MANIPAL
ACADEMY *of* HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

DEPARTMENT OF SCIENCES, M. Sc. (Physics)
IV SEMESTER, END SEMESTER EXAMINATIONS
JULY 2020
Subject: GENERAL RELATIVITY AND COSMOLOGY
(PHY-5204)
(REVISED CREDIT SYSTEM - 2017)

Time: **2 Hours**   **Date**: **JULY 2020**   **MAX. MARKS**: **25**

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Note: **(i) Answer all the questions.**
          (ii) Answer the questions to the point.

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1. (i) What is time dilation?   [2]
(ii) Find the Christoffel's symbols corresponding to
$ds^2 = a^2 d\theta^2 + a^2 sin^2\theta d\phi^2$.   **[3]**

2. (i) What are gravitational waves?   [3]
(ii) What is Schwarzschild radius?   [2]

3. How does the phenomenon of the gravitational redshift confirms the general theory of relativity.   [5]

4. (i) How many types of black holes are there? How are they different?   [3]
(ii) What do you mean by an ergosphere?   [2]

5. Discuss about the cosmological redshift as observable parameter in Robertson - Walker models.   [5]

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