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PHYSIOLOGY




# PHYSIOLOGY

## Solved Question Papers

Seventh Edition

Singi Yatiraj

*Foreword*
B Mallikarjun

# Contents


1. MBBS Phase I Examination – October 2005 (Revised Scheme 2) Paper I ..... 1
   MBBS Phase I Examination – October 2005 (Revised Scheme 2) Paper II ..... 15
2. MBBS Phase I Examination – April 2006 (Revised Scheme 2) Paper I ..... 23
   MBBS Phase I Examination – April 2006 (Revised Scheme 2) Paper II ..... 40
3. MBBS Phase I Examination – October 2006 (Revised Scheme 2) Paper I ..... 51
   MBBS Phase I Examination – October 2006 (Revised Scheme 2) Paper II ..... 64
4. MBBS Phase I Examination – April 2007 (Revised Scheme 2) Paper I ..... 72
   MBBS Phase I Examination – April 2007 (Revised Scheme 2) Paper II ..... 84
5. MBBS Phase I Examination – October 2007 (Revised Scheme 2) Paper I ..... 90
   MBBS Phase I Examination – October 2007 (Revised Scheme 2) Paper II ..... 95
6. MBBS Phase I Examination – April 2008 (Revised Scheme 2) Paper I ..... 99
   MBBS Phase I Examination – April 2008 (Revised Scheme 2) Paper II ..... 110
7. MBBS Phase I Examination – October 2008 (Revised Scheme 2) Paper I ..... 116
   MBBS Phase I Examination – October 2008 (Revised Scheme 2) Paper II ..... 133
8. MBBS Phase I Examination – April 2009 (Revised Scheme 2) Paper I ..... 148
   MBBS Phase I Examination – April 2009 (Revised Scheme 2) Paper II ..... 159
9. MBBS Phase I Examination – October 2009 (Revised Scheme 2) Paper I ..... 171
   MBBS Phase I Examination – October 2009 (Revised Scheme 2) Paper II ..... 186
10. MBBS Phase I Examination – April 2010 (Revised Scheme 2) Paper I ..... 199
    MBBS Phase I Examination – April 2010 (Revised Scheme 2) Paper II ..... 208
11. MBBS Phase I Examination – October 2010 (Revised Scheme 2) Paper I ..... 218
    MBBS Phase I Examination – October 2010 (Revised Scheme 2) Paper II ..... 232
12. MBBS Phase I Examination – April 2011 (Revised Scheme 2) Paper I ..... 248
    MBBS Phase I Examination – April 2011 (Revised Scheme 2) Paper II ..... 253
13. MBBS Phase I Examination – October 2011 (Revised Scheme 2 & 3) Paper I ..... 268
    MBBS Phase I Examination – October 2011 (Revised Scheme 2 & 3) Paper II ..... 276
14. MBBS Phase I Examination – April 2012 (Revised Scheme 2 & 3) Paper I ..... 283
    MBBS Phase I Examination – April 2012 (Revised Scheme 2 & 3) Paper II ..... 295
15. MBBS Phase I Examination – October 2012 (Revised Scheme 2 & 3) Paper I ..... 306
    MBBS Phase I Examination – October 2012 (Revised Scheme 2 & 3) Paper II ..... 317
16. MBBS Phase I Examination – April 2013 (Revised Scheme 2 & 3) Paper I ..... 319
    MBBS Phase I Examination – April 2013 (Revised Scheme 2 & 3) Paper II ..... 328
17. MBBS Phase I Examination – October 2013 (Revised Scheme 2 & 3) Paper I ..... 340
    MBBS Phase I Examination – October 2013 (Revised Scheme 2 & 3) Paper II ..... 360
18. MBBS Phase I Examination – April 2014 (Revised Scheme 2 & 3) Paper I ..... 362
    MBBS Phase I Examination – April 2014 (Revised Scheme 2 & 3) Paper II ..... 368
19. MBBS Phase I Examination – October 2014 (Revised Scheme 2 & 3) Paper I ..... 381
    MBBS Phase I Examination – October 2014 (Revised Scheme 2 & 3) Paper II ..... 385
20. MBBS Phase I Examination – October 1998 (Revised Scheme) Paper I ..... 396
    MBBS Phase I Examination – October 1998 (Revised Scheme) Paper II ..... 400

