	<p style="text-align: center;">TANTA UNIVERSITY FACULTY OF PHARMACY DEPARTMENT OF PHARMACEUTICAL CHEMISTRY</p>			
	<p style="text-align: center;">FINAL EXAM FOR THIRD YEAR PHARMACY STUDENTS</p>			
	COURSE TITLE:	Pharmaceutical Chemistry		COURSE CODE: 4111
DATE:	03/06/2021	SECOND SEMESTER	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 120 MINUTES

This exam booklet contains 14 pages and 100 MCQ questions (1.5 marks each). Fill the separate answer sheet using blue pen only for electronic correction machine.

1) Epinephrine is not released from peripheral sympathetic nerve endings. It is synthesized and stored in the adrenal medulla, from which it is released into the circulation

a) True

b) False

2) Isosorbide mononitrate is the only one capable of stimulating the production of coronary collateral circulation and the only one able to prevent experimental myocardial infarction in coronary occlusion

a) True

b) False

3) *Ortho*-nitrophenyl group of nifedipine is essential for calcium channel blocking activity

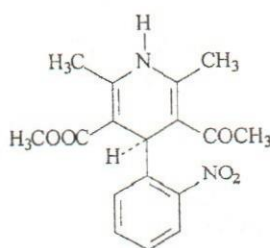
a) True

b) False

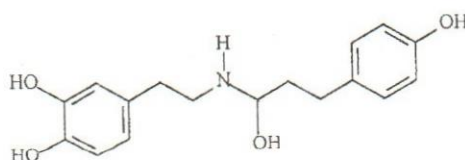
4) The chemical name of verapamil is 5-[(3,5-dimethoxyphenyl)methylamino]-2-(3,5-dimethoxyphenyl)-2-isopropyl valeronitrile hydrochloride

a) True

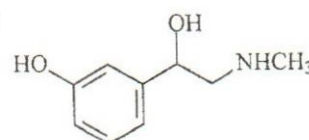
b) False



(I)



(II)



(III)

5) Compound I is

- a) More active than nifedipine
- c) Equal active as nifedipine

- b) Less active than nifedipine
- d) Not active as calcium antagonist

6) Compound I is

a) Chiral molecule

b) Achiral molecule

7) **II** is used as a racemic mixture for treatment of congestive heart failure and hypotension

a) True

b) False

8) Which is **not** true concerning **III**?

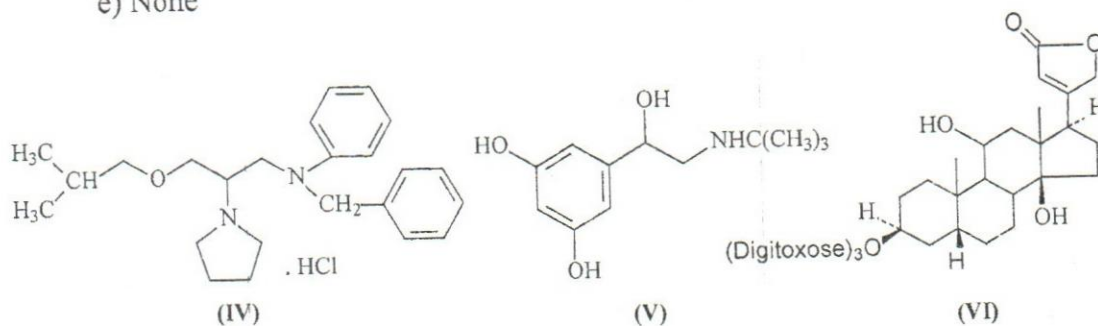
a) It is a selective α_1 -agonist

b) It is an orally active, potent vasoconstrictor

c) It is not metabolized by MAO or COMT

d) It is used in the treatment of severe hypotension

e) None



9) **IV** is Bepridil HCl

a) True

b) False

10) Which is **not** true concerning methacholine?

a) It acts specifically on muscarinic receptors

b) It acts selectively on GIT

c) It is not easily hydrolyzed by cholinesterase enzyme

d) The (*S*) isomer is 240 times more active than the (*R*) one

e) None

11) **V** is

a) Terbutaline

b) Metaproterenol

c) Salbutamol

d) None

12) Which is **not** true concerning indirect-acting sympathomimetics?

