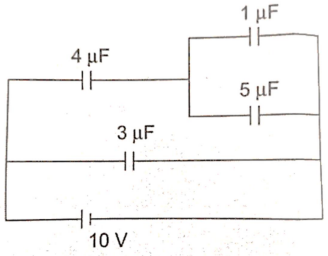
NEW STANDARD ACADEMY

Marks: 60
Time: 90 min.

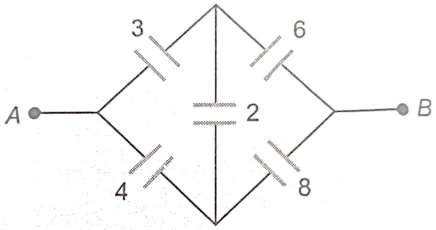
Date : 20-05-24 **CLASS : 12TH (NEET)**

PHYSICS

1. Four electric charge +q,+q,-q and –q are placed at the corners of a squre of side 2L the electric potential at a point A, Midway between two charges +q and +q ,is
   a) $\frac{1}{4\pi\epsilon_0}\frac{2q}{L}\left[1+\frac{1}{\sqrt{5}}\right]$
   b) $\frac{1}{4\pi\epsilon_0}\frac{2q}{L}\left[1-\frac{1}{\sqrt{5}}\right]$
   c) Zero
   d) $\frac{1}{4\pi\epsilon_0}\frac{2q}{L}\left[1+\sqrt{5}\right]$
2. Four point charges –4Q, -q, 2q and +2Q placed one at each corner of the square . the relation between Q and q for which potential at the centre of square is zero is
   a) Q= - q b) Q= $-\frac{1}{q}$
   c) Q=q d) Q = $\frac{1}{2q}$
3. A capacitor having capacity of $2\mu F$ is charged to 200V and then the plates of the capacitor are connected to a resstance wire. The heat produced in joule will be
   a) 2×10^{-2} b) 4×10^{-2}
   c) 4×10^{4} d) 4×10^{10}
4. A capacitor is charged to 200 volt has 10 Coulomb charge. When it is discharged energy will be
   a) 10J b) 40J
   c) 100 J d) 200J
5. If a dielectric substance is introduced between the plates of a charged air-gap capacitor. The energy of the capacitor will
   a) Increase b)Decrease
   c) Remain unchanged
   d) First decrease and then increase
6. The potentials of the two plates of capacitor are+20V and -20V.The charge on one of the plates is 40c .The capacitance of the capacitor is
   a) 2F b) 4F
   c) 1F d) 0.25F
7. The charge on $5\mu F$ capacitor in the given circuit is…. in μC.
   a) 12
   b) 24
   c) 20
   d) 32

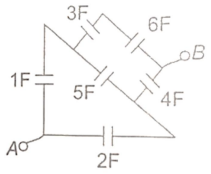


8. Effective capacitance between A and B in the the figure shown is (all capacitance are in μF)



   a) 21 μF b)23 μF
   c) $\frac{3}{14}\mu F$ d)$\frac{14}{3}\mu F$

9. In the figure shown the equivalent capacitance between A and B is:
   a) 3.75F
   b) 2F
   c) 21F
   d) 16F



10. When a slab of dielectric material is removed the parallel plates of a capacitor which remains connected to a battery , Then charge on plates relative to earlier charge
    a) Is less
    b) Is same
    c) Is more
    d) May be less or more depending om the nature of the material introduced

CHEMISTRY

11. For the chemical reaction $3O_2 \longrightarrow 2O_3$ the rate of formation of O_3 is 0.04 mole L^{-1} sec^{-1} .determine the rate of disappearance of O_2.
   a) 0.04 mole L^{-1} sec^{-1}
   b) 0.08 mole L^{-1} sec^{-1}
   c) 0.10 mole L^{-1} sec^{-1}
   d) 0.06 mole L^{-1} sec^{-1}

12. The values of rate constant for the decomposition of N_2O_5, $N_2O_5 \rightarrow N_2O_4 + \frac{1}{2}O_2$ are 3.50×10^{-5} and 5×10^{-3} *at* 27°C *and* 67°C, respectively .calculate the energy of activation?
   a) 14.8 kcal/mol
   b) 24.8 kcal/mol
   c) 25.31 kcal/mol
   d) 34.8 kcal/mol

13. The rate of reaction increases by 2.3 times when the temperature is raised from300K to 310K.If K is the rate constant at 300 K then the rate constant at 310K will be equal to
   a) 2K b) K
   c) 2.3K d) $3K^2$

14. In a first order reaction A→ Products, the ratio of a and (a-x) was found to be 8 after 60 minutes. Calculate the rate of the reaction in moles of A reacted per minute ,If its concentration is 0.1 mol L^{-1}
   a) $5.566\times 10^{-3} mol\ L^{-1}min^{-1}$
   b) $3.466\times 10^{-3} mol\ L^{-1}min$
   c) $4.366\times 10^{-3} mol\ L^{-1}min^{-1}$
   d) $3.466\times 10^{-3} mol\ L^{-1}min^{-1}$

