

## POST GRADUATE COMMON ENTRANCE TEST-2017

<b>DATE and TIME</b>	<b>COURSE</b>	<b>SUBJECT</b>
01-07-2017 2.30 p.m. to 4.30 p.m.	ME/M.Tech/M.Arch/ courses offered by VTU/UVCE/UBDTCE	ENVIRONMENTAL ENGINEERING
<b>MAXIMUM MARKS</b>	<b>TOTAL DURATION</b>	<b>MAXIMUM TIME FOR ANSWERING</b>
100	150 Minutes	120 Minutes
<b>MENTION YOUR PG CET NO.</b>		<b>QUESTION BOOKLET DETAILS</b>
		<b>VERSION CODE</b>
		<b>SERIAL NUMBER</b>
		<b>A - 1</b>
		<b>109023</b>

**DOs :**

1. Check whether the PG CET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. Ensure whether the circles corresponding to course and the specific branch have been shaded on the OMR answer sheet.
3. This Question Booklet is issued to you by the invigilator after the 2<sup>nd</sup> Bell i.e., after 2.25 p.m.
4. The Serial Number of this question booklet should be entered and the respective circles should also be shaded completely on the OMR answer sheet.
5. The Version Code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely on the OMR answer sheet.
6. 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 3<sup>rd</sup> Bell rings at 2.30 p.m., till then;
  - Do not remove the paper seal / polythene bag 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 3<sup>rd</sup> Bell is rung at 2.30 p.m., remove the paper seal / polythene bag 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 BALL POINT PEN against the question number on the OMR answer sheet.**

**Correct Method of shading the circle on the OMR answer sheet is as shown below :**



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 pm, 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-A1



**ENVIRONMENTAL ENGINEERING**  
**PART - 1**

Each question carries one mark.

(50 × 1 = 50)

- |   |   |
|---|---|
| <p>1. Alkalinity is defined as the quantity of ions in water that will reacts to</p> <p>(A) neutralise hydrogen ion</p> <p>(B) acidify hydrogen ions</p> <p>(C) neutralise oxygen ions</p> <p>(D) acidify oxygen ions</p><br><p>2. Noticeable discoloration of teeth when fluoride concentration in drinking water exceeds 1.5 mg/lit is called</p> <p>(A) Leaching</p> <p>(B) Bleaching</p> <p>(C) Mottling</p> <p>(D) Hardness</p><br><p>3. During waste water treatment protozoan consume</p> <p>(A) Suspended bacteria</p> <p>(B) Cysts of amoeba</p> <p>(C) Mycelium of fungi</p> <p>(D) Calcium and magnesium</p> | <p>4. The process of movement of nutrients from the soil by the acid rain is called</p> <p>(A) Transpiration</p> <p>(B) Evapotranspiration</p> <p>(C) Run off</p> <p>(D) Infiltration</p><br><p>5. The ability of a community to establish itself in a different habitat/area is also a form of</p> <p>(A) Eutrophication</p> <p>(B) Ecological resilinee</p> <p>(C) Trophic level</p> <p>(D) Food web</p><br><p>6. Paramxcovirus causes measles and it is</p> <p>(A) Water borne</p> <p>(B) Air borne</p> <p>(C) Chemical borne</p> <p>(D) Pesticide borne</p> |
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Space For Rough Work

