St. Philomena's College (Autonomous), Mysore

PG Department of Biochemistry

Question Bank (Revised Curriculum 2018 onwards)

First Year- Second Semester (2019 - 20 Batch)

Course Title (Paper Title): Hormones & Cell Signaling. QP Code: 54104

Unit	Sl. No	Questions	Marks
1	1.	What is endocrinology?	2
1	2.	What is endocrine system?	2
1	3.	Give the significance of endocrine system?	2
1	4.	List the organs of endocrine system.	2
1	5.	How is hypothalamus inter connected to pituitary gland?	2
1	6.	How is hypothalamus inter connected to thyroid gland?	2
1	7.	How is hypothalamus inter connected to parathyroid gland?	2
1	8.	How is hypothalamus inter connected to pancreas?	2
1	9.	How are adrenals function interconnected to hypothalamus?	2
1	10.	How are suprarenal glands inter connected to hypothalamus?	2
1	11.	How are gonads inter connected to hypothalamus?	2
1	12.	Where is hypothalamus located?	2
1	13.	Give the location of pituitary gland.	2
1	14.	Where are adrenals located?	2
1	15.	Where are suprarenal glands located?	2
1	16.	Comment on the location of thymus.	2
1	17.	Give the location of thyroid and parathyroid gland.	2
1	18.	Give the location and structure of ovaries.	2
1	19.	Give the location and structure of testes.	2
1	20.	Comment on the location of pancreas.	2
1	21.	What are hormones? Give examples.	2
1	22.	What is the effect of concentration of hormones?	2
1	23.	Give the chemical classification of hormones.	2
1	24.	Comment on the water solubility and membrane permeability of hormones.	2
1	25.	Which are the possible different types of effects caused by hormones?	2
1	26.	List the hormones of hypothalamus.	2
1	27.	What are the four important functions of hypothalamus?	2
1	28.	What are neurohormones? Give two examples.	2
1	29.	What is the biological significance of Thyrotropin-releasing hormone.	2
1	30.	Give the biological significance of Corticotrophin-releasing hormone.	2
1	31.	Write the biological significance of Gonadotropin-releasing hormone.	2

1	32.	Give the biological significance of Growth hormone-releasing hormone.	2
1	33.	What is the biological significance of Growth hormone-inhibiting hormone?	2
1	34.	Give the biological significance of Prolactin-inhibiting hormone.	2
1	35.	What is the biological significance of Oxytocin?	2
1	36.	Give the biological significance of Vasopressin.	2
1	37.	Which is the hormone that can increase blood volume? What is its mode of action? Which gland produces it?	2
1	38.	What is ADH? Give its biological significance.	2
1	39.	What is dopamine? Give its biological significance.	2
1	40.	What is PIH? Give its significance	2
1	41.	What is somatostatin? Give its biological importance	2
1	42.	What is GHIH? Give its biological significance.	2
1	43.	What is GHRH? Give its biological significance.	2
1	44.	What is GnRH? Give its biological significance.	2
1	45.	What is CRH? Give its biological significance.	2
1	46.	What is TRH? Give its biological significance.	2
1	47.	What is PRH? Give its biological importance.	2
1	48.	Which hormone determines the duration of pregnancy? Which gland produces it?	2
1	49.	Write the structure of dopamine. Give its biological significance.	2
1	50.	List out the hormones secreted by pituitary gland.	2
1	51.	What are the important functions of pituitary gland?	2
1	52.	What is vasopressin? Give its biological significance?	2
1	53.	What is FSH? Give its biological significance?	2
1	54.	What is TSH? Give its biological significance?	2
1	55.	What is ACTH? Give its biological significance?	2
1	56.	What is POMC? Give its biological significance?	2
1	57.	Give the biological significance of pro-opiomelanocortin.	2
1	58.	POMC neurons bring about the feeling of satiety. Explain.	2
1	59.	Give the biological significance of thyroid gland.	2
1	60.	List the hormones secreted by thyroid gland. Give their structure.	2
1	61.	Give the significance of calcitonin.	2
1	62.	What are T3 and T4? How is T3 formed?	2
1	63.	What is PTH? Give its biological significance.	2
1	64.	How is glucagon involved in the regulation of blood glucose?	2
1	65.	How is insulin involved in the regulation of blood glucose?	2
1	66.	What are the functions of insulin?	2
1	67.	What are GLUT's? Comment on its distribution.	2

