प्रश्नमंजुषा

UNIT – I

1. Explain in detail the common vehicle defects that lead to an accident.   3
2. Describe the methods employed by the forensic investigator to make measurements at the accident site.   2
3. Explain in detail how metal parts of automobile form distinctive marks at the accident site.   3
4. Write a short note on debris collected at an accident site. Give its forensic significance.   3
5. Explain in detail how a forensic investigator examines a vehicle at the accident scene.   3
6. Write in brief about the follow – up examination carried out by a forensic investigator in case of vehicular accidents.   3
7. Explain the formation of skid marks by a vehicle.   3
8. Obtain a formula to calculate the velocity of the vehicle from the length of the skid.   2
9. How are scuff marks formed?   2
10. Describe the different types of scuff marks.   3
11. Problems on skid marks using formula, $v = \sqrt{254\,fd}$ 2
12. Explain the basic aim of a rail accident inquiry.   2
13. Which practices are employed by the investigator during the course of the investigation?   3
14. What is meant by criminal and safety investigations?   2
15. Explain in detail the various types of railway accidents.   5
16. What is meant by averted collision of a railway carriage? What information needs to be extracted from the accident site pertaining to such an accident?   3
17. What is meant by derailment of a railway carriage? What information needs to be extracted from the accident site pertaining to a derailment?   3
18. Give in brief the relevant provisions of Motor Vehicle Act, 1989.   2
19. Give in brief the relevant provisions of Railway Act, 1989.   2
20. Describe in brief the provisions of Section 304 A / Section 337 / Section 279 of the Indian Penal Code.   2

UNIT – II

1. Describe the construction and working of a digital $35mm$ SLR camera with a neat labeled diagram.   3
2. What features make the SLR camera a better choice than the point and shoot camera?   2
3. What are the basic purposes of crime scene photography?   2
4. Explain the settings required on a SLR camera to shoot in various given conditions.   2
5. Explain in detail how the photographer utilizes the various settings on a DSLR camera to take correct crime – scene photographs.   5
6. Write short note on   2
   i) ISO number   ii) Aperture   iii) Focus   iv) Aperture priority   ea
   v) Shutter priority   vi) Exposure index   vii) Colour temperature   ch
7. What is magnetic susceptibility? Give its forensic use.   2
8. Explain the Quinke's method to find the magnetic susceptibility of liquids.   3
9. Explain the Gouy's method to find the magnetic susceptibility of solids.   3
10. Explain the working of a Field effect transistor.   3
11. Describe how the drain characteristics and transfer characteristics of FET are obtained.   4
12. Explain the working of a depletion type MOSFET.   3
13. Describe how the drain characteristics and transfer characteristics of depletion type MOSFET are obtained.   4
14. Explain the working of an enhancement type MOSFET.   3
15. Describe how the drain characteristics and transfer characteristics of enhancement type MOSFET are obtained.   4

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16. Describe Hall effect?   2
17. Obtain a formula to calculate the Hall voltage and Hall coefficient of an n – type semiconductor / p – type semiconductor / metal.   3
18. What is meant by electrical resistivity? Give its forensic use.   2
19. Describe a method to measure electrical resistivity of semiconductors.   3
20. Describe methods to measure electrical resistivity of soil.   2
21. What is meant by piezoelectricity? Give its forensic use.   2
22. Explain the construction and working of a Geiger – Muller counter.   3
23. Describe a fibre optics communication system with a labeled diagram.   3
24. Problems on FET and Hall Effect using formulae, $\mu = g_m \times r_d$, $R_H = \frac{V_H t}{IB}$, $V_H = \frac{BI}{net}$, $R_H = \frac{1}{ne}$.   2

UNIT – III

1. Deduce a relationship to show the nature of trajectory of a bullet fired into vacuum.   3
2. Obtain an expression for the maximum height attained by the bullet.   2
3. Obtain an expression for the horizontal distance travelled by the bullet.   2
4. Obtain an expression for the time taken by a bullet to travel a given distance.   2
5. Obtain an expression to find the angle with which a bullet needs to be fired to travel a given distance.   2
6. Write a short note on bullet drop of a bullet and describe the factors affecting the bullet drop.   3
7. What happens to the bullet trajectory when it travels through air?   2
8. Explain in detail how various parameters of a bullet affect the air drag produced when the bullet is in motion.   3
9. Describe how the drift of a bullet is affected due to gyroscopic spin and Magnus effect.   3
10. Describe how the drift of a bullet is affected due to wind direction.   2
11. What is meant by canting of a bullet trajectory? How is the problem of canting solved?   3
12. What adjustments have to be done by the shooter while shooting a target uphill?   2
13. How the trajectory of a long distance missile is affected by the Coriolis effect?   2
14. Explain ricochet of a bullet?   2
15. Deduce a relationship between the angle of ricochet and angle of incidence of a bullet.   4
16. Describe the lethal effects of a ricocheted bullet.   2
17. Problems on,   2

    i) $y = y_0 + x \tan\theta - \frac{gx^2}{2(u\cos\theta)^2}$

    ii) $v = \sqrt{u^2 - 2gx \tan\theta + \frac{g^2 x^2}{(u\cos\theta)^2}}$

    iii) $H = y_0 + \frac{u^2 (\sin\theta)^2}{2g}$

    iv) $t = \sqrt{\frac{2d}{g}}$

    v) $v_y = \sqrt{2gd}$

    vi) $v = \sqrt{\frac{2mg}{\rho A C_d}}$

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