7. Earth day is held every year on
- (A) June 5<sup>th</sup>
  - (B) November 23<sup>rd</sup>
  - (C) April 22<sup>nd</sup>
  - (D) January 28<sup>th</sup>
8. Waterlogging is a phenomena in which
- (A) Crop patterns are rotated
  - (B) Soil root zones becomes saturated due to over irrigation
  - (C) Erosion of soil
  - (D) Organic farming
9. Plants can take up nitrogen in two forms they are
- (A)  $\text{NH}_4^+$  and  $\text{NO}_3^-$
  - (B)  $\text{NH}_3$  and  $\text{NO}_2^-$
  - (C)  $\text{NO}_3^-$
  - (D)  $\text{NO}_2^-$
10. A common impurity that impair the aesthetic quality of water is
- (A)  $\text{H}_2\text{S}$
  - (B) Calcium
  - (C) Fluoride
  - (D) pH
11. Bacteriophage is used to monitor
- (A) COD
  - (B) Microbial pollution
  - (C) Fluoride
  - (D) Eutrophication
12. Red tides are produced by
- (A) Algae
  - (B) Fungi
  - (C) Virus
  - (D) Bacteria
13. In a static fluid, the pressure at any given point is
- (A) zero
  - (B) different in different directions
  - (C) the same in all directions
  - (D) acting in only one direction

Space For Rough Work

14. Viscosity is the property of a fluid and in the SI system, it has the units of
- (A) poise
  - (B) Stoke ( $\text{cm}^2/\text{s}$ )
  - (C)  $\text{gm}/(\text{cm}\cdot\text{s})$
  - (D) Pa-s ( $\text{N}\cdot\text{s}/\text{m}^2$ )
15. For laminar flow in a circular pipe, average velocity is
- (A) one third of the maximum velocity
  - (B) equal to maximum velocity
  - (C) half of the maximum velocity
  - (D) three fourth of maximum velocity
16. The friction loss from a sudden contraction of the cross-section of the pipe is proportional to
- (A) Pressure head
  - (B) Gravity head
  - (C) Velocity head
  - (D) Potential head
17. Diaphragm pump is an example of
- (A) Centrifugal pump
  - (B) Reciprocating pump
  - (C) Gear pump
  - (D) Mono pump
18. The equation for steady state yield from a tube-well was first developed by
- (A) Darcy
  - (B) Jacob
  - (C) Chow
  - (D) Dupuit
19. S-curve hydrograph is used
- (A) to estimate the peak flood from a basin due to a given storm.
  - (B) to develop synthetic unit hydrograph.
  - (C) to convert the unit hydrograph of given duration into a unit hydrograph of any other duration.
  - (D) to estimate the infiltration losses.

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Space For Rough Work

20. Which one of the following formations does not contain ground water ?

- (A) Aquifer
- (B) Aquitard
- (C) Aquifuge
- (D) Aquiclude

21. The chemical compound which is generally used to reduce the evaporation from water bodies is

- (A) D.D.T.D.
- (B) Alum
- (C) Potassium dichromate
- (D) Acetyl alcohol

22. Depth of standard rate of trickling filter is

- (A) 0.5 to 1.0 m
- (B) 1 to 2.0 m
- (C) 1.5 to 4.8 m
- (D) 1 to 8.0 m

23. F/M is accurately given by

- (A)  $\frac{\text{BOD}}{\text{Total solids}}$
- (B)  $\frac{\text{COD}}{\text{MLSS}}$
- (C)  $\frac{\text{BOD}}{\text{MLVSS}}$
- (D)  $\frac{\text{BOD}}{\text{MLSS}}$

24. Organic loading of ASP is

- (A) 100 to 200 g/m<sup>3</sup>/day
- (B) 200 to 400 g/m<sup>3</sup>/day
- (C) 500 to 650 g/m<sup>3</sup>/day
- (D) 650 to 800 g/m<sup>3</sup>/day

25. Sludge from a Biological treatment is

- (A) Harmless inorganic sediment.
- (B) Rich in organic matter and Bacteria.
- (C) Rich in organic matter and micro-organisms.
- (D) Rich in Bigger inert solids.