1	68.	Insulin Is a Hormone Associated with Energy Abundance. Explain.	2
1	69.	Glucagon is also called the hyperglycemic hormone. Explain.	2
1	70.	Comment on the effects of glucagon on glucose metabolism.	2
1	71.	Give the biological significance of amylin.	2
1	72.	Give the biological significance of pancreatic polypeptide.	2
1	73.	List out the hormones secreted by the different types of cells of pancreas.	2
1	74.	Give the biological significance of thymosin.	2
1	75.	List the hormones of thymus.	2
1	76.	Which are the hormones secreted by adrenal medulla? Give their structure.	2
1	77.	Which are the hormones secreted by adrenal cortex?	2
1	78.	Write the structures of hormones secreted by zona glomerulosa.	2
1	79.	Write the structures of hormones secreted by zona fasciculata.	2
1	80.	Write the structures of hormones secreted by zona reticularis.	2
1	81.	What are the important functions of suprarenal glands?	2
1	82.	Which are the hormones secreted by sympathetic nervous system? Give their significance.	2
1	83.	What are the differences in the effects of epinephrine and norepinephrine?	2
1	84.	What are the differences in the effects of adrenaline and noradrenaline?	2
1	85.	What are the effects of epinephrine on metabolism?	2
1	86.	What are the effects of adrenaline on metabolism?	2
1	87.	Which are the different types of corticosteroids?	2
1	88.	What are mineralocorticoids? Give its significance.	2
1	89.	What are glucocorticoids? Give its significance.	2
1	90.	What are androgens? Give its significance.	2
1	91.	How are male sex cells formed?	2
1	92.	How are female sex cells formed?	2
1	93.	What is testosterone? Give its biological significance.	2
1	94.	What is inhibin? Give its biological significance.	2
1	95.	What is HCG? Give its biological significance.	2
1	96.	What is relaxin? Give its biological significance.	2
1	97.	What are estrogens? Give its biological importance.	2
1	98.	What are secondary sexual characters in female? Which hormone is responsible for these?	2
1	99.	What are secondary sexual characters in male? Which hormone is responsible for these?	2
1	100.	What is progesterone? Give its biological significance.	2

1	101.	What is panhypopituitarism?	2
1	102.	Which are the factors that stimulate GH secretion?	2
1	103.	Which are the factors that inhibit GH secretion?	2
1	104.	What is insulin like growth factors? Give its biological significance.	2
1	105.	What is hypnosis?	2
1	106.	What is dwarfism?	2
1	107.	What is diabetes insipidus?	2
1	108.	What is hypothyroidism? Give example.	2
1	109.	What is hyperthyroidism? Give example.	2
1	110.	What is cretinism?	2
1	111.	What is myxedema?	2
1	112.	What is Hashimoto's thyroiditis?	2
1	113.	What is grave's disease?	2
1	114.	What is goiter?	2
1	115.	Which are the different types of goiter?	2
1	116.	What is thyrotoxicosis?	2
1	117.	What is grave's disease?	2
1	118.	What is multinodular goiter?	2
1	119.	What is thyroid storm?	2
1	120.	What is myxedema coma?	2
1	121.	What is diabetes mellitus? What are its types?	2
1	122.	What is hyperglycemia? Why is it caused?	2
1	123.	What is hypoglycemia? Why is it caused?	2
1	124.	What is somatostatinoma?	2
1	125.	What is diabetic neuropathy?	2
1	126.	What is Maturity onset diabetes of the young?	2
1	127.	What is diabetic nephropathy?	2
1	128.	What are the complications associated with DM?	2
1	129.	What is diabetic retinopathy?	2
1	130.	What are ketone bodies? How are they formed?	2
1	131.	What is ketosis?	2
1	132.	What is Hyperosmolar Hyperglycemic Nonketotic Coma?	2
1	133.	Distinguish between fasting plasma glucose test (FPGT) and oral glucose tolerance test (OGTT).	2
1	134.	What is Cushing’s syndrome?	2
1	135.	What is bushings disease?	2
1	136.	What is Addison’s disease?	2
1	137.	What is primary aldosteronism?	2
1	138.	What is pheochromocytoma?	2

