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Paper Code : CH-401

BASIC ENVIRONMENTAL ENGINEERING & ELEMENTARY BIOLOGY

Time Allotted : 3 Hours   *Full Marks* : 70.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i)   In nephrotoxicity the affected body part is

      a) Liver   b) Kidney

      c) Lungs   d) Stomach.

   ii) The most useful method of disposal of non-hazardous solid waste is

      a) open dumping   b) composting

      c) land filling   d) incineration.

   iii) An example of biotic factor in a forest ecosystem is

      a) water fall   b) cliff

      c) a tree   d) a rock.

   iv) In five days BOD test, BOD_5^{20} is

      a) CBOD

      b) NBOD

      c) Both CBOD & NBOD

      d) DO.

   v)   GWP is maximum for

      a) CO_2 b) CH_4

      c) CFC   d) N_2O.

   vi) Poor air quality when ventilation coefficient is

      a) greater than $6000 \ m^2 s^{-1}$

      b) less than $6000 \ m^2 s^{-1}$

      c) greater than $8000 \ m^2 s^{-1}$

      d) less than $8000 \ m^2 s^{-1}$.

   vii) Stratospheric ozone layer concentration approximately is

      a) 300 DU   b) 200 DU

      c) 100 DU   d) 500 DU.

viii) DO_{min} for aquatic life is

a) 3 ppm

b) 5 ppm

c) 1 ppm

d) 7 ppm.

ix) Trickling filter is classified under

a) Primary treatment

b) Secondary treatment

c) Tertiary treatment

d) none of these.

x) The most important elements causing algal bloom are

a) C, N, P

b) Ca, Pb, Cu

c) Co, Ni, Nn

d) Na, K, Mg.

xi) In Genotoxicity the target area is

a) Blood

b) Liver

c) Kidney

d) Gene.

xii) Sound pressure level (SPL) can be defined as

a) $SPL = 20 \log_{10}\left(\frac{I}{I_0}\right)$

b) $SPL = 20 \log_{10}\left(\frac{P}{P_0}\right)$

c) $SPL = 10 \log_{10}\left(\frac{I}{I_0}\right)$

d) $SPL = 10 \log_{10}\left(\frac{P}{P_0}\right)$.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.   3 × 5 = 15

2. What is black body ? How does the earth manage its radiation balance to maintain an average surface temperature of 15°C ?   1 + 4

3. What is photochemical smog ? Briefly describe the formation mechanism of PAN.   2 + 3

4. How much is a sound of 100 dB louder than a sound of 80 dB ? (reference intensity = 1×10^{-12} w/m^2). Explain different types of noise.   2 + 3

5. Name two hazardous chemicals present in waste water. Write down their source(s) and biochemical effects. 1 + 4

6. Write down the Sulphur cycle in nature with the help of a suitable block diagram.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What is Maximum Sustainable Yield ?

b) Prove that maximum sustainable yield = $\dfrac{R_0 K^2}{4(K \sim N_0)}$

c) Prove that adiabatic lapse rate is equal to $-\dfrac{g}{C_P}$

d) What is hardness of water ? How do you like to remove the hardness of water ? $1 + 4 + 5 + (1 + 4)$

8. a) What do you understand by PSI/AQI in air pollution ? What are criteria pollutants ?

b) What are the differences between photochemical smog and sulphurous smog ?

c) What are the important steps of solid waste disposal management ? Write in details.

d) How does 60 dB_A of sound level differ from 90 dB_A on the basis of sound intensity ? What do you understand by TLV of noise level ? $3 + 3 + 5 + 4$

9. a) How does Antarctica ozone hole formation take place ? What is its impact ?

b) What is oxygen sag curve ? Explain it by a diagram.

c) Describe effluent treatment in details by block diagram.

d) What do you understand by earth albedo and atmospheric window ? $4 + 4 + 5 + 2$

10. a) Name the greenhouse gases.

b) Prove that for exponential growth, $N_t = N_0 e^{Rt}$.

c) Show that for doubling time of population for exponential growth $t_d = 70/R(\%)$ where R is the growth rate.

d) Calculate the earth temperature from radiating heat balance considering albedo.

e) Hence justify the difference between equivalent earth temperature and observed earth temperature.

$3 + 3 + 2 + 5 + 2$

CS/B.TECH/EE/ECE/EIE/EEE/ICE/PWE/BME/EVEN/SEM-4/
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11. Write short notes on any *three* of the following :   3 × 5

    a)   Hot spots

    b)   ESP

    c)   Catalytic converter

    d)   RBC

    e)   EIA

    f)   Eutrophication.