**TASK 1: a) free write the answer or use pack or fill in the gaps or chose the correct term**

Free write or use pack

**Fill in the gaps**: Biological rhythms are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ changes in the way \_\_\_\_\_\_\_\_\_\_\_\_\_\_ systems (humans, animals, plants) behave. One of the most obvious is the **sleep-wake cycle**. In \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_for example, we will typically spend approximately \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of every 24 hour cycle in consciousness, and \_\_\_\_\_\_\_\_\_\_\_ of every 24 hour cycle in varying degrees of unconsciousness. In other words, we spend about \_\_\_\_\_\_\_\_\_\_\_\_\_ of our day sleeping (although individual differences vary greatly) and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ awake

Biological rhythms are cyclical changes in the way **biological/environmental** systems (humans, animals, plants) behave. One of the most obvious is the sleep-wake cycle. In adult humans for example, we will typically spend approximately **8/16** hours of every 24 hour cycle in consciousness, and **8/16 hours** of every **12/24 hour** cycle in varying degrees of unconsciousness. In other words, we spend about **one third/two thirds** of our day sleeping (although individual differences vary greatly) and one-third/two-thirds awake

**Task 3: Which is which?**

1. A rhythmical change that occurs approximately every 24 hours to complete
2. Factors from the environment that influence biological changes in rhythms
3. A rhythmical change that take fewer than 24 hours to complete
4. Biological factors that set our rhythms
5. A rhythmical change that take more than 24 hours to complete (for example, monthly)

**Circadian Rhythms**

**Task 4: group the factors influencing Circadian rhythms**

Endogenous Pacemakers Exogenous Zeitgebers

**Task 5: The role of endogenous pacemakers in the sleep-wake cycle**

**Task 6: The role of exogenous Zeitgebers in the sleep-wake cycle**

The most influential exogenous zeitgeber is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and its role in fine-tuning bodily rhythms has been reliably demonstrated in research.

Light influences our \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ through specialized "light sensitive" cells in the retina of our eyes. These cells, which occupy the same space as the rods and cones that make vision possible, tell the brain whether it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and our sleep patterns are adjusted accordingly. So although the sleep wake cycle exists without light, light does influence the cycle. For example, if there is a shift in external cues, like travelling across time zones, the sleep wake cycle becomes aligned to new cues. This is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

So in other words, both endogenous and exogenous play an important role in the regulation of our sleep-wake cycle. The endogenous pacemakers regulate the continual rhythm, but the exogenous Zeitgebers will re-set the clock allowing the person to live in whatever world they need to. However, if the Zeitgebers change rapidly, this can cause cognitive and physical difficulties for the person, as studies into jet-lag and shift-work have shown. We need a few days to re-adjust to any substantial change in waking hours.

**Task 7: Brief outline of a supporting study for the role of endogenous pacemakers**

**Task 8: Brief outline of a supporting study for the role of exogenous zeitgebers**

**Infradian Rhythms**

**These are rhythms that last for a period of time \_\_\_\_\_\_\_\_\_\_\_ than 24 hours. The obvious example is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which has a number of endogenous mechanisms regulating the cycle, although exogenous zeitgebers can impact the cycle**

When a baby girl is born, she has all the eggs her body will ever use, and many more, perhaps as many as 450,000? They are stored in her **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** , each inside its own sack called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**. As she matures into puberty, her body begins producing various hormones that cause the eggs to mature. This is the beginning of her first cycle; it's a cycle that will repeat throughout her life until the end of menopause.

**What are the endogenous factors?**

**Task 9 – use the pack to produce complete the flow chart below**

1. Part of the brain that releases the chemical FSH-RF
2. Part of the brain that releases FSH and LH into the blood stream which causes the follicles to mature
3. Which hormone is released by the maturing follicles?
4. The pituitary gland secretes more LH which triggers one of the follicles to burst open and release an egg, and this process is called?
5. Which hormone causes the womb lining to thicken?
6. If pregnancy does not occur, the egg is absorbed back into the body and the womb lining is shed, this is the….?

**What are the exogenous factors?**

**Task 10 – answer the questions below using your pack to help**

1. In Reinberg’s early case study, how long had the female participant been in the cave without exogenous zeitgebers?
2. How many hours had her days lengthened to?
3. How many days had her menstrual cycle shortened to?
4. What conclusion can be made about exogenous zeitgebers on the regulation of infradian cycles?
5. In Mc Clintock and Stern’s (1998) study, which exogenous zeitgebers was thought to have influence over the menstrual cycle?
6. What happened to the participants who inhaled the pheromones from women who were about to ovulate?
7. What happened to the participants who inhaled the pheromones from women who had just finished ovulation?
8. What conclusion can be made from this study
9. Are other findings reliable? So can we trust the findings from these studies?

**Ultradian rhythms – the stages of sleep**

* Fill in the gaps: Ultradian rhythms occur \_\_\_\_\_\_\_\_\_\_\_ than \_\_\_\_\_\_\_\_\_\_\_ in a 24 hour cycle (shorter than 24 hours). Most are confined to either day or night, for example the\_\_\_\_\_\_\_\_\_\_\_ \_\_ \_\_\_\_\_\_\_\_\_\_\_\_. A typical night’s sleep takes you from stage \_\_\_\_ to \_\_\_\_ then back to 2 and finally into\_\_\_\_\_\_\_. This whole cycle then repeats itself three or four more times during the night, each cycle lasting about \_\_\_\_\_ minutes. The final stage or two may not contain any stage 4 sleep

**TASK 11: In the box below, draw a typical night’s sleep for most people. Include all the stages (1-4 and REM) and all the cycles**

**Task 12** - **Fill in the table: Which stage? The first is done for you**

Characterised by hypnogogic phenomena and usually comprise of fleeting images – **Stage 1**

Sometimes we may wake without realising that we’ve even been asleep –

Delta waves now constitute most of the brain activity and we are now at our most relaxed –

This is characterised by bursts of high frequency waves called ‘sleep spindles’ –

The brain now becomes very active, almost indistinguishable from a waking brain –

The brain waves start to slow and we experience our first slower ‘delta waves’ on EEG readings –

At this stage we are very difficult to wake up and even vigorous shaking may not be sufficient to wake some people –

We are paralysed and unable to act out the brain’s bizarre thoughts –

**TASK 13 – evidence of the existence of the ultradian rhythms**

**Supporting evidence for the distinct stages of sleep and the role of REM sleep**

**Dement** (1960) compared participants who had been deprived of REM sleep with a control group who had been deprived of the same amount of NREM sleep. He found that the REM deprived group were more irritable, more aggressive and unable to concentrate on various tasks.

How does this support the concept of separate and distinct stages of sleep?

**Borbely** (1986) found that REM deprived individuals made 31 attempts to re-enter REM on the first night of deprivation, 51 attempts on the second night and over 60 attempts on the third. This shows that REM is a distinct stage of sleep and important for our psychological well-being.

How does this support the concept of separate and distinct stages of sleep?

**Exam practice: Do question a and plan question b (complete b if you like)**

1. **Make two distinctions between ultradian rhythms and infradian rhythms (4 marks)**
2. **Discuss the role of endogenous pacemakers and one exogenous zeitgebers in the sleep-wake cycle (8 marks)**