21. MBBS Phase I Examination – April 1999 (Revised Scheme) Paper I ..... 406
MBBS Phase I Examination – April 1999 (Revised Scheme) Paper II ..... 409
22. MBBS Phase I Examination – October 1999 (Revised Scheme) Paper I ..... 418
MBBS Phase I Examination – October 1999 (Revised Scheme) Paper II ..... 426
23. MBBS Phase I Examination – April 2000 (Revised Scheme) Paper I ..... 436
MBBS Phase I Examination – April 2000 (Revised Scheme) Paper II ..... 445
24. MBBS Phase I Examination – October 2000 (Revised Scheme) Paper I ..... 449
MBBS Phase I Examination – October 2000 (Revised Scheme) Paper II ..... 460
25. MBBS Phase I Examination – April 2001 (Revised Scheme) Paper I ..... 465
MBBS Phase I Examination – April 2001 (Revised Scheme) Paper II ..... 469
26. MBBS Phase I Examination – October 2001 (Revised Scheme) Paper I ..... 475
MBBS Phase I Examination – October 2001 (Revised Scheme) Paper II ..... 484
27. MBBS Phase I Examination – April 2002 (Revised Scheme) Paper I ..... 488
MBBS Phase I Examination – April 2002 (Revised Scheme) Paper II ..... 491
28. MBBS Phase I Examination – October 2002 (Revised Scheme) Paper I ..... 496
MBBS Phase I Examination – October 2002 (Revised Scheme) Paper II ..... 499
29. MBBS Phase I Examination – April 2003 (Revised Scheme) Paper I ..... 502
MBBS Phase I Examination – April 2003 (Revised Scheme) Paper II ..... 506
30. MBBS Phase I Examination – October 2003 (Revised Scheme) Paper I ..... 514
MBBS Phase I Examination – October 2003 (Revised Scheme) Paper II ..... 519
31. MBBS Phase I Examination – April 2004 (Revised Scheme) Paper I ..... 525
MBBS Phase I Examination – April 2004 (Revised Scheme) Paper II ..... 535
32. MBBS Phase I Examination – October 2004 (Revised Scheme) Paper I ..... 542
MBBS Phase I Examination – October 2004 (Revised Scheme) Paper II ..... 549
33. MBBS Phase I Examination – April 2005 (Revised Scheme) Paper I ..... 552
MBBS Phase I Examination – April 2005 (Revised Scheme) Paper II ..... 554
34. MBBS Phase I Examination – October 2005 (Revised Scheme) Paper I ..... 556
MBBS Phase I Examination – October 2005 (Revised Scheme) Paper II ..... 561
35. MBBS Phase I Examination – April 2006 (Revised Scheme) Paper I ..... 566
MBBS Phase I Examination – April 2006 (Revised Scheme) Paper II ..... 573
36. MBBS Phase I Examination – October 2006 (Revised Scheme) Paper I ..... 581
MBBS Phase I Examination – October 2006 (Revised Scheme) Paper II ..... 589
37. MBBS Phase I Examination – April 2007 (Revised Scheme) Paper I ..... 599
MBBS Phase I Examination – April 2007 (Revised Scheme) Paper II ..... 604
38. MBBS Phase I Examination – October 2007 (Revised Scheme) Paper I ..... 609
MBBS Phase I Examination – October 2007 (Revised Scheme) Paper II ..... 613
39. MBBS Phase I Examination – April 2008 (Revised Scheme) Paper I ..... 620
MBBS Phase I Examination – April 2008 (Revised Scheme) Paper II ..... 628
40. MBBS Phase I Examination – October (Revised Scheme) 2008 Paper I ..... 641
MBBS Phase I Examination – October (Revised Scheme) 2008 Paper II ..... 645
41. MBBS Phase I Examination – April 2009 (Revised Scheme) Paper I ..... 650
MBBS Phase I Examination – April 2009 (Revised Scheme) Paper II ..... 660
42. MBBS Phase I Examination – October 2009 (Revised Scheme) Paper I ..... 668
MBBS Phase I Examination – October 2009 (Revised Scheme) Paper II ..... 676