a) Clinically used are not catechols

b) β -hydroxyl group reduces effectiveness of indirect effect

c) α -methyl group reduces effectiveness of direct effect

d) Nitrogen substitution reduces indirect effect

e) None

13) **VI** is

a) Digoxin

b) Digitoxin

c) None

14) Both (*R*)- and (*S*)-enantiomers of propafenone exert similar Na⁺ channel-blocking effects, the (*R*)-enantiomer also produces a β-adrenergic blockade because of the correct configuration similar to (-)-(*R*)epinephrine

a) True

b) False

15) Which drug is reserved for use in ventricular arrhythmias that are resistant to other therapies

a) Lidocaine

b) Procainamide

c) Phenytoin

d) Amiodarone

e) Bretylium tosylate

16) α-Methylnorepinephrine acts on α₂-adrenergic receptors to inhibit the release of NE, resulting in a decrease of sympathetic outflow from the central nervous system and an activation of parasympathetic outflow

a) True

b) False

17) Which is **not** true concerning propranolol?

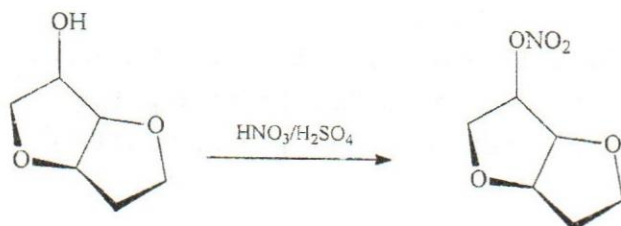
a) It is an aryloxypropanolamine derivative

b) It is the first one used clinically

c) It is a nonselective β-adrenergic antagonist

d) It is used for treatment of angina, hypertension arrhythmia and in prophylaxis of migraine headache

e) None



18) The above equation shows the preparation of isosorbide mononitrate

a) True

b) False

19) The chemical name of diazoxide is 7-Chloro-2-methyl-2*H*-1,2,4-benzothiadiazine 1,1-oxide

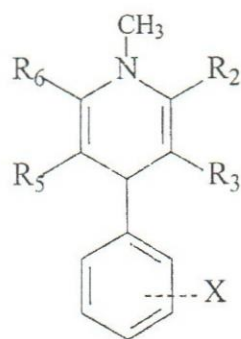
a) True

b) False

20) Timolol is a nonselective β-blocker used for treatment of glaucoma and hypertension

a) True

b) False



(VII)

21) VII is considered as DHP

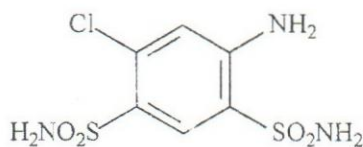
a) True

b) False

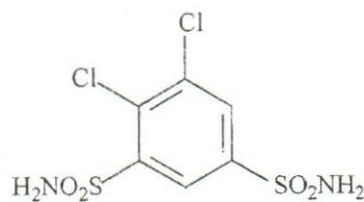
22) 3-Methoxy-4-hydroxymandelic acid is the principal urinary metabolite of NE

a) True

b) False



Chloraminophenamide



Dichlorophenamide

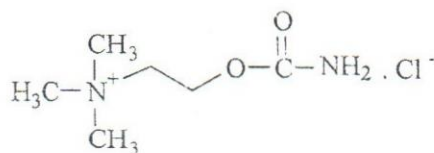
23) Which is **not** true concerning the above structures?

- a) Both chloraminophenamide and dichlorophenamide are active diuretics
- b) Chloraminophenamide is less active than dichlorophenamide as CAI
- c) Dichlorophenamide is more active than chloraminophenamide as CAI
- d) All
- e) None

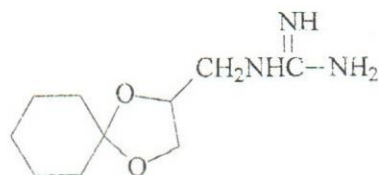
24) Which ACE inhibitor does not have 2-(S)-aminophenylbutyric acid ethyl ester moiety

- a) Lisinopril
- c) Enalapril
- e) None

- b) Fosinopril
- d) Ramipril



(VIII)

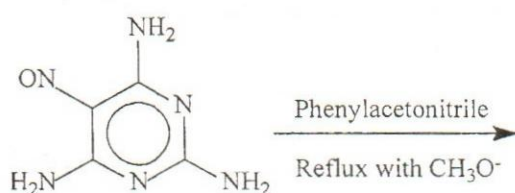


(IX)

