

1.

Tenby Turbo Techniques have invented a new novel variable geometry charging system with the potential to improve boost response and efficiency throughout the engine speed range.

- a) Advise Tenby Turbo Techniques on alternative ways that they can protect their new technology

5 Marks

- b) Explain your chosen protection strategy implementation.

6 Marks

Prior to releasing the novel variable geometry turbocharger into the market Tenby Turbo Techniques will need to set a price for the product.

- c) Briefly explain two of the following methods of product pricing.

- a. Penetration pricing
- b. Market skimming pricing
- c. Cost plus pricing
- d. Demand pricing

6 marks

- d) Select the most appropriate pricing strategy for Tenby Turbo Techniques and explain your reasoning.

3 marks

2. Caterham have recently released a new product; the Caterham-Lola SP/300R.

Retail price around £65k The vehicle is destined for three markets.

- i) A single make race series
- ii) A specialist trackday vehicle

Additionally the vehicle will be homologated to pass the Specialist Vehicle Approval (SVA) test, and hence be available as

- iii) A performance road vehicle.

- a) Caterham wish to communicate information about their new product. Discuss various communication media and how they could be employed. **8 marks**

- b) Advertising is often used as a promotional tool. Contrast opportunities for 'paid-for' and 'unpaid for' advertising and the advantages and disadvantages of each. **5 marks**

- c) Map out a potential marketing / communication mix strategy for Caterham, identifying possible purchases of the product(s) and routes to communicate with them **7 marks**

3. Caterham have recently developed a new product. The Caterham – Lola SP/300R. The vehicle is designed to be a road going race/sports prototype performance vehicle.

- a) Explain the possible range of types of contract that Caterham could employ with its range of suppliers of components and engineering services. Use a graphics model as appropriate **4 marks**

Caterham is to place contracts with tier 1 suppliers for the design, development and supply of various components. For the following components evaluate the most appropriate contract type, explain your justification and outline the contract terms you would think appropriate.

- b) Chassis and body system from Lola

6 marks

- c) Ford duratec 2 litre engine supplied with turbo charger from an external tuning company.

6 marks

- d) Wheel and tyre assembly

4 marks

4. Many motorsport team bosses describe team working as an essential ingredient of a successful motorsport company.

A new team is to be established to run a vehicle in a new one make prototype sports car series.

- a) Explain the stages in the formation of a team and why it is important in motorsport.

3 marks

- b) Good leadership is an important part of establishing and running a motorsport team. Evaluate the traits and style that could be appropriate for the head of a motorsport company in the following situations.

- i) Vehicle development and testing

4 marks

- ii) Arranging sponsorship funding

4marks

- iii) Practice and the race weekend

4 marks

- c) The leader is required to motivate the team after a rather disappointing initial shake-down and test session. Describe two models of motivation and how the team principle could employ them.

5 marks

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Programme:	BEng M'Sport / Automotive / Motorcycle	Year:	2
Module/Unit :	Engineering Management		
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1a	Tenby Turbo Techniques have invented a new novel variable geometry charging system with the potential to improve boost response and efficiency throughout the engine speed range. e) Advise Tenby Turbo Techniques on alternative ways that they can protect their new technology Students expected to identify and briefly explain - Patents - Trade marks - Copyright - Trade secrets - Design rights They should mention / distinguish between unregistrable and registrable property rights.	5
1.b	Explain your chosen protection strategy implementation Students should target patents and explain that it should meet the following criteria 1) Novel 2) Specific restrictions 3) Capable of industrial application 4) An inventive step that is not obvious 5) Have had no prior disclosure Students should discuss employee/ employer rights. And employment contract Students should mention the 20 yr limitation. Students could mention copyright of designs and drawing Students could discuss timing of application and regions and approx costs	4 2

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1.c	Prior to releasing the novel variable geometry turbocharger into the market Tenby Turbo Techniques will need to set a price for the product. a) Briefly explain two of the following methods of product pricing. a. Penetration pricing Used to gain market share in an existing market by selling cheap, often at or below cost. With example b. Market skimming pricing Starting out with a high price to maximise returns, limiting supply. Then reducing price in stages to gain market share. With example c. Cost plus pricing Simply calculate the full cost of production, including overheads then add on a fixed percentage 'mark up'. With examples d. Demand pricing Ascertain potential demand through surveys etc. compare to potential supply and use supply demand price theory. With examples	6
1.d	Select the most appropriate pricing strategy for Tenby Turbo Techniques and explain your reasoning. If novel enough go for market skimming to quickly get a return on R and D investment and patent costs. Discuss advantages – quick buck and prestige product Disadvantages, may be too expensive, other could undercut, slow market penetration	3 marks