43. MBBS Phase I Examination – April 2010 (Revised Scheme) Paper I ..... 683
MBBS Phase I Examination – April 2010 (Revised Scheme) Paper II ..... 697
44. MBBS Phase I Examination – October 2010 (Revised Scheme) Paper I ..... 706
MBBS Phase I Examination – October 2010 (Revised Scheme) Paper II ..... 712
45. MBBS Phase I Examination – April 2011 (Revised Scheme) Paper I ..... 718
MBBS Phase I Examination – April 2011 (Revised Scheme) Paper II ..... 726
46. MBBS Phase I Examination – October 2011 (Revised Scheme) Paper I ..... 730
MBBS Phase I Examination – October 2011 (Revised Scheme) Paper II ..... 737
47. MBBS Phase I Examination – April 2012 (Revised Scheme) Paper I ..... 748
MBBS Phase I Examination – April 2012 (Revised Scheme) Paper II ..... 754
48. MBBS Phase I Examination – October 2012 (Revised Scheme) Paper I ..... 766
MBBS Phase I Examination – October 2012 (Revised Scheme) Paper II ..... 779
49. MBBS Phase I Examination – April 2013 (Revised Scheme) Paper I ..... 788
MBBS Phase I Examination – April 2013 (Revised Scheme) Paper II ..... 796
50. MBBS Phase I Examination – October 2013 (Revised Scheme) Paper I ..... 805
MBBS Phase I Examination – October 2013 (Revised Scheme) Paper II ..... 817
51. MBBS Phase I Examination – April 2014 (Revised Scheme) Paper I ..... 828
MBBS Phase I Examination – April 2014 (Revised Scheme) Paper II ..... 833
52. MBBS Phase I Examination – October 2014 (Revised Scheme) Paper I ..... 836
MBBS Phase I Examination – October 2014 (Revised Scheme) Paper II ..... 839
53. MBBS Phase I Examination – October 1998 (Old Scheme) Paper I ..... 841
MBBS Phase I Examination – October 1998 (Old Scheme) Paper II ..... 845
54. MBBS Phase I Examination – April 1999 (Old Scheme) Paper I ..... 849
MBBS Phase I Examination – April 1999 (Old Scheme) Paper II ..... 854
55. MBBS Phase I Examination – October 1999 (Old Scheme) Paper I ..... 859
MBBS Phase I Examination – October 1999 (Old Scheme) Paper II ..... 865
56. MBBS Phase I Examination – April 2000 (Old Scheme) Paper I ..... 871
MBBS Phase I Examination – April 2000 (Old Scheme) Paper II ..... 876
57. MBBS Phase I Examination – October 2000 (Old Scheme) Paper I ..... 880
MBBS Phase I Examination – October 2000 (Old Scheme) Paper II ..... 882
58. MBBS Phase I Examination – April 2001 (Old Scheme) Paper I ..... 884
MBBS Phase I Examination – April 2001 (Old Scheme) Paper II ..... 886
59. MBBS Phase I Examination – October 2001 (Old Scheme) Paper I ..... 889
MBBS Phase I Examination – October 2001 (Old Scheme) Paper II ..... 900
60. MBBS Phase I Examination – April 2002 (Old Scheme) Paper I ..... 906
MBBS Phase I Examination – April 2002 (Old Scheme) Paper II ..... 911
61. MBBS Phase I Examination – April 2004 (Old Scheme) Paper I ..... 913
MBBS Phase I Examination – April 2004 (Old Scheme) Paper II ..... 917
62. MBBS Phase I Examination – October 2004 (Old Scheme) Paper I ..... 921
MBBS Phase I Examination – October 2004 (Old Scheme) Paper II ..... 923
63. MBBS Phase I Examination – October 2005 (Old Scheme) Paper I ..... 925
MBBS Phase I Examination – October 2005 (Old Scheme) Paper II ..... 929
64. MBBS Phase I Examination – April 2006 (Old Scheme) Paper I ..... 933
MBBS Phase I Examination – April 2006 (Old Scheme) Paper II ..... 935

