pathogenic bacteria

(B) turbidity

(C) any taste

(D) any colour

10. Modern turbidimeters, working on the Principle of 'Scattering of light' are known as :

(A) Spectrometers

(B) Tinto meter

(C) Optimeters

(D) Nephelometers

11. The detention time for a water sedimentation tank may vary between

(A) 1 to 2 hr   (B) 2 to 4 hr

(C) 4 to 8 hr   (D) 16 to 24 hr

12. Rapid gravity filters remove bacteria to as much as :

(A) 80 to 90%   (B) 90 to 95%

(C) 98 to 99%   (D) 91 to 94%

13. Disinfection of water helps in

(A) removing turbidity

(B) removing hardness

(C) killing pathogenic bacteria

(D) Complete sterilisation

14. Sullage is

(A) Waste water from baths

(B) drainage from roads

(C) industrial liquid waste

(D) waste water from toilets

Space For Rough Work

15. Velocity of flow through a grit chamber is

(A) 30 to 60 cm/sec

(B) 30 to 60 cm/min

(C) 15 to 45 cm/sec

(D) 15 to 45 cm/min

16. Anaerobic treatment is best suited for

(A) high efficiency

(B) toxic wastes

(C) dilute inorganic wastes

(D) strong organic wastes

17. The process is necessary when the waste water contains either excess alkali or excess acid, is known as,

(A) Equalization

(B) Neutralization

(C) Chemical treatment

(D) Biological treatment

18. BOD of Distillery and Brewery industrial waste water is

(A) 70 to 3000 mg/l

(B) 200 to 1500 mg/l

(C) 500 to 3500 mg/l

(D) 100 to 200 mg/l

19. The putrescible organic waste from kitchens, hotels, restaurants in the form of waste food articles, vegetable and fruit peelings is known as

(A) Rubbish

(B) Garbage

(C) Refuse

(D) None of the above

20. The transportation of solid waste using with vehicle

(A) Auto-rickshaws

(B) Trailers

(C) Tracks

(D) All the above

Space For Rough Work

21. Putrescible organic matter in the solid waste or refuse is digested anaerobically and converted into humus and stable mineral compounds is known as

    (A) Composting

    (B) Pulverization

    (C) Incineration

    (D) Land Filling

22. Size of trench in Bangalore method of Composting is

    (A) $12 \times 2 \times 1.5$ m

    (B) $10 \times 1.5 \times 1.5$ m

    (C) $11 \times 1.5 \times 1.0$ m

    (D) $10 \times 2 \times 1.6$ m

23. Fume is one which has a particle size

    (A) less than 0.0002 μm

    (B) between 0.0002 and 1 μm

    (C) 1 to 75 μm

    (D) 75 to 500 μm

24. The major sources of hydrocarbons is

    (A) gasoline exhaust

    (B) diesel exhaust

    (C) forest fires

    (D) agricultural burning

25. Acid rain is because of

    (A) SO_x (B) CO_x

    (C) COH (D) H_2S

26. Plume rise is more when

    (A) wind velocity is more

    (B) less is the linear diameter of the stack

    (C) less is the exit velocity of the effluent

    (D) more is the difference in temperature between exit gas and air temperature

Space For Rough Work

27. Which pollutants that are aloft in the air are brought rapidly to ground level when the air destabilizes is known as

(A) Trapping

(B) Lofting

(C) Fumigation

(D) Fanning

28. The device used for the easy separation of dry dust of 10 to 100 μm size is

(A) cyclone

(B) gravity settling chamber

(C) bag filter

(D) Scrubber

29. World Environmental day is held every year on

(A) January 28th

(B) June 5th

(C) April 22nd

(D) November 23rd

30. Environmental Protection Act year is

(A) 1976   (B) 1993

(C) 1986   (D) 1988

31. The process of gases are passed through material which contain solids of porous structure is known as

(A) Absorption

(B) Combustion

(C) Adsorption

(D) None of the above

32. The deoxygenation constant k, determined by the equation with temperature

(A) $k_T = k_{20}\,\theta^{(T-20°)}$

(B) $k_T = k_{30}\,\theta^{(T-30°)}$

(C) $k_T = k_{35}\,\theta^{(T-35°)}$

(D) $k_T = k_{25}\,\theta^{(T-25°)}$

Space For Rough Work

33. The method indicate broad areas of possible impacts by listing composite environmental parameters like flora and fauna is known as.