25) **VIII** is nonselective muscarinic
 a) Agonist b) Antagonist c) None

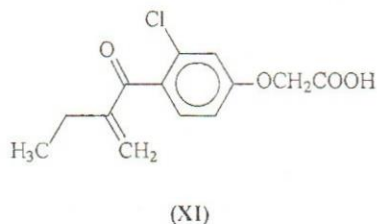
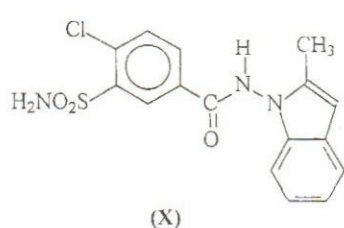
26) **VIII** has longer duration than ACh
 a) True b) False

27) **IX** acts as
 a) α_1 -blocker b) α_2 -blocker
 c) α_1 -agonist d) None



28) The product of the above equation is
 a) 2,4,7-triamino-6-phenylpteridine
 b) 2,5,7-triamino-6-phenylpteridine
 c) 3,4,7-triamino-6-phenylpteridine
 d) 3,5,7-triamino-6-phenylpteridine

29) The chemical name of acetazolamide is *N*-(5-sulfamoyl-1,3,4-thiadiazol-2-yl)acetamide
 a) True b) False



30) **X** is
 a) Indapamide b) Xipamide
 c) Chlorthalidone d) None

31) **XI** is an active diuretic similar to ethacrynic acid
 a) True b) False

32) Hydralazine is usually used with other antihypertensive agent
 a) True b) False

41) Which of the following modifications will **decrease** the activity of benzodiazepines?

- a) The chloride present at position (7)
- b) The presence of (4,5) double bond
- c) The presence of phenyl group at 5th position
- d) The presence ethyl group at 3rd position

42) Which of the following benzodiazepines does not contain a carbonyl group at position 2?

- a) Diazepam
- b) Flurazepam
- c) Chlordiazepoxide
- d) Oxazepam

43) Which of the following is the active form of Clorazepate Dipotassium?

- a) Nordazepam
- b) Lorazepam
- c) Oxazepam
- d) Alprazolam

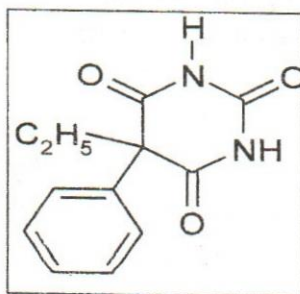
44) Which of the following is non-benzodiazepine hypnotics and has no affinity for the GABA receptor complex?

- a) Flumazenil
- b) Eszopiclone
- c) Ramelteon
- d) None

45) Which of the following is essential for sedative and hypnotic activity of barbiturates?

- a) Alkylation at 1 or 3 position
- b) Two alkyl groups at 5 position
- c) Sulfur atom at 2 position
- d) Hydrogen atom at 5 position

46) Which of the following is correct regarding the barbiturate hereunder?



- a) It has a short duration of action
- b) It has a long duration of action
- c) It has an intermediate duration of action
- d) It is inactive

47) Which of the following is a barbiturate with a short duration of action?

- a) Thiopental sodium
- b) Cyclobarbitone
- c) Pentobarbital-Sodium
- d) Mephobarbital

48) Which of the following drugs has the chemical name: 3-ethyl-3-phenylpiperidine-2,6-dione?

- a) Glutethimide
- b) Meprobamate
- c) Methaqualone
- d) Zaleplon

49) Which of the following inhalation anesthetics have chloride, bromide and fluoride atoms?

- a) Chloral hydrate
- b) Nitrous oxide
- c) Methoxyflurane
- d) Halothane

50) Which of the following drugs is an arylcyclohexylamine intravenous anesthetic?

- a) Thiамylal sodium
- b) Thiopental sodium
- c) Ketamine HCl
- d) Midazolam

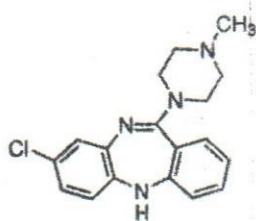
51) Potency of phenothiazines is maximum when there are (5) carbons between two 'N' atoms?