**65. MBBS Phase I Examination – October 2006 (Old Scheme) Paper I ..... 937**
**MBBS Phase I Examination – October 2006 (Old Scheme) Paper II ..... 943**
**66. MBBS Phase I Examination – April 2007 (Old Scheme) Paper I ..... 946**
**MBBS Phase I Examination – April 2007 (Old Scheme) Paper II ..... 952**
**67. MBBS Phase I Examination – October 2007 (Old Scheme) Paper I ..... 955**
**MBBS Phase I Examination – October 2007 (Old Scheme) Paper II ..... 959**
**68. MBBS Phase I Examination – April 2008 (Old Scheme) Paper I ..... 961**
**MBBS Phase I Examination – April 2008 (Old Scheme) Paper II ..... 963**
**69. MBBS Phase I Examination – October 2008 (Old Scheme) Paper I ..... 965**
**MBBS Phase I Examination – October 2008 (Old Scheme) Paper II ..... 967**
**70. MBBS Phase I Examination – April 2009 (Old Scheme) Paper I ..... 976**
**MBBS Phase I Examination – April 2009 (Old Scheme) Paper II ..... 978**
**71. MBBS Phase I Examination – October 2009 (Old Scheme) Paper I ..... 982**
**MBBS Phase I Examination – October 2009 (Old Scheme) Paper II ..... 986**
**72. MBBS Phase I Examination – April 2010 (Old Scheme) Paper I ..... 989**
**MBBS Phase I Examination – April 2010 (Old Scheme) Paper II ..... 997**
**73. MBBS Phase I Examination – October 2010 (Old Scheme) Paper I ..... 1002**
**MBBS Phase I Examination – October 2010 (Old Scheme) Paper II ..... 1007**
**74. MBBS Phase I Examination – April 2011 (Old Scheme) Paper I ..... 1014**
**MBBS Phase I Examination – April 2011 (Old Scheme) Paper II ..... 1022**
**75. MBBS Phase I Examination – October 2011 (Old Scheme) Paper I ..... 1024**
**MBBS Phase I Examination – October 2011 (Old Scheme) Paper II ..... 1027**
**76. MBBS Phase I Examination – April 2012 (Old Scheme) Paper I ..... 1032**
**MBBS Phase I Examination – April 2012 (Old Scheme) Paper II ..... 1038**
**77. MBBS Phase I Examination – October 2012 (Old Scheme) Paper I ..... 1041**
**MBBS Phase I Examination – October 2012 (Old Scheme) Paper II ..... 1048**
**78. MBBS Phase I Examination – April 2013 (Old Scheme) Paper I ..... 1050**
**MBBS Phase I Examination – April 2013 (Old Scheme) Paper II ..... 1053**
**79. MBBS Phase I Examination - October 2013 (Old Scheme) Paper I ..... 1057**
**MBBS Phase I Examination - October 2013 (Old Scheme) Paper II ..... 1060**

*Index ..... 1065*

# MBBS PHASE I EXAMINATION

## OCTOBER 2013

## (Old Scheme)

## PAPER II

### LONG ESSAYS

1. **Describe the synthesis and functions of thyroxine.**
   Refer Question No. 1 April 2011 (RS2) Paper II.

2. **Draw neat diagram of muscle spindle and explain its role in maintaining muscle tone.**
   Refer Question No. 10 Oct. 2010 (RS2) Paper II.

### SHORT ESSAYS

3. **Describe actions of estrogen.**
   Refer Question No. 12 Oct. 2001 (OS) Paper I.

4. **Name the primary taste sensations and trace the taste pathway.**

**For primary taste sensations**

Refer Question No. 12 April 2002 Paper II.

**For taste pathway**

Refer Question No. 9 April 2012 (RS2) Paper II.

5. **What are the compensatory changes initiated in response to cold.**
   Refer Question No. 12 Oct. 2011 Paper II.

6. **Phototransduction.**
   Refer Question No. 11 April 2009 Paper II.

7. **Pathway of internal analgesic system.**
   Refer Question No. 2 April 1999 Paper II.

8. **Physiological changes in mother during pregnancy.**
   Refer Question No. 5 April 2009 Paper II.

9. **Mention four features of Cushing's syndrome and actions of glucocorticoid responsible for the same.**
   Refer Question No. 2 April 2010 (RS2) Paper II.

10. **Describe briefly important connections and functions of neocerebellum.**
    Refer Question No. 1 Oct. 1999 Paper II.

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## 11. Plantar reflex and its clinical significance.

- Plantar reflex is a superficial cutaneous reflex
- It is a flexor (withdrawal) response.

### Efferents

- Tibial nerve ($L_4$-$L_5$).

### Spinal Centers

- $L_5$-$S_2$.

### Afferents

- Tibial nerve ($L_5$-$S_2$).

### Procedure

- Plantar reflex is elicited by gently stroking gently outer edge of the sole of the foot with a firm tactile stimulus from heel towards the little toe and medially across the metatarsus.

### Observation

- Observation for movement of toes.

### Interpretation

- It is never completely absent in healthy individuals
- Normal response – Downward movement (plantar flexion) of great toe and adduction of others toes (due to contraction of flexor hallucis longus)
- Babinski sign – First an upward movement (dorsiflexion) of great toe and fanning out (abduction) of small toes (due to contraction of extensor hallucis longus).