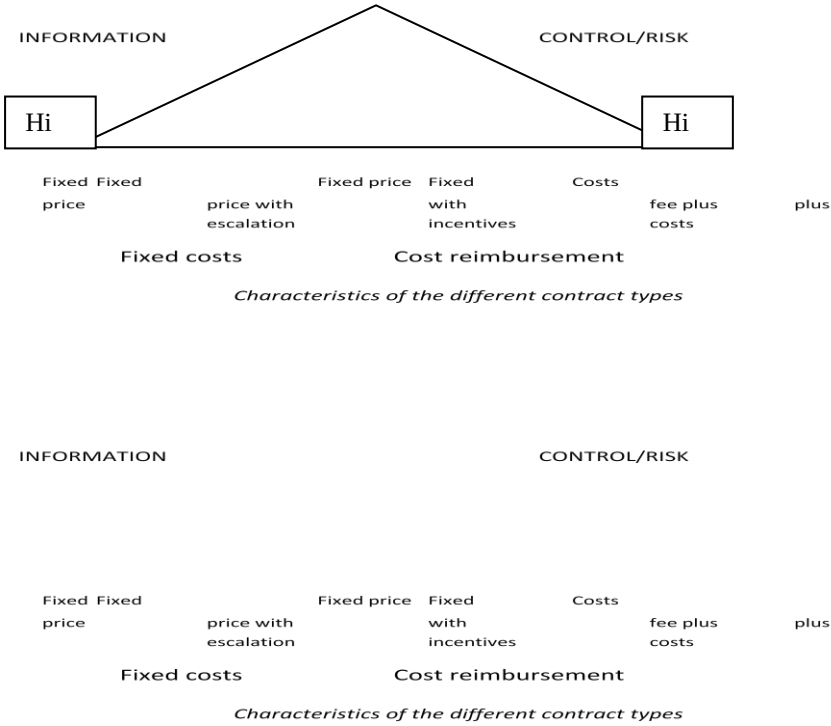
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2	Caterham have recently released a new product; the Caterham-Lola SP/300R. Retail price around £65k The vehicle is destined for three markets. iv) A single make race series v) A specialist trackday vehicle Additionally the vehicle will be homologated to pass the Specialist Vehicle Approval (SVA) test, and hence be available as vi) A performance road vehicle.		
2a	Caterham wish to communicate information about their new product. Discuss various communication media and how they could be employed This includes ☐ Print media – mags general and industry specific etc ☐ Television Cinema and radio ☐ Outdoor advertising ☐ Internet advertising ☐ Attendance at trade shows etc	8	
2b	d) Advertising is often used as a promotional tool. Contrast opportunities for 'paid-for' and 'unpaid for' advertising and the advantages and disadvantages of each. Paid for: Explicit and controlled, targeted. Expensive always +ve Examples ads in selected mags and internet sites/pop-ups etc Unpaid for: Uncontrolled and unpredictable. Cheap – except for preparation and management. Can be extensive for investment Examples : providing vehicles for independent testing ets	5	
2.c	a) Map out a marketing / communication mix strategy for Caterham, identifying possible purchases of th product(s) and routes to communicate with them The student is required to generate a mind map or similar Target each customer grp and expand Professional race team managers, interested in sponsorship and attracting pay for drive customers. Track days targeting keen trackday drivers with money, get them out of Porsches, Ferraris etc and into a proper car. Road car target at current caterham customers and new customers for something special and bizarre for the road, probably 4th or 5th vehicle!.	7	

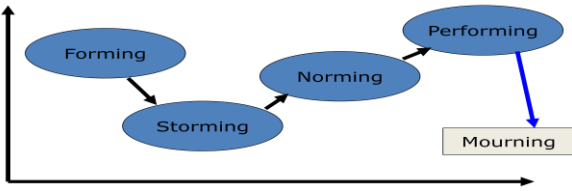
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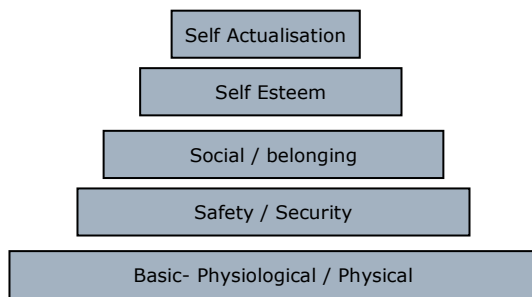
3	Caterham have recently developed a new product. The Caterham – Lola SP/300R. The vehicle is designed to be a road going race/sports prototype performance vehicle.	
3. a	e) Explain the possible range of contracts that Caterham could employ with its range of suppliers of components and engineering services. Use an appropriate model. Students should apply the triangle model covering extremes of cost plus profit and fixed price.  Characteristics of the different contract types	4
	Caterham is to place contracts with tier 1 suppliers for the design, development and supply of various components. For the following components evaluate the most appropriate contract type, explain your justification and outline a purchase strategy.	
3b	Chassis and body system from Lola Students should discuss; It's a significant part of the vehicle in terms of cost and performance Exclusive development for them Probably cost plus with incentives Strategy would be to give lola a low fixed dev cost and % from each vehicle sold	6