15. The reaction
   $2NO+Br_2 \rightarrow 2NOBr$
   Follows the mechanism given below
   I. $2NO+Br_2 \rightarrow NOBr_2$
   II. $NO\ Br_2 + NO \rightarrow 2NOBr_2$
   The overall order of this reaction is
   a) 2 b) 1
   c) 3 d) 0

16. In the following first order completing reactions. A + Reagent →Product, B+ Reagent → Product ,the ratio of K1/K2 If only 59% of B will have been reacted , When 94% of A has been reacted is
   a) 4.06 b) 0.246
   c) 2.06 d) 0.06

17. Which of the following is not an anodic reaction?
   a) $Ag+ \rightarrow Ag - e^-$
   b) $Cu \rightarrow Cu^{2+}+2e^-$
   c) $Fe2+ \rightarrow Fe^{3+}+ e^-$
   d) $4OH^- \rightarrow 2H_2O+O_2+4e^-$

18. The standard e.m.f of a call , involving one electron change is found to be 0.591 V at 25°C. The equilibrium constant of the reaction is (F=96500 C mol^{-1};R=8.314JK^{-1} mol^{-1})
   a) 1.0×10^{10}
   b) 1.0×10^{5}
   c) 1.0×10^{1}
   d) 1.0×10^{30}

19. Calculate the quantity of electricity that woucd be required to reduce 12.3 g of nitrobenzene to aniline if current efficiency is 50%.If the potential drops across the cell is 3.0 volts how much energy will be consumed?
   a) 347.4KJ b) 447.4 KJ
   c) 3474 KJ d) 3.474KJ

20. If v, in the equation Λ=sp.cond× V, is the volume in cc containing 1 eq.of the electrolyte ; V for a $\frac{N}{10}$solution will be
   a) 10 cc b) 100cc
   c) 1000 cc d) 10000 cc

BIOLOGY

21. Match the list of items of column I with column II and select the correct option from the codes given below:

column I	column II
A. F.Meischer	i) DNA duble helix
B. Griffith	ii) Nuclein
C. Hershey and Chase	iii) S.Pneumoniae
D. Watson and Crick	iv) Bacteriophages
E. Wilkins and Franklin	v) X-ray diffraction Studies

a) A-(ii),B-(iii),C-(iv),D-(i),E-(v)
b) A-(ii),B-(iv),C-(iii),D-(i),E-(v)
c) A-(i),B-(iii),C-(iv),D-(ii),E-(v)
d) A-(i),B-(iv),C-(iii),D-(ii),E-(v)

22. Histone proteins are
a) Basic,negatively charged
b) Basic, Positively charged
c) Acidic Positively charged
d) Acidic ,negatively charged

23. DNA dependent RNA polymerase catalyzes the polymerization in
a) 5'-3' direction
b) 3'-5' direction
c) 3'-1' direction
d) 1'-3' direction

24. The sequence of structural genes in lac operonis
a) Lac A, Lac Y, Lac Z
b) Lac A, Lac Z, Lac Y
c) Lac Y, Lac Z, Lac A
d) Lac Z, Lac Y, Lac A

25. The probes used in DNA fingerprinting technique are
a) Radioactive natural DNA/RNA with known sequences
b) Radioactive syntheticDNA/RNA with unknown sequences
c) Radioactive natural DNA/RNA with unknown sequences
d) Radioactive syntheticDNA/RNA with known sequences

26. Which of the following sequence of steps is correct in DNA fingerprinting?
a) Southern blotting, Electrophoresis, Hybridization, Autoradiography
b) Autoradiography, Electrophoresis, Hybridization, Southern blotting
c) Electrophoresis, Southern blotting, Hybridization, Autoradiography
d) Hybridization, Southern blotting, Electrophoresis, Autoradiography

27. Hypervariable region of DNA is formed of
a) Minisatellite DNA
b) Microsatellite DNA
c) Probes
d) Both (a) and (b)

28. What is the criterion for DNA Fragments movement on agarose gel during gel electrophoresis?
a) The larger the fragment size, the the farther it moves.
b) The smaller the fragment size, the the farther it moves.
c) Positively charged fragments move to the father end.
d) Negatively charged fragments donot move.

The question given below consists of Assertion and Reason. Use the following key to select the correct answer:

a) If both assertion and reason are correct and reason is correct explanation for assertion.
b) If both assertion and reason are correct but reason is not correct explanation for assertion.
c) IF assertion is correct but reason is incorrect.
d) Both assertion and reason is incorrect.

29. Assertion(A): Split genes concept is applicable only to the prokaryotes.
Reason(R): Prokaryotic genome is divided into exons and introns

30. Assertion(A): Replication and transcription occur in the nucleus but translation occurs in the cytoplasm.
Reason: mRNA is transferred from the the nucleus into the cytoplsm where ribosomes and amino acids are available for protein synthesis