    (A) Ad hoc method

    (B) Checklist method

    (C) Matrics method

    (D) Networks method

34. Goal of EIA

    (A) Resources Conservation

    (B) Waste minimisation and recovery of byproduct

    (C) Efficient equipment

    (D) Above all

35. A study of the probable changes in Socio-economic and bio-physical characteristics of the environment is known as

    (A) EPA   (B) EIS

    (C) EIA   (D) ERA

36. The Conclusion of the EIA as the result of the assessment with report is known as

    (A) EIA   (B) EIS

    (C) ERA   (D) EPA

37. Organic loading of ASP is

    (A) 100 to 200 g/m^3/day

    (B) 200 to 400 g/m^3/day

    (C) 500 to 650 g/m^3/day

    (D) 650 to 800 g/m^3/day

38. In operation a RBC is nearer to

    (A) aerated Lagoon

    (B) Oxidation ditch

    (C) activated sludge Process

    (D) trickling filter

Space For Rough Work

39. Higher pH for water is undesirable because

(A) it corrodes Zinc, Copper and Lead pipes

(B) it induces scour taste

(C) it renders chlorination less effective

(D) it promotes growth of Iron and Sulphur bacteria

40. BOD represents

(A) pollutional strength of a waste

(B) pollutional strength of an organic fraction of wastes

(C) pollutional strength of inorganic fraction of wastes

(D) pollutional strength of bio-degradable organic wastes

41. The Presence of nitrogen in water is an indication of the prehce

(A) Organic Matter

(B) Chlorides

(C) Inorganic Matter

(D) None of the above

42. A pathogenic organism of unicellular/protozoal group is

(A) escherichia coli

(B) salmonella typhi

(C) entomoeba hystolytica

(D) B-Coli

43. A harmful organism, which may be Present in feacal matter, may be

(A) bacterial-Coli

(B) escherichia - Coli

(C) Vibrio Cholerae

(D) None of the above

44. Primary Consumers are in eco system

(A) Cats, Foxex Snakes

(B) Rabbit, Deer, Goat

(C) Wolves, Fox

(D) Lions, Tigers

Space For Rough Work

45. Each organism eats the smaller organisms and is eaten by the larger one is known as

(A) Food Web   (B) Energy flow

(C) Food Chain   (D) Producers

46. Eutrophication results from the enrichment of a body of water

(A) with fertilizing elements

(B) with heavy metals

(C) with high D.O.

(D) with less D.O.

47. Newton's Law of viscosity states that

(A) Shear stress is directly proportional to the velocity

(B) Shear stress is directly proportional to velocity gradient

(C) Shear stress is directly proportional to shear strain

(D) Shear stress is directly proportional to the viscosity

48. The flow in a pipe is laminar if

(A) Reynold number is equal to 2500

(B) Reynold number is equal to 4000

(C) Reynold number is more than 2500

(D) None of the above

49. An orifice is known as large orifice when the head of liquid from the centre of orifice is

(A) more than 10 times the depth of orifice

(B) less than 10 times the depth of orifice

(C) less than 5 times the depth of orifice

(D) more than 8 times the depth of orifice

50. A turbine is a device which converts

(A) Hydraulic energy into Mechanical energy

(B) Mechanical energy into Hydraulic energy

(C) Kinetic energy into Mechanical energy

(D) Electrical energy into Mechanical energy

Space For Rough Work

Each question carries two marks. (25 × 2 = 50)

51. When the flow of water in pipe is 0.624 cumecs, the velocity is 1.5 m/s, then the area of pipe is

    (A) 0.318 m²   (B) 0.416 m²

    (C) 0.501 m²   (D) 0.456 m²

52. The capacity of the tank is 3000 m³ with the length of tank 72 m, then the area of rectangular sedimentation tank is

    (A) 41.67 m²   (B) 43.45 m²

    (C) 51.67 m²   (D) 48.36 m²

53. Uniformity coefficient of filter sand is given by

    (A) D_{50}/D_5 (B) D_{50}/D_{10}

    (C) D_{60}/D_5 (D) D_{60}/D_{10}

54. When was the Water Act enacted by the Indian parliament ?

    (A) 1970   (B) 1974

    (C) 1980   (D) 1985

55. Overflow rate for a primary clarifier is

    (A) 20 – 30 m³/m²/day

    (B) 30 – 100 m³/m²/day

    (C) 5 – 10 m³/m²/day

    (D) 200 – 300 m³/m²/day

56. A grit chamber of dimensions 12.0 m × 1.50 × 0.80 m liquid depth has a flow of 720 m³/hr. Its surface loading rate and detention time are, respectively