- a) True
- b) false

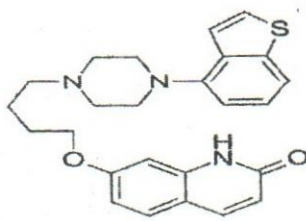
52) Which of the following modifications will **increase** the activity of phenothiazines?

- a) Introduction of methyl group at C-1 of alkyl side chain.
- b) Oxidation of sulphur at fifth position.
- c) Replacement of dimethylamino group by morpholine.
- d) Introduction of oxygen into C-1 of alkyl side chain.

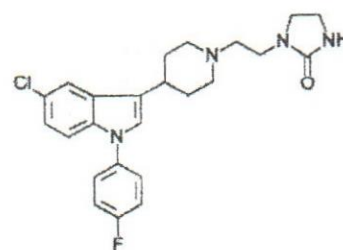
53) Which of the following drugs is atypical antipsychotic agent with partial agonist on specific dopamine and serotonin receptors while antagonizing other serotonin receptors?



a)



b)

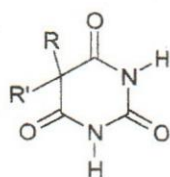


c)

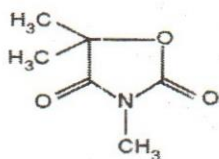
54) Which of the following is the mechanism of anticonvulsant activity of phenisuximide?

- a) Blocking sodium channels.
- b) Inhibiting gamma amino butyric acid transaminase enzyme.
- c) Blocking T-type calcium channels.
- d) GABA agonist.

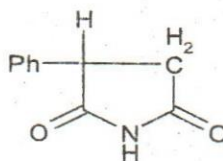
55) Which of the following drugs belongs to oxazolidinone anticonvulsants?



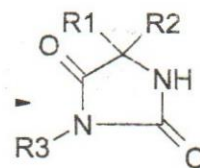
a)



b)



c)



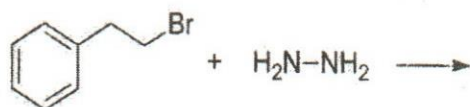
d)

56) Lamotrigine, a 1,2,4-triazine derivative, is potent and long acting anticonvulsant, used as an add-on therapy for treatment of generalized seizures and acts as sodium channel blocker.

a) True

b) False

57) Which of the following antidepressant drugs is the product of the reaction hereunder?



a) Phenelzine

b) Meclobemide

c) Selegiline

d) Tranylcypromine

58) Which of the following groups is not essential for activity of tricyclic antidepressant?

a) A protonable nitrogen

b) Two aromatic rings

c) The C10-C11 bridge

d) Approximately a 3-carbon distance between the protonable nitrogen and aromatic ring

59) Which of the following antidepressant drugs is selective serotonin reuptake inhibitor and has anxiolytic activity?

a) Maprotiline Hydrochloride

b) Fluoxetine

c) Nisoxetine

d) Venlafaxine

60) COX-2 is responsible for the production of prostaglandins at the inflammation site?

a) True

b) False

61) Which of the following modifications could abolish activity of salicylates as anti-inflammatory drug?

a) Salt of salicylic acid with choline or magnesium.

b) Introduction of (F) at 5 position.

c) The presence of phenolic hydroxyl group at ortho position to the carboxyl group.

d) Placement of the phenolic hydroxyl group at meta or para to the carboxyl group.

62) Which of the following is essential for the activity of the 3,5-pyrazolidinedione?

- a) Replacement of one of the nitrogen atom in the pyrazolidinediones with an oxygen atom.
- b) The dicarbonyl function at the 3rd and 5th positions.
- c) m-Substitution of aryl rings with a methyl or chloride.
- d) 4, 4-dialkyl derivatives.

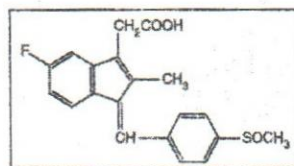
63) Which of the following drugs is an anthranilic acid derivative?

- a) Flufenamic Acid
- b) Phenylbutazone
- c) Paracetamol
- d) Phenacetin

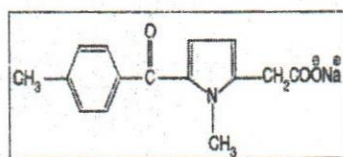
64. The presence of indole ring nitrogen is essential for activity of indole acetic acid derivatives.