1	139.	What is Amenorrhea? What are the different types?	2
1	140.	What is hypogonadism leading to in females?	2
1	141.	What is polycystic ovary?	2
1	142.	What is hypogonadism in males? What are the different types?	2
1	143.	Heart performs secondary endocrine functions. Explain.	2
1	144.	Kidney performs secondary endocrine functions. Explain.	2
1	145.	What is menstrual cycle? What is its significance?	2
1	146.	What is reproductive cycle? What is its significance?	2
1	147.	What are the three different phases of reproductive cycle? Give their significance.	2
1	148.	Give the graphical representation of the hormones of gonads and pituitary during reproductive cycle.	2
1	149.	How are theca and granulose cells involved in the production of ovarian hormones?	2
1	150.	What are exogenous gonadotropins? Give its significance.	2
1	151.	How is corpus leutium formed?	2
1	152.	What are the different phases of endometrial cycle? Give their significance.	2
1	153.	What is LH surge?	2
2	154.	Give the general mechanism of regulation of hormone production and release.	2
2	155.	Give the pictorial representation for hypothalamus-pituitary and different organs axis.	2
2	156.	Give an example for feedback mechanism of hormone production and release.	2
2	157.	How is the production of hormones of gonads regulated?	2
2	158.	How is the production of hormones of adrenal glands regulated?	2
2	159.	How is the production of hormones of pancreas regulated?	2
2	160.	How is the production of hormones of thyroid gland regulated?	2
2	161.	Give the steps involved in progesterone biosynthesis from cholesterol.	2
2	162.	Give the steps involved in testosterone biosynthesis from 17-α-hydroxy pregnenolone.	2
2	163.	Give the steps involved in estrogens biosynthesis from androstenedione.	2
2	164.	Give the steps involved in aldosterone biosynthesis from progesterone.	2
2	165.	Give the steps involved in cortisol biosynthesis from progesterone.	2
3	166.	Which are the different types of cellular signaling?	2
3	167.	Give the general mechanism of peptide hormone action.	2
3	168.	Which are the major classes of peptide hormone receptors?	2
3	169.	What are hydrophilic factors? Give examples.	2

3	170.	What are transmembrane receptors? Give example with its significance.	2
3	171.	What are GPCRs? Give names of the different families of GPCRs.	2
3	172.	What are the prototypical features of GPCRs? Which are the categories of ligands for these receptors?	2
3	173.	Give the general mechanism of GPCR's	2
3	174.	What are the different classes of GPCR's? Give their significance.	2
3	175.	Give the mechanism of Adenylate cyclase cAMP mediated pathway of GPCR's.	2
3	176.	Give the mechanism of Phospholipase mediated pathway of GPCR's.	2
3	177.	What is the mechanism of cholera toxin?	2
3	178.	What is the difference between RTK's and non RTK's? Give two examples of ligands for each.	2
3	179.	What is visual cycle? Which are the cells involved in it? Give their significance.	2
3	180.	What are the rods of photoreceptors meant for? Give its structure.	2
3	181.	What are the cones of photoreceptors meant for? Give its structure.	2
3	182.	What is rhodopsin bleaching?	2
3	183.	What is rhodopsin reformation?	2
3	184.	What is gag reflex? Give its significance.	2
3	185.	How are salty and sour tastes precepted?	2
3	186.	What is gestation? Which are the structures involved in gustatory transduction?	2
3	187.	What is gestation? Which are the different types of tastes?	2
3	188.	How are sweet and bitter tastes precepted?	2
3	189.	What is primary auditory pathway?	2
3	190.	What is non-primary auditory pathway?	2
3	191.	What is sound? What are its characteristic features?	2
3	192.	What is the path of sound?	2
3	193.	What are ion channels? Give its biological importance.	2
3	194.	What are the different types of ion channels? Give example.	2
3	195.	What are voltage gated ion channels? Which are the different types?	2
3	196.	Give the structure of voltage gated ion channel.	2
3	197.	What are cysteine loop receptors?	2
3	198.	What are Ionotropic Glutamate Receptors?	2
3	199.	What are ATP gated channels? Give example.	2
3	200.	What are metabotropic receptors?	2
3	201.	Give the mechanism of potassium channels.	2
3	202.	What are ligand gated ion channels? What are the different types?	2
3	203.	What are ion channel receptors? Give its significance.	2