    (A) 40,000 m³/hr/m² and 1.2 minutes

    (B) 40,000 lph/m² and 40 minutes

    (C) 40 m³/hr/m² and 1.2 minutes

    (D) 40,000 lph/m² and 1.2 minutes

57. The usual rate of hydraulic loading on a high rate trickling filter is

    (A) 1 to 2 m³/m²/day

    (B) 2 to 5 m³/m²/day

    (C) 5 to 10 m³/m²/day

    (D) 10 to 30 m³/m²/day

Space For Rough Work

58. The treatment of pharmaceutical waste with filter aid is,

(A) Sand

(B) Red Soil

(C) Coalin

(D) Diatomaceous earth

59. The Process of removal of gases in industrial waste water along with packed beds is known as

(A) Aeration

(B) Chemical oxidation

(C) Air Stripping

(D) Chemical Precipitation

60. The waste water for some Pre-determind time in a continuously mixed basin, which produces an effluent of fairly uniform characteristics is known as

(A) Neutralization

(B) Physical treatment

(C) Biological treatment

(D) Equalization

61. If the Period of incubation at 37 °C is 15 days in the relative stability test on sewage, then the relative stability is

(A) 99%   (B) 99.99%

(C) 99.9%   (D) 100%

62. The total amount of solid waste is 17,500 kgs/day and compacted density is 504 kg/m^3, then the volume of solid waste is

(A) 36.70 m^3/day

(B) 38.65 m^3/day

(C) 34.72 m^3/day

(D) 32.82 m^3/day

63. Volume of solid waste is 40 m^3/week and the capacity of vehicle is 20 m^3, so that the requirement of vehicular number is,

(A) 5   (B) 2

(C) 4   (D) 3

Space For Rough Work

64. The categories of hazardous waste

   (A) chemicals

   (B) biological waste

   (C) explosives

   (D) all the above

65. The dia of bag is 0.3 m and the length of bag is 6.0 mtr, then the area of bag is

   (A) 5.65 m^2 (B) 6.10 m^2

   (C) 4.86 m^2 (D) 7.35 m^2

66. To determine the height of chimney for emission of PM by equation

   (A) $h = 64 \, (Q_p)^{0.30}$

   (B) $h = 74 \, (Q_p)^{0.27}$

   (C) $h = 79 \, (Q_p)^{0.27}$

   (D) $h = 72 \, (Q_p)^{0.31}$

67. Combination of smog is

   (A) Dust and SO_X

   (B) Smoke and fog

   (C) Dust and NO_X

   (D) None of the above

68. To perform Environmental Risk Assessment is required

   (A) identification

   (B) accounting

   (C) risk characterization

   (D) all the above

69. World Water Day is held every year on

   (A) 22 March

   (B) 22 April

   (C) 22 May

   (D) 22 June

Space For Rough Work

70. In the determination of sulfate concentration by the gravimetric procedure, a 400 ml sample yielded 0.0360 g of $BaSO_4$, how many mg/l sulphates were present in the sample

(A) 39 mg/l (B) 41 mg/l

(C) 37 mg/l   (D) 38 mg/l

71. Mottling of teeth is associated with the pressure of

(A) Chlorides in water

(B) Calcium in water

(C) Flourides in water

(D) Sulphur in water

72. Bacteria that obtain energy and material from organic sources are called

(A) autotrophs

(B) heterotrophs

(C) phototrophs

(D) protists

73. The flow of water in the pipe is 0.25 m³/s and the area of pipe is 0.03141 m², then the velocity of flow is,

(A) 7.53 m/s   (B) 7.96 m/s

(C) 8.20 m/s   (D) 8.15 m/s

74. The head loss due to friction in pipe can be calculated by chezy's formula

(A) $V = C\sqrt{mi}$

(B) $V = m\sqrt{CP}$

(C) $V = C\sqrt{ms}$

(D) $V = C\sqrt{mQ}$

75. A town having the population of 25,000 and per capita demand of 120 ltrs/day, then the average daily water consumption is,

(A) 3 MLD   (B) 4 MLD

(C) 5 MLD   (D) 6 MLD

Space For Rough Work

Space for Rough Work

Space for Rough Work