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Space For Rough Work

26. Waters from the following source is likely to be hard :
- (A) Lake
  - (B) Pond
  - (C) Deep well
  - (D) River
27. Design period mainly depends on
- (A) percentage interest at which the loan is taken.
  - (B) capacity of the municipality to repay.
  - (C) rate of growth of population.
  - (D) maintaining of fittings.
28. The average domestic demand of water for an Indian city is
- (A) 270 lpcd
  - (B) 400 lpcd
  - (C) 700 lpcd
  - (D) 135 lpcd
29. For an old city with constraints for growth the best method of forecasting future population is
- (A) Incremental increase method
  - (B) Geometrical increase method
  - (C) Logestic curve method
  - (D) Arithmetical increase method
30. The usual amount of residual chlorine required after 10 minutes of contact is
- (A) 0.1 mg/l
  - (B) 0.2 mg/l
  - (C) 1 mg/l
  - (D) more than 3 mg/l
31. Free chlorine residual means
- (A)  $\text{HOCl} + \text{HCl}$
  - (B)  $\text{HCl} + \text{OCl}$
  - (C)  $\text{HOCl} + \text{OCl}$
  - (D) Chloramines

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Space For Rough Work

32. A lamp hole is helpful in
- (A) illuminating sewer line
  - (B) cleaning sewer line
  - (C) repairing
  - (D) testing sewers
33. In General Imperviousness of any catchment shall be between
- (A) 1% to 95%
  - (B) 0.1% to 10%
  - (C) 0.01% to 95%
  - (D) 0.0001% to 100%
34. Moisture content of solid waste is found in
- (A) Proximate analysis
  - (B) Ultimate analysis
  - (C) Potential analysis
  - (D) Carbon analysis
35. Energy content of a solid waste is expressed in
- (A) kJ
  - (B) kJ.kg
  - (C) kJ/kg
  - (D) kg
36. OTEC means
- (A) Optimal Thermal Energy Conversion
  - (B) Ocean Thermal Energy Conversion
  - (C) Ocean Tidal Energy Conversion
  - (D) Optimal Tidal Energy Conversion
37. Mining activity
- (A) Devastates ecosystem
  - (B) Creates biodiversity
  - (C) Recycles solid waste
  - (D) Controls pollution
38. Under superadiabatic conditions, with light to moderate wind speed, on a hot summer afternoon when large scale thermal eddies are present, the plume behaviour would be
- (A) Coning
  - (B) Looping
  - (C) Fanning
  - (D) Trapping

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**Space For Rough Work**

39. The air sample collected by filling an evacuated flask or an inflatable bag is called

- (A) Freeze out sampling
- (B) Grab sampling
- (C) Coarse sampling
- (D) Grannular sampling

40. Formation of ozone layer is explained by

- (A) Rosenmund's reaction
- (B) Chapman's reaction
- (C) Henderson's reaction
- (D) Perkin's reaction

41. Estimated residence time of  $\text{SO}_2$  in a dry atmosphere is

- (A) 4 days
- (B) 7 days
- (C) 8 months
- (D) 3 years

42. Widely used device for controlling particulate emissions at industrial installations ranging from power plants, cement and paper mills to oil refineries are

- (A) Catalytic convertors
- (B) Electrostatic precipitators
- (C) Cyclone separators
- (D) Settling chambers

43. Rate of oxidation of organic matter can be approximated as

- (A) First order reaction
- (B) Second order reaction
- (C) Third order reaction
- (D) Zero order reaction

44. Fick's law can be represented as

- (A)  $J_A = \frac{dc}{dt}$
- (B)  $J_A = \frac{dc}{dx} \Delta t$
- (C)  $J_A = -D_{AB} \frac{\partial C_A}{\partial Z}$
- (D)  $J_A = -\frac{\partial C_A}{\partial Z}$

