



B.E./B.TECH. DEGREE EXAMINATIONS: MAY 2018

(Regulation 2015)

Sixth Semester

U15MCOE04/ P15IEOE01: Mechanics in Cricket

(Common to all Branches)

COURSE OUTCOMES

- CO1:** Understand the basic principles of the skills of the game, tactics, field placement and umpiring signals
- CO2:** Understand the rules and regulations for various types of cricket
- CO3:** Apply this knowledge to improve their performance and enjoyment in both practice and the game
- CO4:** Handle the pressure situations as a captain and as a team-player
- CO5:** Develop team spirit and be a team-worker
- CO6:** Discuss the development of the game in recent times

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Match the following properties of solids with its corresponding details

CO1 [K₃]

List I				List II
A. Drone analysis				(i) Ball & Bat contact detection
B. Snickometer				(ii) Ball Speed
C. Go No-GO Gauge				(iii) Pitch analysis
D. Radar Gun				(iv) Ball Circularity

- | | A | B | C | D |
|----|-----|----|-----|-----|
| a) | ii | iv | i | iii |
| b) | iii | i | iv | ii |
| c) | ii | iv | iii | i |
| d) | iii | i | ii | iv |

2. Hotspot uses _____ technique to detect the ball-bat contact. CO6 [K₁]
 a) Infrared imaging b) Cosmic rays
 c) Alpha rays d) Supersonic rays
3. A vertically free falling object's velocity in vacuum doesn't depends on CO2 [K₂]
 i) shape of the object ii) its own weight
 iii) free falling height iv) gravitational force
 a) i-ii-iii b) i-iii
 c) i-ii d) i-iv
4. If a ball fall freely from a height of 1m, with what velocity it will hit the ground? CO2 [K₃]
 a) 4.43 m/sec b) 19.62 m/sec
 c) 21.69 m/sec d) 9.81 m/sec
5. Assertion (A): English willows uses rubber material in between the handle pieces. CO3 [K₂]
 Reason (R): To damp the vibrations produced by the bat-bat impact/contact.
 a) Both A and R are individually true and R is the correct explanation of A b) Both A and R are individually true but R is not the correct explanation of A
 c) A is true but R is false d) Both A and R are false
6. M.S. Dhoni hits a ball with an initial velocity of 30m/sec at an angle of 50⁰ with the horizontal. The maximum height attained by the ball is CO3 [K₃]
 a) 26.91m b) 29.61m
 c) 62.91m d) 96.21m
7. Arrange the following blade sizes bats for various ball materials in ascending order. CO3 [K₂]
 1. Cork ball bat 2. Rubber ball bat
 3. Stitched ball bat 4. Tennis ball bat
 a) 2-3-4-1 b) 1-4-2-3
 c) 1-4-3-2 d) 4-2-1-3
8. The ratio of bouncing speed to incident speed is CO3 [K₁]
 a) Zero b) Less than one
 c) Equal to one d) Greater than one
9. Assertion (A): Rough patches in the pitch assists spin bowling CO4 [K₂]
 Reason (R): It provides uneven bounce and more turn
 a) Both A and R are individually true and R is the correct explanation of A b) Both A and R are individually true but R is not the correct explanation of A
 c) A is true but R is false d) Both A and R are false

10. In Hawk-eye technique, how many cameras are used to track the trajectory of the ball CO6 [K₁]
a) 2 b) 3
c) 1 d) 6

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. How the cricket ball used in international cricket is selected/rejected depends on its bouncing characteristics? CO1 [K₂]
12. How metrology is used in the ball selection process? CO2 [K₂]
13. Rohit Sharma decided to hit a ball to score a sixer which is at a distance of 75m from the stumps. Calculate the minimum velocity to attain it. CO3 [K₂]
14. Illustrate the effect of ball after it gets edged from bat, is it gets accelerated or decelerated? Justify it. CO3 [K₂]
15. Distinguish between swing bowling and seam bowling. CO3 [K₂]
16. In a match between Srilanka and India, Sehwag was on 99. Srilanka scored 170 and india scored 170/4 in 34.3 overs. India need 1 run to win and Sehwag was in need of 1 run to complete his century. Suraj Randiv bowled a no-ball to restrict Sehwag from scoring century. Is it improve the spirit of the gentleman's game? Justify your answer. CO4 [K₂]
17. Discuss about the various ball tampering incidents happened in the game of cricket. CO4 [K₁]
18. If you have to select a team of 11 players from both the cricket teams. How many ways/combinations you will get? CO3 [K₂]
19. Distinguish the variations in the effect of catching process for tennis and stitched ball. CO6 [K₂]
20. Discuss about the various deliveries that can be declared as no-ball. CO1 [K₂]

Answer any FIVE Questions:-

PART C (5 x 14 = 70 Marks)

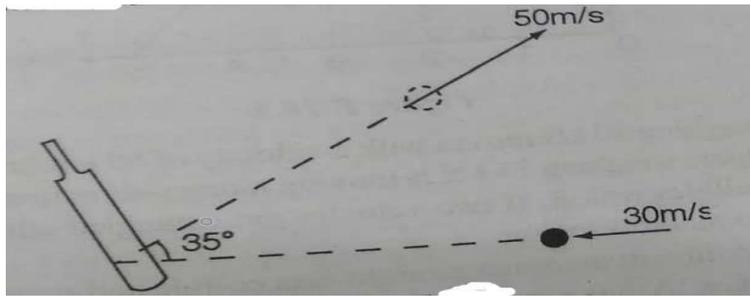
(Answer not more than 300 words)

Q.No. 21 is Compulsory

21. Explain in detail about the fluid mechanics concept involved in the ball swinging process. Also explain the variation in the ball grip and seam position and its effect on in-swing and out-swing deliveries. CO3 [K₃]

22. How do you select the bats for various ball materials? Discuss in detail about the no. of grains, blade variations, handle size variations and the design optimization used in the cricket bat design. CO2 [K₃]

23. A ball of mass 150g is moving towards a bat with the velocity of 30 m/sec as shown in below figure. When it is hit by a bat, the ball attains a velocity of 50 m/sec. If the ball and bat are in contact for a period of 0.025sec, determine the average impulse force exerted by the bat on the ball during the impact. CO3 [K₃]



24. A ball of mass 160g moves towards a English willow bat of weight 1.2kg with a speed of 145 km/hr, if the batsman swings the bat with the same velocity in the opposite direction that of the ball's velocity, find the velocity of the ball after the impact. Take the co-efficient of restitution as 0.8. CO3 [K₃]

25. Enumerate and describe about the various sensors used in the game of cricket. CO6 [K₂]

26. (i) List out various slower ball delivery techniques used by the bowlers. Explain any three techniques and its effect. (7) CO5 [K₃]

(ii) When a Kookaburra ball is dropped on a steel plate from a height of 2m, it bounces back upto a height of 0.67m. Find the co-efficient of restitution of the cricket ball. (7) CO2 [K₃]

27. Discuss about the Steven smith's test ban due to ball tampering issue in current test series between South-Africa and Australia. How the Australian cricket team did the tampering process? What effect the tampered ball will produce? CO4 [K₃]