3	204.	How are electrical signals propagating in ion channel receptors?	2
3	205.	Give the mechanism of sodium channels.	2
4	206.	What are second messengers? Give examples.	2
4	207.	How is IP3 generated? What is its significance?	2
4	208.	How is DAG generated? What is its significance?	2
4	209.	How is cAMP generated? What is its significance?	2
4	210.	How are protein kinases activated? What is its significance?	2
4	211.	Which is the reaction catalyzed by nitric oxide synthase? Give the reaction.	2
4	212.	Which are the different types of NOS? Give their significance.	2
5	213.	What are growth factors? Give examples.	2
5	214.	Write the structure and significance of EGF.	2
5	215.	Write the structure and significance of PDGF.	2
5	216.	Write the structure and significance of insulin receptor.	2
6	217.	Give the general mechanism of action of steroid hormones	2
6	218.	Give the structure of steroid receptors. Add a note on its biological significance.	2
6	219.	How are steroid receptors regulated?	2
6	220.	Which are the different types of estrogen receptors?	2
6	221.	What is receptor down regulation? What is its biological significance?	2
6	222.	What is receptor desensitization? Give its biological significance.	2
6	223.	What is receptor desensitization? What are the different types?	2
6	224.	What is receptor up regulation? Give an example	2
6	225.	What are eicosanoid receptors? Give two examples of its ligands with structure	2
6	226.	What are epiphysis cerebra? What are its functions?	2
6	227.	What is melatonin? What is its biological significance?	2
6	228.	What is circadian rhythm? What is the significant effect of zeitgeber on rhythms?	2
6	229.	Which are the classic phase markers to measure circadian rhythms?	2
7	230.	What are eicosanoids? Which are the different classes? Give one example each.	2
7	231.	What are prostaglandins? Which are the different classes? Give one example each	2
7	232.	What are the characteristic features of prostaglandins?	2
7	233.	What are the functions of prostaglandins?	2
7	234.	What are leukotrienes? Give its biological significance.	2
7	235.	Write the structure of PGE2? Give its biological significance.	2
7	236.	Write the structure of PGD2? Give its biological significance.	2
7	237.	Write the structure of PGF2α? Give its biological significance.	2

7	238.	Write the structure of PGH2? Give its biological significance.	2
7	239.	Write the structure of leukotrieneB4 and Give its biological significance.	2
7	240.	Write the structure of leukotrieneC4 and Give its biological significance .	2
7	241.	Write the structure of leukotrieneD4 and Give its biological significance.	2
7	242.	Write the structure of leukotrieneE4 and Give its biological significance.	2
7	243.	Write the structure of prostacyclin I2 and Give its biological significance.	2
7	244.	Write the structure of thromboxane A2 and B2. Give its biological significance.	2
8	245.	What are the endocrine glands in insects? What do they produce? Give their significance.	2
8	246.	Which are the classes of insect hormones? Give their significance.	2
8	247.	What are brain hormones? Give their biological significance.	2
8	248.	What are neurohormones? Give their biological significance.	2
8	249.	Which are the hormones of corpora cardiaca? Give their biological significance.	2
8	250.	What are the different types of molting hormones? Give their structure and biological significance.	2
8	251.	MH's can be used in pest control. Justify.	2
8	252.	What are the different types of ecdysteroids? Give their structure and biological significance.	2
8	253.	Which are the hormones secreted by corpora allata? Give their biological significance.	2
8	254.	Give the structures of different types of juvenile hormones.	2
8	255.	What is metamorphosis? Give its biological significance.	2
8	256.	What is Vitello genesis? Give its biological significance.	2
8	257.	What is diapause? Give its biological significance.	2
8	258.	What is polymorphism in insects? Give its biological significance.	2
8	259.	Juvenile hormones can be used as insecticides. Justify.	2
8	260.	What is inhibitory or status quo hormone? Give its biological significance.	2
9	261.	What are pheromones? Give their significance.	2
9	262.	What are the different types of pheromones? Give their significance.	2
9	263.	What are the different types of pheromone signaling?	2
9	264.	What are the three different types of communication in insects? Give their significance.	2
9	265.	What are behavioral pheromones? Give their significance.	2