Space For Rough Work



45. The difference between the saturation concentration of DO(CS) and the concentration actually present in water (CL) is called as
- (A) Additional DO
  - (B) Excess DO
  - (C) Ultimate DO
  - (D) DO deficit
46. The record of repeated observations made at a particular location in the environment is called
- (A) Observations
  - (B) Time series
  - (C) Polynomial series
  - (D) Comprehensive
47. The term EIA came into existence through NEPA on
- (A) 20 Jan 1972
  - (B) 10 Jan 1980
  - (C) 1 Jan 1970
  - (D) 15 Aug 1980
48. Most air pollution episodes have occurred in the season
- (A) Rainy
  - (B) Summer
  - (C) Winter
  - (D) August to September
49. The analytical function not associated with environmental impact assessment include
- (A) Prediction
  - (B) Defining scope of EIA
  - (C) Impact evaluation and analysis
  - (D) Recycle and Reuse
50. In comprehensive EIA, the radius of influence of the project on the environment is
- (A) 100 km
  - (B) 25 km
  - (C) 10 km
  - (D) 500 km

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**Space For Rough Work**

**PART - 2**

**Each question carries two marks.**

**(25 × 2 = 50)**

51. What is the suitable diameter for the pores in a filter used for concentrating virus from a 100 ml water sample ?
- (A) 10 μm  
(B) 100 μm  
(C) 10 nm  
(D) 100 nm
52. Nobel Peace Price (2004) for contribution to sustainable development was awarded to
- (A) Madhav Gadgil  
(B) Wangari Maathai  
(C) Medha Patkar  
(D) Sunderlal Bahuguna
53. Reynold's number is the ratio of
- (A) Gravity force to pressure force  
(B) Inertia force to the viscous force  
(C) Pressure force to shear force  
(D) Gravity force to viscous force
54. The head loss due to friction measured in terms of metre(m) of a flowing fluid is given by
- (A)  $h_{fs} = \frac{4fLu^2}{2gD}$   
(B)  $\Delta_p = \rho gH^2$   
(C)  $h_{fs} = \frac{\Delta P}{2gD}$   
(D)  $h_{fs} = \frac{4L^2}{2uD}$
55. Overall efficiency of a pump is defined as ratio of
- (A) pressure to head  
(B) useful work to pressure  
(C) hydraulic work performed to the actual work input  
(D) actual work input to velocity

**Space For Rough Work**

56. Water of density  $1000 \text{ kg/m}^3$  and viscosity  $0.0008 \text{ (N.S)/m}^2$  is pumped at a rate of  $1000 \text{ cm}^3/\text{s}$  through a 25 mm i.d. pipe. Reynold's number of water will be
- (A) 2246  
 (B) 63662  
 (C) 5001  
 (D)  $2 \times 10^4$
57. If the gauge pressure is  $32424 \text{ N/m}^2$ , the absolute pressure is equal to
- (A)  $1421 \text{ N/m}^2$   
 (B)  $22 \times 10^5 \text{ N/m}^2$   
 (C)  $44313 \text{ N/m}^2$   
 (D)  $133749 \text{ N/m}^2$
58. Discharge through a rectangular notch varies as
- (A)  $H^{9.5}$   
 (B)  $H^{2.5}$   
 (C)  $H^{1.5}$   
 (D)  $H^{0.5}$
59. A catchment of  $20.000 \text{ m}^3$  has runoff co-efficient 0.4 and received rainfall at an uniform rate of 5 mm/hour, what is the maximum rate of runoff?
- (A)  $0.011 \text{ m}^3/\text{s}$   
 (B)  $2 \text{ m}^3/\text{s}$   
 (C)  $1.4 \text{ m}^3/\text{s}$   
 (D)  $2.5 \text{ m}^3/\text{s}$
60. An isolated 4h storm occurred over a catchment as follows :
- | Time          | 1 <sup>st</sup> hr | 2 <sup>nd</sup> hr | 3 <sup>rd</sup> hr | 4 <sup>th</sup> hr |
|---------------|--------------------|--------------------|--------------------|--------------------|
| Rainfall (mm) | 9                  | 28                 | 12                 | 7                  |
- The  $\phi$  index for the catchment is 10 mm/h. The estimated run-off depth from the catchment due to the above storm is
- (A) 10 mm  
 (B) 20 mm  
 (C) 23 mm  
 (D) 16 mm