- a) True
- b) false

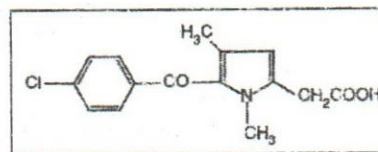
65. Which of the following is zomepirac?



a)



b)



c)

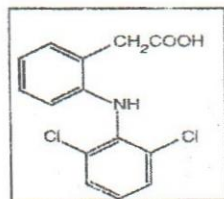
66) Which of the following is the most active isomer of ibuprofen?

- a) The (S)-(-) isomer
- b) the (S)-(+) isomer
- c) The (R)-(+) isomer
- d) the (R)-(-) isomer

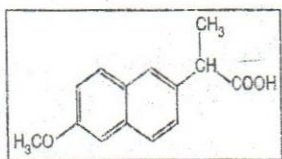
67) Which of the following drugs is a cyclized heteroarylpropionic acid derivative with the alpha methyl group being fused to the pyrrole ring and is accepted as alternative to narcotic analgesics?

- a) Diclofenac
- b) Naproxen
- c) Ketoprofen
- d) Ketorolac

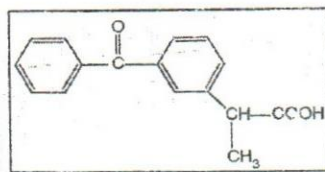
68) Which of the following drugs possesses structural characteristic of both arylalkanoic acid and the anthranilic acid classes?



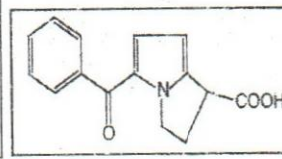
a)



b)



c)



d)

69) The introduction of heterocyclic ring in the amide chain significantly increases the anti-inflammatory activity of oxicams.

a) True

b) false

70) Which of the following drugs is a prodrug, second-generation COX-2 inhibitor developed for injectable use and is rapidly converted by hepatic enzymes to the active form?

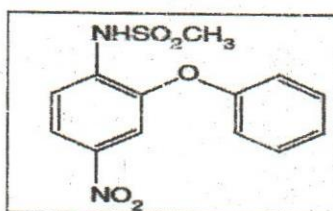
a) Valdecoxib

b) Celecoxib

c) Parecoxib

d) Nimesulide

71) Which of the following is correct regarding the drug hereunder?



a) It contains a sulphonamide moiety as basic group.

b) It exhibits significant selectivity towards COX-1.

c) It is a prodrug.

d) It is nimesulide

72) Which of the following classes contain the endorphins?

a) Natural opiates

b) Semi-synthetic opiates

c) Endogenous opioid peptides

d) Fully- synthetic opioids

73) Which of the following is essential for activity of morphine?

a) Alcoholic OH

b) The phenolic OH

c) Double bond between C7 & C8

d) The ether bridge

74) Which of the following makes morphinans more potent agonists and antagonists?

a) Removal of ring D

b) The phenolic OH

c) The introduction of a hydroxyl group at position 14

d) Removal of ring E

75) Which of the following opiates does not have rings C and D?

a) Heroine

b) Nalorphine

c) Oxymorphone

d) Benzomorphans

76) Which of the following is true about structure of methadone?

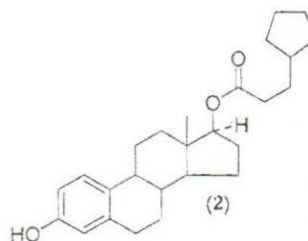
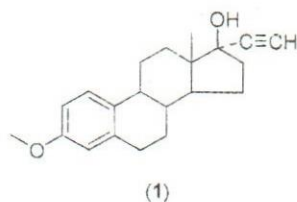
a) Does not have rings B, C and D

b) Does not have rings B, C and E

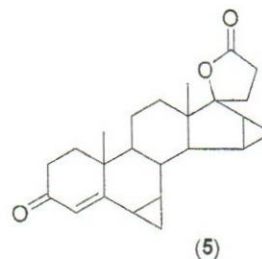
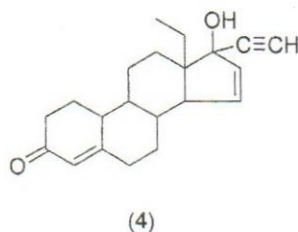
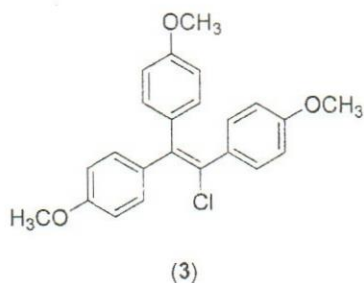
c) Does not have rings B and D