9	266.	What are marker pheromones? Give their significance.	2
9	267.	What is queen mandibular pheromone? Give its significance.	2
9	268.	How does perception of pheromones occur in insects?	2
9	269.	What is Mc clintock effect?	2
9	270.	What is round dance? Explain.	2
9	271.	What is waggle dance? Explain	2
1	1.	List out the endocrine organs along with their secretions and important significances respectively.	5
1	2.	Give a detailed account on location and inter relationship of endocrine glands in humans.	5
1	3.	explain Briefly the biological significance of different types of hormones secreted by hypothalamus.	5
1	4.	Which are the different types of hormones secreted by hypothalamus? Give their biological significance.	5
1	5.	Briefly explain the biological significance of different types of hormones secreted by pituitary gland.	5
1	6.	Which are the different types of hormones secreted by pituitary? Give their biological significance.	5
1	7.	summarize the biological significance of different types of hormones produced by thyroid gland.	5
1	8.	Give a detailed review on the biological significance of different types of hormones produced by thyroid gland.	5
1	9.	Summarize the role of different types of hormones secreted by pancreas.	5
1	10.	Give a comparative analysis of glucagon and insulin in balancing blood glucose levels. Add a note on the effect of somatostatin as well.	5
1	11.	Summarize the biological importance of catecholamines with their structures.	5
1	12.	Summarize the biological importance of zona reticularis with their structures.	5
1	13.	Summarize the biological importance of mineralocorticoids with their structures.	5
1	14.	Summarize the biological importance of glucocorticoids with their structures.	5
1	15.	Give a detailed review on the biological significance of different types of hormones produced by zona fasciculata with their structures.	5
1	16.	Give a detailed review on the biological significance of different types of hormones produced by zona glomerulosa with their structures.	5
1	17.	Summarize the process of production of male and female reproductive cell from gonads.	5
1	18.	Write a review on the biological significance of male sex hormones.	5

		Give their structures.	
1	19.	Write a review on the biological significance of female sex hormones. Give their structures.	5
1	20.	What are secondary sexual characters in males and females? Comment on the effects of hormones on them.	5
1	21.	Comment on the hypo and hypersecretory conditions of pituitary gland.	5
1	22.	Briefly explain the hypersecretory effects of thyroid hormones.	5
1	23.	Briefly explain the hyposecretory effects of thyroid hormones.	5
1	24.	Give a detailed account on diabetes mellitus and its types.	5
1	25.	Write a review on the complications associated with diabetes mellitus.	5
1	26.	Summarize the hyposecretory complications of the hormones of pancreas.	5
1	27.	Summarize the hypersecretory complications of the hormones of pancreas.	5
1	28.	What are the complications associated with hyper and hyposecretions of the hormones of adrenal glands?	5
1	29.	Give a detailed account on the hypo and hypersecretory conditions of gonads.	5
1	30.	What are the effects of hormones on the reproductive cycle and its phases?	5
1	31.	Summarize the phases of menstrual cycle and the effect of hormones on it.	5
2	32.	Write a review on the regulation of hormonal biosynthesis and secretion.	5
2	33.	Give the biosynthesis of steroid hormones.	5
2	34.	How are steroid hormones synthesized from cholesterol?	5
3	35.	Give a detailed account on GPCR's and its mechanism of action.	5
3	36.	Give a review on the ligands and the mechanism of action of RTK's.	5
3	37.	Give a review on the ligands and the mechanism of action of non RTK's.	5
3	38.	Briefly explain the anatomy of photoreceptor cells with their mechanism of action.	5
3	39.	Give a detailed account on visual cycle.	5
3	40.	What is gestation? Give its mechanism.	5
3	41.	What are the different pathways of auditory system? Comment on signal transduction in ear.	5
3	42.	Write a review on ion channels and its types.	5
3	43.	Give a detailed account on the structure and mechanism of voltage gated ion channels.	5
3	44.	Comment on the structure and mechanism of ligand gated channels	5