Space For Rough Work

61. In the application of rational formula for computing the design discharge, the rainfall duration is stipulated as the time of concentration because
- (A) This leads to the largest possible rainfall intensity.
  - (B) This leads to the smallest possible rainfall intensity.
  - (C) The time of concentration is the smallest rainfall duration for which the rational formula is applicable.
  - (D) The time of concentration is the largest rainfall duration for which the rational formula is applicable.
62. The vertical hydraulic conductivity of the top soil at certain stage is 0.2 cm/h a storm of intensity 0.5 cm/h occurs over the soil for an indefinite period. Assuming the surface drainage to be adequate, the infiltration rate after the storm has lasted for a very long time, shall be
- (A) 0.2 cm/h
  - (B) smaller than 0.2 cm/h
  - (C) 0.5 cm/h
  - (D) between 0.2 and 0.5 cm/h
63. The detention period for a standard rate digester is
- (A) 10 to 20 days
  - (B) 20 to 30 days
  - (C) 30 to 90 days
  - (D) 90 to 180 days
64. The last trap provided in a house drainage system is
- (A) Q-trap
  - (B) Floor trap
  - (C) Nahani trap
  - (D) Interception trap
65. Design a circular settling tank unit for a primary treatment of sewage at 12 million lts/day. Assume suitable values of detention period and surface loading.
- (A) Settling tank with 18.7 m dia and 3.2 m water depth
  - (B) Settling tank with 19.6 m dia and 3.2 m water depth
  - (C) Settling tank with 20.7 m dia and 3.2 m water depth
  - (D) Settling tank with 20.99 m dia and 3.2 m water depth

Space For Rough Work

66. Amount of return sludge in conventional ASP is
- (A) 10 – 20%
  - (B) 25 – 50%
  - (C) 50 – 100%
  - (D) 100 – 300%
67. If a sample is heated to 600 °C the fraction getting evaporated represents
- (A) fixed solids
  - (B) volatile solids
  - (C) total dissolved solids
  - (D) settleble solids
68. Volatile solids represents
- (A) Organic dissolved solid
  - (B) Inorganic dissolved solid
  - (C) Total dissolved solid
  - (D) Suspended and colloidal solids
69. Zero hardness of water is achieved by
- (A) Lime soda process
  - (B) Ion exchange treatment
  - (C) Excess lime treatment
  - (D) Excess alum and lime treatment
70. What is the density of the sludge removed from the aeration tank ?
- (A) 990 kg/m<sup>3</sup>
  - (B) 1000 kg/m<sup>3</sup>
  - (C) 1011 kg/m<sup>3</sup>
  - (D) 1022 kg/m<sup>3</sup>
71. Permissible standards of air quality fixed in India for residential areas for SPM, SO<sub>2</sub>, NO & CO in µg/m<sup>3</sup> respectively are
- (A) 500, 120, 5000, 6000
  - (B) 160, 80, 100, 1000
  - (C) 100, 30, 30, 1000
  - (D) 200, 80, 80, 2000

Space For Rough Work

72. An anemometer at a height of 10 m above the ground measures the wind speed at 2.5 m/s, the wind speed at an elevation of 300 m in rough terrain for atmospheric stability class C with exponent  $P = 0.2$  is

- (A) 5 m/s
- (B) 4.9 m/s
- (C) 6 m/s
- (D) 9 m/s

73. An aerobic method of decomposing of solid waste is called

- (A) Incineration
- (B) Burning
- (C) Pyrolysis
- (D) Composting

74. EIA-report is prepared referring

- (A) Base line data
- (B) Composting
- (C) Geological data only
- (D) Previous reports

75. Specific surface area of Activated Carbon is around

- (A)  $1 - 2 \text{ m}^2/\text{g}$
- (B)  $10 - 20 \text{ m}^2/\text{g}$
- (C)  $100 - 200 \text{ m}^2/\text{g}$
- (D)  $1000 - 1500 \text{ m}^2/\text{g}$

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