d) Does not have rings B, D and E

- 77) Estrogens reduce bone resorption and increase bone formation
 a) True b) False
- 78) Males also possess estrogen receptors and estrogen to some extent and levels in the male blood are higher than post-menopausal women.
 a) True b) False
- 79) To prevent oxidation of hydroxyl group at C17 in estradiol to be taken orally, we should:
 a) Replace the hydrogen atom with ethinyl (alkyne) group.
 b) Convert the cyclopentyl ring to phenyl ring.
 c) Block OH by esterification.
 d) All of the above.



- 80) Compound 1 is
 a) Mestranol b) Quinestrol
 c) Estradiol 3-benzoate d) Estradiol Cypionate
- 81) Compound 2 is
 a) Mestranol b) Quinestrol
 c) Estradiol 3-benzoate d) Estradiol Cypionate
- 82) To improve oral absorption of Ethinyl Estradiol, make
 a) Etherification at OH group at position 3
 b) Esterification at OH group at position 3
 c) Oxidation CH group at position 3
 d) Alkylation at OH group at position 3
- 83) To slower rate of estradiol release for depot IM preparation, make the esterification at OH group at position 3 or 17.
 a) True b) False
- 84) Letrozole inhibits the conversion of estradiol to androstenedione and testosterone
 a) True b) False
- 85) Clomiphene can be synthesized from acetophenone derivative
 a) True b) False



- 86) Compound 3 acts as
- Antiestrogenic agent
 - Non-steroidal Estrogenic agent
 - Progesterone antagonist
 - Aromatase Inhibitors
- 87) Compound 4 is
- Mestranol
 - Quinestrol
 - Estradiol 3-benzoate
 - Gestodene
- 88) Compound 5 is
- Mestranol
 - Quinestrol
 - Drospirenone
 - Gestodene
- 89) Tamoxifen acts as antiestrogenic agent by:
- Block Estrogen receptor
 - Inhibit Aromatase enzyme
 - Block Progesterone receptor
 - Kills sperm or stops it from moving
- 90) Physiological function(s) of progesterone is (are)
- increase thickness of endometrium of uterus.
 - desensitization of uterus to oxytocin
 - decrease the sperm motility
 - all of the above
- 91) Norethistrone can be characterized by
- Has moderate to high potency and has androgenic action
 - It is progesterone derivatives
 - Has high potency with anti-mineralocorticoid action
 - It is Spironolactone derivatives
- 92) If progesterone is taken orally, it is metabolized by reduction to inactive metabolite that is called:
- Dydrogestrone
 - Prognanediol
 - Medroxy-progesterone
 - Norgestimate
- 93) Medroxy-progesterone can be taken orally by:
- Remove two hydrogen atoms at C6 & C7 of progesterone

- b) Add methyl gp at C6 and ester gp at C17 of progesterone
- c) Add methoxy gp at C6 and ester gp at C17 of progesterone
- d) Replace hydrogen atoms at C6 & C7 of progesterone with halogens

94) Mifepristone:

- a) Used as abortifacient
- b) Decrease endometrium thickness of uterus and increase the uterus motility.
- c) Block progesterone receptor
- d) All of the above

95) Progestin component of the Yasmin® is

- a) Drospirenone
- b) Levonorgestrol
- c) Dydrogestrone
- d) Lynestrenol

96) Nonoxynol-9 act as:

- a) Male hormonal contraceptive
- b) Spermicides
- c) Mono-phasic oral contraceptive pills
- d) Bi-phasic oral contraceptive pills

97) Monophasic oral contraceptive pills contain a constant amount of estrogen and progestin in each active pill throughout entire cycle.

- a) True
- b) False

98) The substitution of position 16 with hydroxyl group of estradiol lead to remarkable decrease in activity as in

- a) Estriol
- b) Estrone
- c) Ethinyl Estradiol
- d) Estradiol 3-benzoate

99) Dydrogestrone can be characterized by

- a) Has moderate to high potency and has androgenic action
- b) It is progesterone derivatives
- c) Has high potency with anti-mineralocorticoid action
- d) It is Spironolactone derivatives

100) Phenolic moiety at ring A in estradiol is an important in activity.

- a) True
- b) False