		and its receptors.	
4	45.	How is nitric oxide produced in our system? Write a note on its mechanism of action.	5
5	46.	Write the structure and Give the mechanism of action of EGF receptors.	5
5	47.	Write the structure and Give the mechanism of action of PDGF receptors.	5
5	48.	Write a summary on the structure and the mechanism of action of insulin receptors.	5
6	49.	Give the molecular structure of steroid receptors? Add a note on its regulation and mechanism.	5
6	50.	Write the structure of estrogen receptors? Write a note on its mechanism of action.	5
6	51.	Give a detailed account on receptor regulation.	5
6	52.	Write a note on eicosanoid receptors. Add a note on its mechanism of action.	5
6	53.	What is the biological significance of pineal gland? Add a note on circadian rhythm and disorders associated with it.	5
7	54.	Give a detailed account on the chemistry of prostaglandins? Write a note on the biological significance of prostaglandins.	5
7	55.	Give a detailed account on the chemistry of leukotrienes? Write a note on their biological significance.	5
8	56.	Write a review on the structure and functions of molting hormones.	5
8	57.	What are juvenile hormones? Give a detailed account on its types and biological significance.	5
9	58.	What are pheromones and its types? Add a note on its Signaling and types of communication.	5
9	59.	Give the biological significance of different types of pheromones in honey bees.	5
9	60.	How are pheromones used in combination with the dancing languages in honey bees?	5

Model Question Paper

Q.P Code: 54104

(4)

St. Philomena's College (Autonomous) Mysore

II Semester M.Sc. - Final Examination : May - 2019

Subject: BIOCHEMISTRY

Title: Hormones and Cell Signaling (SC)

me: 3 Hours **Max Marks: 70**

PART –A

Answer any TEN of the following: **10×2=20**

1. a. Differentiate endocrine and exocrine glands. Give examples.
   b. Mention the hormones produced by Heart and Kidney and write their functions.
   c. Write the functional relationship between hypothalamus and pituitary.
   d. Give the characteristic features of peptide hormones.
   e. Write a note on auditory signal transduction.
   f. Define second messengers. Write the structure of any one.
   g. Write the structure of insulin receptor.
   h. Write a note on pineal gland and its biological significance.
   i. Which hormones regulate calcium levels in blood?
   j. Mention any two hormones which regulate vasodilation.
   k. Give the structure of ecdysone and its function.
   l. How pheromones are useful in controlling pests?

PART –B

Answer any FIVE of the following: **5×10=50**

2. a. Discuss the location and inter-relationship of endocrine glands in human.
   b. Give an account of hypo and hyper secretion of thyroid hormones. **5+5**

3. a. Write short notes on:
      i) Pro – opiomelanocortin
      ii) Hormones of menstrual cycle
   b. Explain feedback mechanism in steroid hormone synthesis. **5+5**

4. a. List the events occurring during GPCR signaling.
   b. Give an account of Ion channel – receptors. **5+5**

PTO

5	a	Write in detail the role of G-protein coupled receptors in signal transduction.	
	b	Give a detailed account on the receptors mechanism of tyrosine kinase receptors	5+5
6	a	Explain the Gustatory pathway.	
	b	Describe the role of nitrous oxide in signaling Pathway.	5+5
7	a	Give the general mechanism of action of steroid hormones.	
	b	Explain receptor down regulation and up regulation with suitable example.	5+5
8		**Write notes on ANY Two of the following :**	
	a.	Insulin receptor	
	b.	Circadian biorhythm.	
	c.	Visual cycle	
	d.	Pheromones.	5+5

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