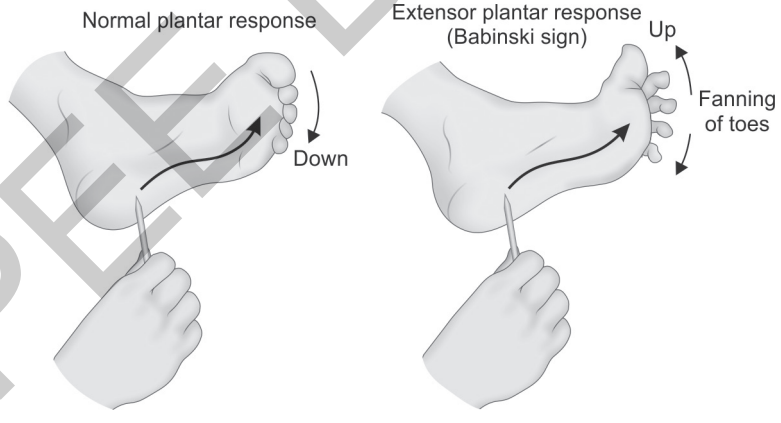


**Fig. 1:** Plantar reflex

### Significance

- Plantar reflex is associated with pyramidal tract and develops along with development of pyramidal tract thus its presence indicates meylinated pyramidal tracts (thus it is negative in infants as pyramidal tracts not meylinated till child starts walking)
- Plantar reflex is used to differentiate between lower and upper motor neuron lesions (Babinski's positive in upper motor neuron lesions)
- Once Babinski sign becomes positive, it remains positive for rest of life thereafter.



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**12. Explain how hypothalamus controls secretion of pituitary gland.**

Refer Question No. 1 April 2013 (RS2) Paper II.

## SHORT ANSWERS

**13. Purkinje Samson images.**

Refer Question No. 26 Oct. 2000 Paper II.

**14. Two functions of frontal lobe.**

- Frontal lobe is the part of cerebral cortex anterior to central sulcus and medial to sylvian fissure
- It forms 1/3rd of cortical surface

**Divisions and functions**

| Division | Functions |
|---|---|
| a. Precentral region | ♦ Controls both skilled and postural movements (area 4 and 6) |
| b. Transitional region | ♦ Control motor activities of speech apparatus (area 44)<br>♦ Controls eye movements (area 8) |
| c. Prefrontal association cortex | ♦ Provides neocortical connections to basal forebrain structures |

### Significance

- Lesions of frontal lobe results in
  - Hypertonia at rest
  - Inability to perform a delayed response task and perseveration
  - Lack of initiative and inability to assess personal performance.

**15. Explain with example permissive actions of hormones.**

Refer Question No. 17 Oct. 2000 Paper II.

**16. Retrograde amnesia.**

- Amnesia is impairment or loss of memory.

### Retrograde Amnesia

- Retrograde amnesia is a type of amnesia
- It is the loss of memory for events just preceding the cause of amnesia.

### Causes

- Head injury—commonly seen in patients who develop concussion
- Korsakoff syndrome
- Electroshock therapy
- Temporal lobe syndrome
- Infections—encephalitis.

### Features

- Often temporally graded, consistent with Ribot's law, i.e. subjects are more likely to lose recent memories that are closer to the traumatic incident than more remote memories
- Usually only short term memory is lost
- Remote memory is not affected
- May persist for few hours to even years.

Old Scheme

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**17. What is visual acuity? How is normal visual acuity expressed?**

Refer Question No. 2 April 1999 (OS) Paper II.

**18. Name any four hyperglycemic hormones.**

Refer Question No. 4 Oct. 2001 Paper II.

**19. What is meant by proprioceptive sensation? What type of receptor mediate it?**

- Proprioceptive sensation is afferent input arising from stimulation of muscle, tendon and joint mechanoreceptors that inform about movements of joints and body parts in space
- It is sensation of location and movements of body parts.

**Receptors**

- Proprioceptors are receptors for proprioception.

*Examples*

| *Proprioceptors* | *Location* |
|---|---|
| a. Muscle spindle | ♦ Skeletal muscle |
| b. Golgi tendon organ | ♦ Tendons |
| c. Pacinian corpuscles | ♦ Skin<br>♦ Fascia overlying muscle<br>♦ Tendons<br>♦ Tissue surrounding joint<br>♦ Joint capsule and synovium |
| d. Slowly adapting spray endings | ♦ Skin<br>♦ Skeletal muscle and their tendons<br>♦ Fascia overlying muscle<br>♦ Joints |
| e. Vestibular receptors | ♦ Labyrinth |

**20. Name hormones of placenta.**

Refer Question No. 5 April 2002 Paper II.

**21. Milk ejection reflex.**

Refer Question No. 7 Oct. 2001 Paper II.

**22. Name receptors to detect gravitational force and rotational movements.**

| *Sensation* | *Receptors* |
|---|---|
| ♦ Gravitational force | Hair cells of otolith organ |
| ♦ Rotational force | Hair cells of semicircular canals |



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- **Revised Course Contents** as per the university are also included
- More **emphasis on the revised scheme 3**, keeping in mind the present pattern
- All the questions are answered to reduce the workload on the student
- Also included are **pathways, reactions, flow charts, figures and graphs** that are essential and sufficient for the question
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