**INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR**

**Class Test; Spring Semester 2022-23**

Date of Examination: 15.04.23 Session (FN/AN): FN Duration: 1 hour

Full Marks: 10 Subject No.: HS50019 Subject: ECONOMIC MODELLING

Department/Center/School: HUMANITIES & SOCIAL SCIENCES

Specific charts, graph paper, log book etc., required: None

Special Instructions: **Answer all. There can be more than one correct answers.**

1. Let’s consider an index known as the Hirschman-Herfindahl index (HHI). It is commonly used to measure market concentration. It is given by the formula –

for an industry consisting of number of firms and is the market share of the *i*th firm. Given this, the relationship between HHI and the optimal advertisement-to-sales ratio will, in general, be (2)

1. directly proportional
2. **inverse**
3. no relation
4. more information required Ans: b

See slide 10 of Advertising

1. Consider the aggregate inverse demand function . All firms have identical unit cost (such that, ). Suppose one firm innovates and its unit cost falls to (such that ). What type of innovation will this be? (2)
2. frugal
3. minor
4. **major**
5. more information needed Ans: c

P=a-Q; c<a<2c

Qm=(a-c)/2; Pm=(a+c)/2

New cost: d=2c-a

Qm’=a-c; Pm’=c

Pm-Pm’=(a-c)/2>0

1. Consider a duopolistic market structure with the demand functions given as –



The firms compete in price. Firm 1 can set the price simultaneously along with Firm 2. Firm 1 can also set the price in period 1 knowing that Firm 2 will observe and set the its price in period 2. What will Firm 1 do? (1)

1. Set price simultaneously
2. **Set price in period 1**
3. Will prefer not to set price
4. More information required Ans: b

Case 1: Firm 1 can decide to set the price simultaneously along with Firm 2 implying simple Bertrand

Case 2: Firm 1 set the price in period 1 knowing that Firm 2 will observe and set the its price in period 2 implying Stackelberg in prices



1. A firm wants to increase its sales from the present level. It appoints a market research organization and finds out that the price elasticity of its product is -0.6 and the advertising elasticity for its product is 0.8. What will the firm do? (1)
2. **Advertise more**
3. Opt for a price cut
4. Opt for price increase
5. Invest in R&D Ans: a

See slide 9 of advertising

1. Two commercial swimming pools “Anderson Club” and “Calcutta Rowing Club”, located just next to each other, face a fixed seasonal demand of 1000 swimmers. They can try to persuade potential customers (swimmers) from each other through advertising but can’t alter the rates they charge (Rs. 100 per hour). The cost of maintaining the pools are same (say K). What will be their profits at the end? (1)
2. (100-K)/2
3. 50-K
4. **0**
5. Can’t say Ans: c

See slide 14 of advertising

1. Consider Linear City Model with 2 firms and a continuum of buyers. The firms advertise their locations. What will be the outcome of such advertising done by these firms? (1)
2. Increase price competition
3. **Decrease price competition**
4. **Increase differentiation**
5. Decrease differentiation Ans: b,c

See slide 15 of advertising

1. Two firms invest in R&D to invent a new battery for electric vehicles. The probability of success is 0.2 for both the firms. What will be the expected date (approximately, rounded off) of such invention? (1)
2. 1
3. 2
4. **3**
5. 4 Ans: c

See slide 17 of R&D

1. Pegasus Phone Co. (PPC) launches a 5G mobile telephone network in Estonia. The critical mass that PPC requires is 10000. It declares an inaugural price of €100 per semester for college students. Jamila knows that initially there will be around 5000 students subscribing the plan. What will be the Nash equilibrium in this scenario? (1)
2. 5001 students subscribing
3. 5000 students subscribing
4. 4999 students subscribing
5. **No students subscribing**
6. Every students subscribing
7. Can’t say Ans: d

See slides 3-4 of network externalities

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