	Probably both share tooling costs 50/50	
3.c	Ford duratec 2 litre engine supplied with turbo charger from an external tuning company. Ford engine cheap and available Supercharging special. Caterham need to keep costs down, nothing fancy, one make series Probably fixed price with penalties for reliability Possible contract for post season rebuild contracts, incentive.	6
3.d	Wheel and tyre assembly Simple fixed price contract One make series has probably a control tyre, therefore cheap supply and control prices for subsequent customers. Standard wheel can be cheap and heavy	4

4	Many motorsport team bosses describe team working as an essential ingredient of a successful motorsport company. A new team is to be established to run a vehicle in a new one make prototype sports car series.	
4.a	d) Explain the stages in the formation of a team and why it is important in motorsport. Students should refer to Tuckmans model. Esp for M'sport as unusual working hours, seasonal working, pressure and stress. Therefore trust/camaraderie is important etc. 	3
4.b	e) Good leadership is an important part of establishing and running a motorsport team. Evaluate the traits and style that could be appropriate for the head of a motorsport company in the following situations. The students will discuss and expand upon: iv) Vehicle development and testing 4 marks Leave the engineers alone to develop the vehicle Encourage innovative thinking and practices Empower snr members of the team and stand back Judge progress with objective measures. Such as lap times and lap time improvement v cost. v) Arranging sponsorship funding 4marks As figurehead get involved. Charismatic and energetic. Ability to juxtaposition to potential sponsoring organisation and individual Communication and presentation skills vi) Practice and the race weekend 4 marks In the public eye, presentation all important Innovation has finished, now is the time for established systems and discipline. Authoritarian approach. Just do it. The outcomes are usually a result of repetitive practice and discipline – pit stops, vehicle data analysis, maintenance procedures etc.	12
4.c	The leader is required to motivate the team after a rather disappointing initial shake-down and test session. Describe two models of motivation and how the team principle could employ them.	

a) The student should describe two models of motivation possibly from the following models

Maslows Hirachy of needs

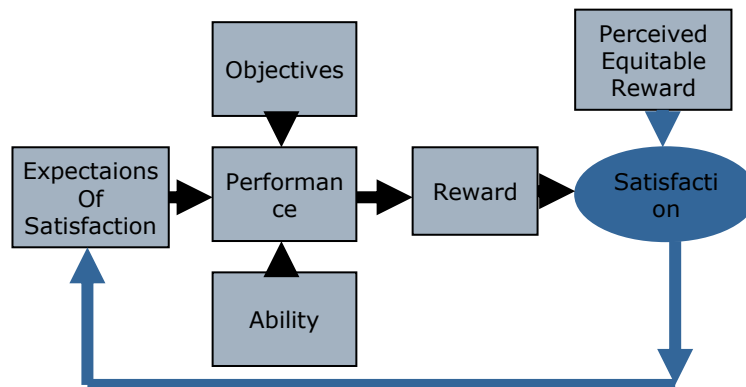


Hertzbergs – two factor theory

- ☐ Some factors in the workplace control **job satisfaction**
- ☐ If these factors are not present there will be **no job satisfaction**
- ☐ Other factors in the workplace control **job dissatisfaction**
- ☐ If these factors are not correct there will be **job dissatisfaction**
- ☐ **Motivators** control the level of **job satisfaction**
- ☐ **Hygiene factors** control the level of **job dissatisfaction**

The student should offer examples of motivators and hygiene factors

Expectation theory



The student should identify techniques that apply to the whole team that may include:

- ☐ Clear (smart) objectives and goals for the team
- ☐ Improved working environment, 5 s's etc
- ☐ Openness and Confrontation
- ☐ Support and trust to/from all
- ☐ Co-operation and conflict
- ☐ Sound procedures and practices – both technical and administrative
- ☐ Appropriate leadership – style, including motivational speeches
- ☐ Regular review – and team feedback
- ☐ Sound relationships with other teams
- ☐ Play - Let the team play together (and boss pays for it)

The student should identify that different individuals have different motivators and that they will respond to alternative techniques, ideally using examples, techniques recommended could include :

	☐ Incentives - Money, benefits, bonuses, holiday ☐ Enthuse - Encourage, praise, back patting ☐ Progress - Demonstrate progress made to a goal. Or progress made away from nasty stuff ☐ Big picture - Let them see the full picture and where they fit in ☐ Personnel goals - Link tasks and training with the individuals goals ☐ Ownership - Define responsibility, offer autonomy ☐ Recognition - Allow people to obtain recognition for work ☐ Importance - Explain the significance of the task	
4.d		

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