

**IEEE STUDENT BRANCH
INSTITUTE OF TECHNOLOGY GOPESHWAR
‘Quiz Competition’**

Time: 30 minutes

Max. Mark: 50

Name.....

Branch.....

Roll No.....

INSTRUCTIONS

- 1. Tick (✓) the correct option for each question.**
- 2. Each question carries equal marks of 2.5.**
- 3. Total Marks = $20 \times 2.5 = 50$ marks.**

Q1. A shopkeeper marks an article 40% above its cost price and offers a discount of 20%. His profit percentage is:

- ☐ A) 10%
- ☐ B) 12%
- ☐ C) 15%
- ☐ D) 20%

Q2. The average of five consecutive odd integers is 27. What is the product of the smallest and largest integers?

- ☐ A) 625
- ☐ B) 621
- ☐ C) 713
- ☐ D) 675

Q3. A can complete a work in 12 days and B can complete the same work in 18 days. They work together for 4 days, after which A leaves. How many more days will B require to complete the remaining work?

- ☐ A) 6
- ☐ B) 7

☐ C) 8

☐ D) 9

Q4. Choose the option that best completes the sentence:

Although the prototype failed during the first test, the engineers did not _____ their efforts; instead, they _____ the design and tested it again.

- ☐ A) abandon — modified
- ☐ B) abandon — ignored
- ☐ C) continue — discarded
- ☐ D) reduce — rejected

Q5. Choose the sentence in which the word “pragmatic” is used correctly.

- ☐ A) The engineer took a pragmatic approach by choosing a reliable solution within the available budget.
- ☐ B) The engineer used a pragmatic theory because the circuit contained no practical components.
- ☐ C) The student gave a pragmatic answer because it was completely unrelated to the problem.
- ☐ D) The machine became pragmatic after its operating temperature increased.

Q6. Three switches A, B and C control three bulbs X, Y and Z in another room. Each switch controls exactly one bulb. You may enter the room only once and cannot return to the switches.

You can turn the switches on or off as many times as needed before entering the room. How can you determine which switch controls which bulb?

- ☐ A) Turn A on, leave B and C off, then enter and identify X
- ☐ B) Turn A on for several minutes, turn it off, turn B on, then enter and use the bulbs' light/temperature states
- ☐ C) Turn A and B on together, then turn both off before entering
- ☐ D) Turn all three switches on and enter immediately

Q7. A man is looking at a photograph and says:

“Brothers and sisters have I none, but this man's father is my father's son.”

Who is the man in the photograph?

- ☐ A) His father
- ☐ B) His son
- ☐ C) His brother
- ☐ D) Himself

Q8. You have 8 identical-looking balls. One ball is slightly heavier than the others. Using a balance scale, what is the minimum number of weighing required to guarantee finding the heavier ball?

- ☐ A) 1
- ☐ B) 2
- ☐ C) 3
- ☐ D) 4

Q9. Suppose a country's nominal GDP increases by 10%, while its general price level increases by 6%. Ignoring population changes, which statement is most accurate?

- ☐ A) Real GDP necessarily increased by exactly 10%
- ☐ B) Real GDP increased by approximately 4%
- ☐ C) Real GDP decreased by approximately 4%
- ☐ D) Real GDP remained unchanged

Q10. Four people—A, B, C and D—are standing in a line.

- A is not at either end.
- B is somewhere to the right of A.
- C is immediately to the left of D.
- D is not at the right end.

Which arrangement is possible?

- ☐ A) A – C – D – B
- ☐ B) C – D – A – B
- ☐ C) B – A – C – D
- ☐ D) C – A – D – B

Q11. A particle is projected vertically upward with an initial velocity of 20 m/s . Taking $g = 10 \text{ m/s}^2$, the maximum height reached by the particle is:

- ☐ A) 10 m
- ☐ B) 20 m
- ☐ C) 30 m
- ☐ D) 40 m

Q12. Two capacitors of capacitance $3 \mu\text{F}$ and $6 \mu\text{F}$ are connected in series across a 12 V battery. The charge stored on the $3 \mu\text{F}$ capacitor is:

- ☐ A) $12 \mu\text{C}$
- ☐ B) $18 \mu\text{C}$
- ☐ C) $24 \mu\text{C}$
- ☐ D) $36 \mu\text{C}$

Q13. A block of mass 2 kg is attached to a spring of force constant 200 N/m . It is pulled 0.10 m from its equilibrium position and released. What is its maximum speed?

- ☐ A) 0.5 m/s
- ☐ B) 1.0 m/s
- ☐ C) 1.5 m/s
- ☐ D) 2.0 m/s

Q14. A charged particle enters a uniform magnetic field perpendicular to its velocity and moves in a circular path of radius r . If both its velocity and charge are doubled while the magnetic field remains unchanged, the new radius will be:

- ☐ A) $r/4$
- ☐ B) $r/2$
- ☐ C) r
- ☐ D) $2r$

Q15. In a series LCR circuit, the resistance is 20Ω , inductive reactance is 30Ω , and capacitive reactance

is $10\ \Omega$. If an AC voltage of 100 V is applied, the current in the circuit is:

- ☐ A) 2 A
- ☐ B) $2\sqrt{2}\text{ A}$
- ☐ C) 4 A
- ☐ D) $2.5\sqrt{2}\text{ A}$

Q16. For a first-order reaction, the half-life is 20 minutes. The percentage of reactant remaining after 60 minutes is:

- ☐ A) 25%
- ☐ B) 12.5%
- ☐ C) 6.25%
- ☐ D) 3.125%

Q17. Which of the following has the highest boiling point?

- ☐ A) CH_3CH_3
- ☐ B) $\text{CH}_3\text{CH}_2\text{OH}$
- ☐ C) CH_3OCH_3
- ☐ D) CH_3CHO

Q18. For the electrochemical cell: $\text{Zn} | \text{Zn}^{2+}(0.1\text{M}) || \text{Cu}^{2+}(1\text{M}) | \text{Cu}$ the standard cell potential is 1.10 V . At 25°C , the approximate cell potential is:

Use: $E = E^\circ - \frac{0.0591}{n} \log Q$

- ☐ A) 1.070 V
- ☐ B) 1.100 V
- ☐ C) 1.130 V
- ☐ D) 1.159 V

Q19. Which of the following complexes is expected to be diamagnetic?

- ☐ A) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
- ☐ B) $[\text{Fe}(\text{CN})_6]^{4-}$
- ☐ C) $[\text{CoF}_6]^{3-}$
- ☐ D) $[\text{NiCl}_4]^{2-}$

Q20. For the reaction $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$ the equilibrium constant is K_p . If the pressure of the entire system is increased at constant temperature, the equilibrium will:

- ☐ A) Shift towards N_2 and H_2
- ☐ B) Shift towards NH_3
- ☐ C) Remain unchanged
- ☐ D) First shift left and then right